

EVMS Training Snippet Library: High-level EVM Expectations



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

- **EVM Concepts and Objectives**
- **Scheduling and Budgeting**
- **Work Authorization**
- **Level of Effort Concerns**
- **Variance Analysis and Reporting**
- **Estimate at Completion**
- **Baseline Control and Revisions**
- **Synopsis**

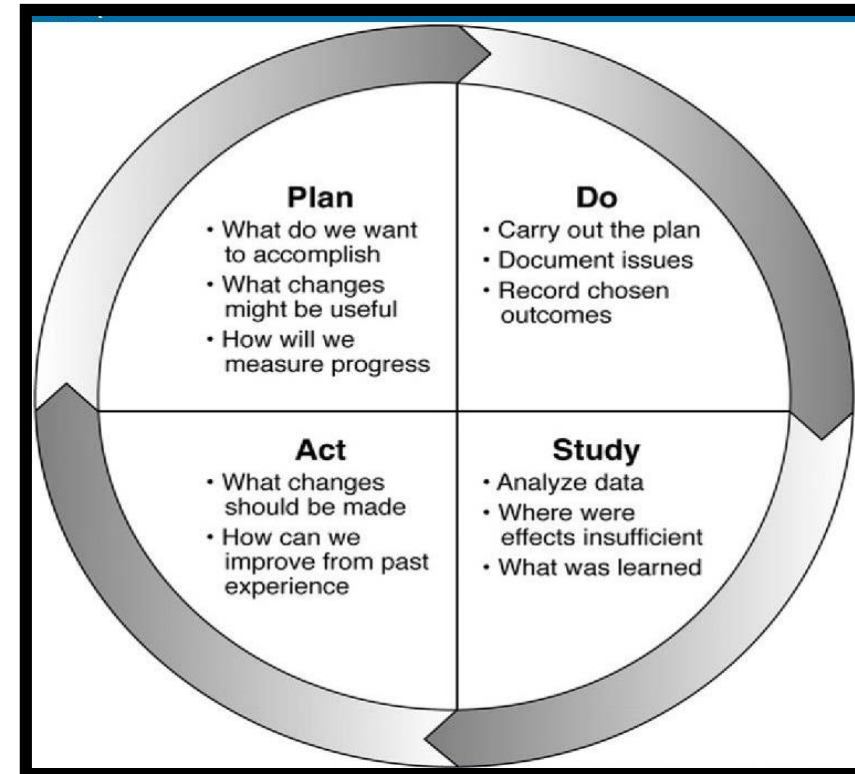
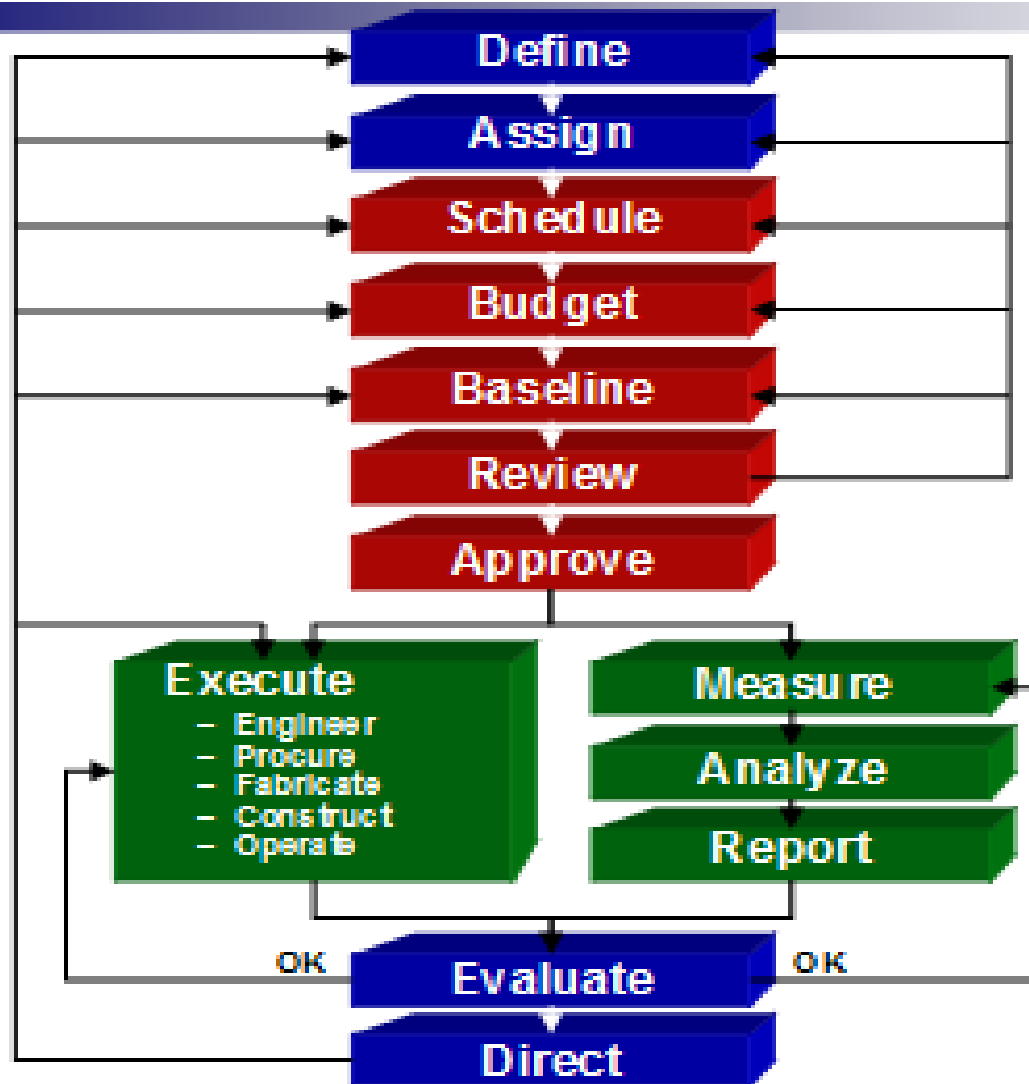




