

EVMS SOP 7: Standard Operating Procedures for EVM Reporting and Analysis

Date	Version	Description	Concurrence	
			Administration	Date
2/2/07	1.0			

PURPOSE

This document describes the key activities associated with collecting, reporting, and analyzing Earned Value Management (EVM) data. This document also provides guidance on specific control documents, such as the Cost Performance Report (CPR). As required by Veterans Affairs policy Directive 6061, the VA Cost Performance Report is used to compile cost and schedule performance information on VA projects and contracts requiring compliance with the American National Standards Institute/Electronic Industries Alliance (ANSI/EIA) Standard 748 *Earned Value Management Systems*.

POLICY

This policy outlines three performance parameters used for EVM:

1. Planned Value – Assigning estimated costs to project work at various points in the project schedule. Cumulative estimated costs across the project schedule are usually reflected in the form of a Performance Measurement Baseline (PMB).
2. Actual Costs – Accumulating the actual costs incurred to perform the work at the end of the reporting period.
3. Earned Value – Calculating the planned value of work that has been accomplished at the end of the reporting period.

This policy describes how each of these performance parameters is calculated, reported, and analyzed within a compliant Earned Value Management System (EVMS). This SOP was developed to help VA comply with the following ANSI / EIA 748 Guidelines for an Earned Value Management System:

No. 12 – Identify and control all work in terms of time-phased budget packages and only those efforts that cannot be measured in practical terms will be classified as Level of Effort (LOE).

No. 22 – Generate monthly reports at the control account level that will disclose schedule variances (Budgeted Cost of Work Performed or Earned Value less Budgeted Cost of Work Scheduled or Planned Value) and cost variances (Budgeted Cost of Work Performed or Earned Value less Actual Costs of Work Performed or Actual Costs).

No. 23 – Identify on a monthly basis, variances and if the variances are significant, provide reasons and actions to address the variances.

No. 25 – Summarize variance by different organizational elements, not just project levels, so that management can assess and evaluate overall project performance across the agency or organization.

No. 26 – Have a process for detail review and analysis of earned value management information, such as trends, to pro-actively manage project performance.

No. 27 – Regularly review and update project estimates, such as Estimate to Complete (ETC) based on the most current project performance information and compare to the project plans, budgets and other controls to identify variances (such as total expected budget over-run).

PROCEDURES

A. Project Managers are responsible for:

1. Establish Planned Value (PV) - Maintain a current baseline that accurately reflects the budgets for work to be performed. This is the source for Planned Value or Budgeted Cost of Work Scheduled (BCWS), one of the three performance parameters used in EVM analysis and reporting. Changes to Planned Value only occur when changes take place to either the project schedule or the project budget. The following documents provide additional guidance on the Performance Measurement Baseline (which is the source for Planned Value):

Performance Measurement Baseline Management Guide
EVMS SOP No. 6 – Performance Measurement Baseline
EVMS SOP No. 3 – Project Budget Control and Integration

Visit the EVMS Home Page to download these documents:

<http://vawwww.va.gov/OIT/CIO/ITPM/EVMS/default.asp>

Steps 2 through 9 are required on a monthly basis for EVM Analysis and Reporting:

2. Collect Actual Costs (AC) – Accumulate all actual costs to date by Control or Cost Accounts for comparison to budgeted or planned values. This data is sometimes referred to as Actual Costs Work Performed (ACWP). This requires a monthly process of capturing all resources expended (both direct and indirect) in relation to the work performed.
 - a. Direct Costs – All costs directly associated with the work will get posted to cost accounts by the end of the reporting month. This includes Government FTE's (full time equivalents) charging time to the project, contractors assigned to work on the project, and the use of equipment and materials on the project. Additional guidance is available by referring to EVMS SOP No. 1 – Direct Costs.
 - b. Indirect Costs – All costs not directly associated with the project, but the project benefits from these resources. Indirect Cost includes service support for administering contracts, assistance with preparation of budgets and Exhibit 300 documents, personnel support such as recruitment,

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training, and placement, telecommunications and computer support help, and the use of common facilities and infrastructure. Projects will accrue indirect costs using standard rates as described in EVMS SOP No. 2 – Indirect Costs.