- **Objective:**
 - Provide Department of Energy (DOE) including the National Nuclear Security Administration with program and project management direction for the acquisition of capital assets with the goal of delivering projects within the original performance baseline (PB), on schedule, within budget and fully capable of meeting mission performance, safeguards and security, and environmental, safety, and health requirements
- **Earned Value Management System.**
 - An EVMS is required for all projects with a TPC greater than or equal to \$20M. In accordance with FAR Subpart 52.234-4, a contractor's EVMS will be reviewed for compliance with ANSI/EIA-748B, or as required by the contract.



EVMS Process Flow vs. Plan, Do, Study, Act





- **Relate time-phased budgets to specific contract tasks and/or statements of work**
- **Indicate work progress**
- **Relate technical, schedule, and cost performance**
- **Conduct detailed analysis so appropriate corrective actions can be implemented and monitored to completion to avoid reoccurrence and minimize impacts**
- **Provide valid, timely, and auditable data/information**
- **One project management system used by both Contractor and DOE**

Benefits of Good Planning

- Improves communications both internally and externally
- Fosters a team approach
- Provides direction and purpose to activities
- Instills a clear understanding of work to be accomplished
- Engenders power to complete the project
- Forecast of when the project will complete and for how much
 - No surprises – trends indicate problems in advance

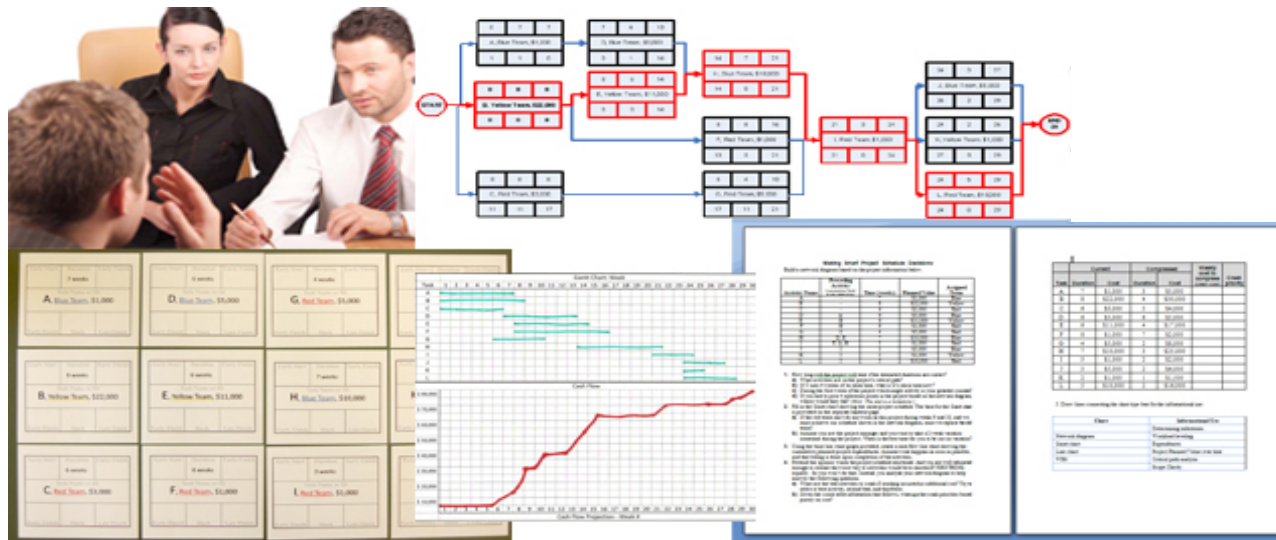




- **Formally authorize scope and associated budget and schedule**
- **Establish and maintain a WBS Dictionary**
- **Each scheduled work segment has a budgeted value**
- **Identify measurement techniques for detailed tasks**
- **Schedule Baseline**
 - The original approved project plan (resource-leveled) for accomplishing the project objectives, plus any changes to that plan
- **Performance Measurement Baseline**
 - In a fully integrated EVM system, the resource-leveled schedule baseline is the basis for the PMB

Schedule Considerations

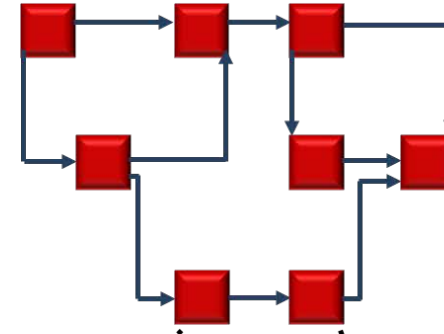
- It is an iterative process
- It must be developed by the individual responsible for the work
- Use standard logic and minimal constraints
- Check logic very carefully
- Avoid excessive detail
- Assign responsibility for each activity



Hierarchy of Schedules

Total Project Level

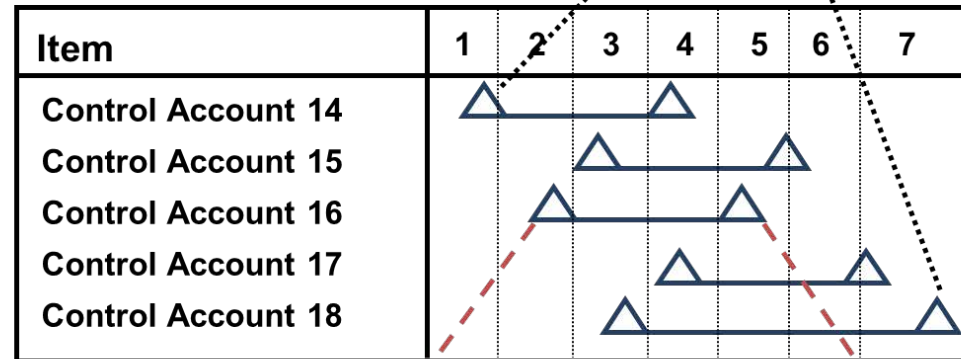
- Customer
- Senior Management
- Project Office



**Contract/
Project
Schedule**

Intermediate Level

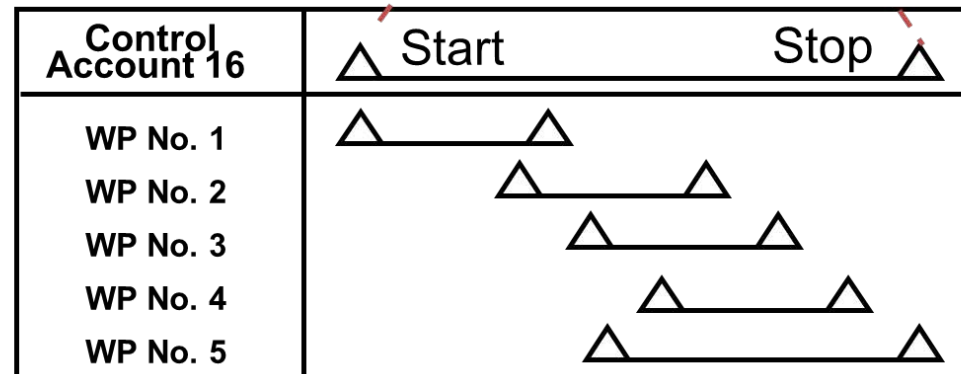
- Customer
- Project Office
- Functional Management
- Control Account Managers



**Major event
or Functional
Organization
Milestone
Schedule**

Detail Project Level

- Project Office
- Functional Management
- Control Account Managers



**Control
Account and
Work Package
Schedules**



- **Excessive High Float**
 - Indicates that the task is planned incorrectly in time OR that accurate successors have not been identified
- **Excessive Constraints**
 - Distort the critical path algorithms
- **Excess Lags**
 - Creates unknown gaps in the Gantt view of the schedules
- **LOE on the Critical Path**
 - LOE cannot have a schedule variance (days or dollars) by definition