All costs are accumulated using the Primavera Tool. Project Managers should refer to the *IT Project Office Earned Value Management User Guide*, available via the Internet at: <http://vaww.va.gov/OIT/CIO/ITPM/Default.asp>. This *Guide* discusses recommended settings within the application, various earned value reports, and how to maintain and update the progress of a project. Appendix A of this SOP provides additional information concerning the components of a project schedule.

3. Calculate Earned Value (EV) – Accumulate the degree of planned work that has been completed to date. This is sometimes referred to as Budgeted Cost of Work Performed (BCWP) or Earned Value (EV). Start with each cost account budget or planned value that has been assigned to the activity. Calculate how much of the work has been completed using an appropriate Earned Value Measurement Technique.

Type of Work	Duration of Work	
	1 to 2 Months	Over 2 Months
Tangible	1. Fixed Formula	2. Weighted Milestone 3. Percent or Units Complete
Intangible	4. Apportioned Effort 5. Level of Effort	

When work can be defined in terms of tangible work products or milestones, the following three measurement techniques are recommended:

1. Fixed Formula – Used for small duration tasks (2 months or less). Usually done in increments of 25%, such as 50 / 50 (accrue 50% of the expense when the work starts and accrue the other 50% when the work is completed).
2. Weighted Milestone – Used for longer term deliverables that you can clearly measure. Divide the work into segments and assign a value to each milestone or work product.
3. Percent Complete – Used when you have long term work that is difficult to measure until the end of the contract, such as estimating the percentage of completion over the life of the contract. Where practical, the Weighted Milestone method is preferred over the Percent Complete method.

In the event that work is not clearly defined in terms of a tangible work product or milestone, two other techniques may be used:

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1. **Apportioned Effort** – Used for support related work that is somehow linked to discrete, tangible work. For example, maybe you have a quality assessment / review of a milestone that costs \$ 150,000 and you estimate that the quality review represents 10% of the \$ 150,000 costs. So as the milestone gets completed, you apportion 10% of the costs to the quality review work.

2. **Level of Effort** – Used for support related work that is not linked to any tangible work associated with the project. Since Planned Value and Earned Value are the same, there is no schedule variance.

Table A-1 in Appendix A of this SOP provides some additional examples of how to determine which measurement technique is appropriate.

4. **Calculate the Variances** – Based on the three performance parameters as described in Step 1 – Planned Value, Step 2 – Actual Costs and Step 3 – Earned Value, the Primavera Tool will calculate the following two variances:

- a. **Cost Variance (CV):** Total under or over budget amount as of the reporting period. $\text{Cost Variance} = \text{Earned Value} - \text{Actual Costs}$.
- b. **Schedule Variance (SV):** Total amount the project is ahead or behind schedule as of the reporting period. $\text{Schedule Variance} = \text{Earned Value} - \text{Planned Value}$.

Appendix B of this SOP provides an example of how variances are calculated and reported using the Cost Performance Report (CPR). The CPR is the output for EVM Reporting within VA.