Benefits of a Work Authorization System



- **Line management commitment**
- **Clear understanding of responsibility levels**
- **Forces review and SOW /PEP cross-matching**
- **Minimizes potential for added scope without budget**
- **Serves as an in-house contract**

Primary Elements of a Work Authorization Document



- Budget
- Schedule
- Statement of Work
- Unique identifying number
- Person Responsible

Control Account Work Authorization						Page 1 of 1
Project	Energy Project		Contract No.	20117856		
Customer	TACOM		Project No.	86-2120		
	CCN No.	N/A		Revision No.	0	
Contract Cost		References		Dates		
Current	\$0	Schedule	EEL-LVL1-01-R0	Original	3/2/Yr01	
This Release	\$54,980,000	CLIN	Attachment A	Revision		
Total	\$54,980,000					
Fee (10%)	\$5,498,000	Contract Type	CPIF			
Price	\$60,478,000	Share Ratio	80/20			
Contract Requirements						
Description	Z-Best is to provide the TACOM with modified generators in accordance with the contract statement of work, revision 1, dated February 15, Yr01.					
Deliverables/ Quantity	220 custom all generators					
Schedule	The generators must be received at TACOM in Warren, MI on these dates: Lot 1 of 150 generators: October 1, Yr03 Lot 2 of 70 generators: January 10, Yr04					
Special Instructions	Jim Levins is delegated the Project Manager responsibilities and authority for the management of this contract.					
Approvals						
Contract Administrator	Date	Vice President, Finance		Date		
Mary Steele	3/2/Yr01	Betty Washington		3/8/Yr01		
Project Controls Manager	Date	Division Vice President		Date		
Steve Garcia	3/2/Yr01	Donald Smith		3/8/Yr01		
Project Manager	Date	Division President		Date		
Jim Levins	3/2/Yr01	Nancy Harris		3/10/Yr01		



- **Work Authorization scope inadequately defined**
 - Key assumptions and requirements not documented
 - Basis for later scope changes (MR, change control)
 - Linked to existing budget and schedule as basis for change
- **Work Authorization not updated with changes**
 - Extensions of schedule for variances
 - Scope changes



- **Use of LOE**
 - Limited to management type tasks that cannot slip
 - Should never be used for discrete design, test, verify, assess, complete, or other engineering tasks as these are typical construction performance aspects which can slip
- **Question to ask for appropriate LOE use:**

“What is the impact to the critical path if this task slips three years?”

If the answer is none, then LOE may be appropriate.



- **Schedule Variance (current/cumulative), $SV = BCWP - BCWS$ (negative answer means unfavorable; i.e., behind schedule)**
- **Cost Variance (current/cumulative), $CV = BCWP - ACWP$ (negative means unfavorable, i.e., overrunning)**
- **Variance at Complete, $VAC = BAC - EAC$ (negative answer means unfavorable; i.e., overrunning at completion)**

10 Steps in the Variance Analysis Process



- 1. Review internal performance reports to quantify the variances and to isolate them by work package**
- 2. Review the work packages driving the variances by element of cost**
- 3. Review the labor charging report**
- 4. Identify the root causes for the variances**
- 5. Quantify the reasons for each identified cause**
- 6. Discuss the impact these variances will have on the project and the rationale to support a new EAC and ECD, as applicable**
- 7. Formulate a plan for corrective action (who, what, where, when, and how)**
- 8. Write the Variance Analysis Report**
- 9. Implement the Corrective Action Plan**
- 10. Monitor the corrective action taken for solutions and resolutions**



Example Variance Analysis Report

Project: CTAS Workstations

WBS: 6EGG.420 - Internal Build Qual Test (BQT)

As of: 09/30/XX

	<u>BCWS</u>	<u>BCWP</u>	<u>ACWP</u>	<u>SV</u>	<u>SV%</u>	<u>CV</u>	<u>CV%</u>	<u>SPI</u>	<u>CPI</u>
Current:	29,500	58,900	165,700	29,400	99.7	-106,800	-181.3	1.997	0.355
Cumulative:	686,500	657,900	1,014,000	-28,600	-4.2	-356,100	-54.1	0.958	0.649
	<u>BAC</u>		<u>EAC</u>			<u>VAC</u>	<u>VAC%</u>	<u>TCPI</u>	
At Complete:	718,500		1,149,100			-430,600	-59.9	0.449	

Cause of Variance: The Cumulative Negative Cost Variance is a result of additional resources (6 persons) being applied to the BQT-3 effort due to lower than planned productivity on the BQT-1 and BQT testing activities. The productivity problem was primarily because of the experience level of the testing organization during BQT-1 and BQT-2 testing which resulted from the late staffing activities for the ITG. The key variance drivers are the additional testing activities associated with CHI and the special testing initiated to ensure testing of the Baseline functions using the new V&V live data app.

Impact on Cost and Schedule: The continuing use of additional resources will result in a cost overrun of approximately \$430K for this task. However, the effort will be completed on the schedule developed for the test replan. The \$1,149,100 is based upon the cumulative ACWP of \$10,014,000 and an estimated \$85,000 for October and \$25,000 for both November and December. The \$85,000 estimate for October includes test conduct for BQT-3 continuing through the 11th of October and V&V testing continuing through the end of the month. Work in November and December will be limited to generation of the BQT-3 Final Test Report. Phase 2 and 3 of the V&V activity will be included as part of the System Testing activity.

Corrective Action Plan: A re-plan of the entire Spiral 1 Build 2 testing activity occurred during the June and July specified tests, schedule, and resources required to ensure adequate testing of the Baseline and New Functions associated with Spiral 1 Build 2 CTAS. This re-plan has been implemented since the first of July and has testing on schedule to complete BQT-3 on October 11th and System Testing November 22nd. The re-plan activity will continue to use the same WBS structure for Build Qualification Testing and will therefore continue to show a cost overrun but maintain the baseline the baseline schedule for completion of all testing associated with Spiral 1 Build 2 CTAS.

Approvals:	Control Account Manager	Project Control	Project Manager
	George Jones, 10/26/XX	Jake Bollinger, 10/27/XX	Brett Troop, 10/27/XX

Estimate at Completion (EAC)



- **Actual cost of work to date plus the estimated cost of remaining work, or**
 $EAC = ACWP + ETC$ (Estimate to Complete)
- **Must be generated in a rational, consistent manner**
- **Consider:**
 - Performance to date (current and cumulative variances and efficiency)
 - Impact of approved corrective action plans
 - Known/anticipated downstream problems
 - Best estimate of the cost to complete the remaining work



- **Include Schedule Risk Assessment (SRA) and other remaining risks**
- **Include rate/efficiencies and price/usage impacts**
- **Consider CPI vs. TCPI analysis**
- **Anticipate downstream problems**
- **Document rationale and assumptions**
- **Contractor PM sets proper ETC atmosphere**
 - Encourages surfacing of real and potential problems
 - Does not “absolve overruns” with Management Reserve (MR) misuse
 - Makes honest assessments to avoid problems being masked
 - Does not borrow budget from future SOW to cover current cost problems



- **CAM updates the EAC whenever they know of a significant change or they exceed a threshold**
- **The PM has overall authority for the EAC. If the PM does not concur this should be reported in the EAC analysis section of the CPR**
- **The EAC needs to address assessment of FFP impacts (REAs or schedule extensions)**



- **Importance of Baseline Maintenance**

- Performance can only be measured successfully against a baseline that is stable
- Changes are expected, but must be incorporated in a logical and consistent manner
- Contractors should not do work they are not authorized to do

- **Elements**

- CBB - Contract Budget Base: The budget against which overall contract performance is assessed, and is the summation of the PMB, UB, and MR
- MR - Management Reserve: Budget without scope set aside by the contractor's Project Manager to accommodate risk and uncertainty
- UB - Undistributed Budget: A temporary holding account for authorized scope of work and its budget that has not been assigned to a control account or summary level planning package.
- PMB - Performance Measurement Baseline: The baseline against which project performance is measured



- **Changes to the CBB**
 - Contractor owns the allocated CBB
 - Changes are expected, but can only be made with Government approval
 - All changes to the CBB must be documented
- **Changes to the PMB**
 - The contractor's PM "owns" the PMB
 - Changes are expected, but can only be made with contractor PM approval
 - Changes need to be documented and approved
- Refer to Snippet 4.6, Baseline Control Methods, for more information

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- **WBS results in clear picture of who and what**
- **Detailed planning reinforces communications with other managers involving interfaces and need dates**
- **Objective contract status information**
- **Performance data measurement and analysis identifies and quantifies cost and schedule problems, allowing for prompt course correction actions**
- **Improved communications internally and with the DOE FPD**
- **Project is definitely better controlled**



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EARNED VALUE MANAGEMENT

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Project Management
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Lessons Learned
Reviews and Validations
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RCA and CAP

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>

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