5. **Update Estimate at Completion** – Project Managers should continue to update their forecast of final costs to complete the project. This is referred to as Estimate at Completion or EAC. As the project continues to incur actual costs, Project Managers should review current burn rates of various resources and compare to what is expected to complete the work. This represents the Estimate to Complete or ETC. Using the Estimate to Complete and the Actual Costs incurred to date, the EAC is:

$\text{EAC} = \text{Cumulative Actual Costs} + \text{Estimate to Complete (ETC)}$

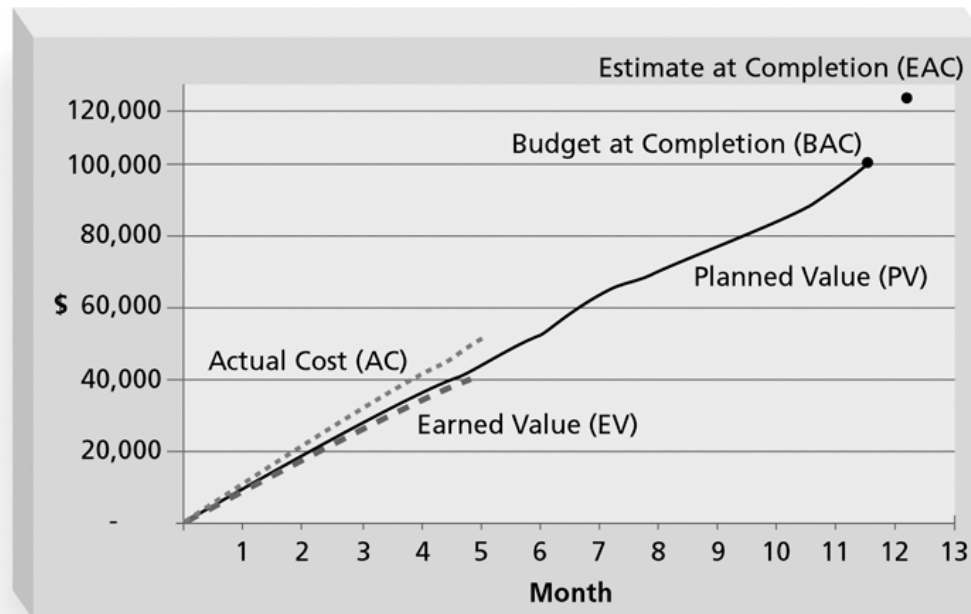
Once the EAC has been updated, Project Managers can independently validate the EAC using the following formulas:

- a. $\text{EAC} = \text{Actual Costs} + ((\text{Budget at Completion} - \text{Earned Value}) / \text{CPI})$
[Recommended and Calculated using the Primavera tool]
- b. $\text{EAC} = \text{Budget at Completion} / \text{CPI}$
- c. $\text{EAC} = \text{Actual Costs} + ((\text{Budget at Completion} - \text{Earned Value}) / (\text{CPI} \times \text{SPI}))$

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After validating the EAC, Project Managers should calculate a total estimated cost variance at completion of the project. This will help identify possible budget short-falls going forward.

Variance at Completion = Budget at Completion – Estimate at Completion

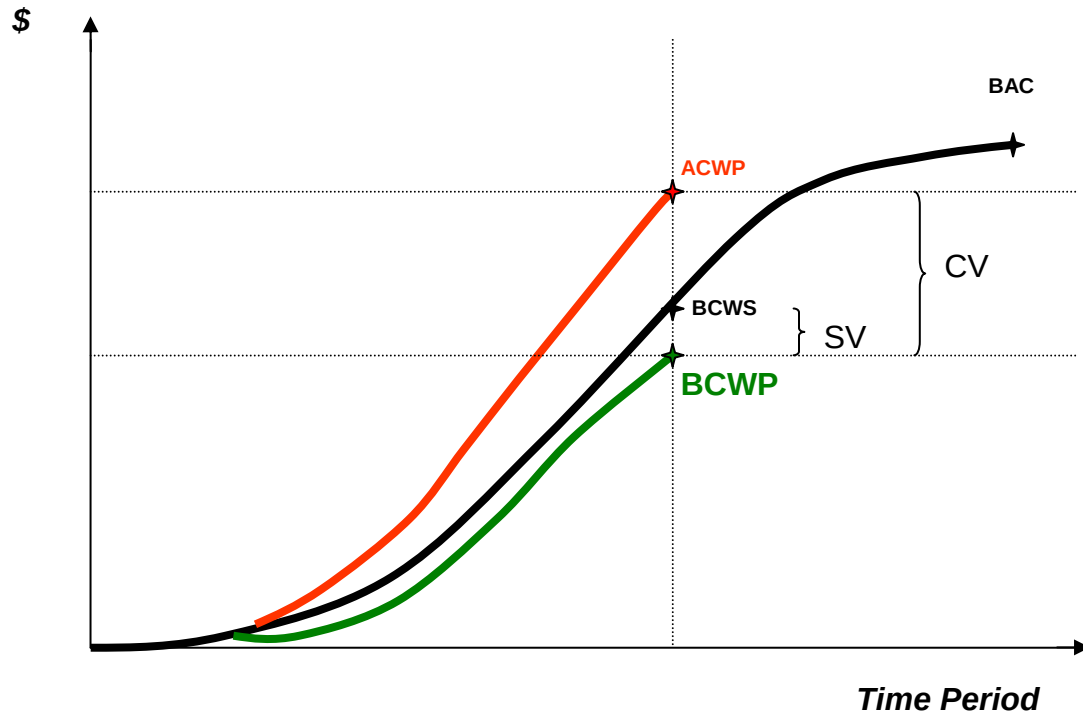


6. Report the Variances – The standard report used to report variances within VA is referred to as the Cost Performance Report or CPR. The CPR presents cost and schedule performance data for both the current reporting period and cumulative to date. The CPR is generated on a monthly basis using the Primavera tool. Variances are reported in two sections of the CPR:

- Format 1 – Cost and Schedule Performance are organized by WBS (Work Breakdown Structure)
- Format 2 – Cost and Schedule Performance are organized by OBS (Organizational Breakdown Structure)

Appendix B of this SOP provides detail information on how EVM performance information is reported using the CPR.

Tracking EVM Performance



7. Analyze the Variances – Project Managers should review the variances as reported in the CPR (Cost Performance Report). Project Managers can include descriptive information concerning their analysis in Format 5 – Explanations and Problem Analysis of the CPR. This would include factors that are creating the variance(s), unusual conditions contributing to the variance(s) and other issues, problems or concerns related to the analysis.
8. Take Corrective Action – Format 5 – Explanations and Problem Analysis of the CPR is used to explain the reasons for significant variances. As required per OMB (Office of Management and Budget) Circular A-11, VA must on average achieve 90% of its cost, schedule and performance goals for major IT projects. Project Managers should determine the root causes behind the Cost or Schedule Variance(s) when either of these variance is greater than 10%. A Plan of Action (POA) is also required for reducing the variance going forward.
9. Submit the Final CPR – Once Project Managers have completed the monthly process of capturing and updating actual costs, calculating Earned Value, revising their Estimates at Completion, and working through their Cost Performance Reports (CPR), a final copy of the CPR should be submitted to the respective EPMO or PMO for consolidated reporting of all projects.

B. Enterprise Program Management Office (EPMO) and the Project Management Office (PMO) will:

1. Assist PM's with the validation and verification of the CPR report. The EPMO or PMO should ensure PM's are providing timely, reliable summary-level data with which to assess current and projected project and contract performance. The EPMO or PMO as well as PM's can use the CPR to confirm, quantify and track known or emerging project and contract problems and as a basis for communicating with the PM's and Contractor. The EPMO or PMO should assist PM's and Contractor to ensure that CPR data accurately reflect how work is being performed and is consistent with the actual project and contract status.
2. Compile and summarize all CPR's for evaluating performance across the portfolio of projects. Prepare comparative charts, graphs, and other documents to assist Program Managers, Portfolio Managers and other VA officials in understanding performance between various projects.

REFERENCES

[Earned Value Management System VA Cost Performance Report Description Document \(VA-DI-MGMT-81466A\)](#)

[Earned Value Management System VA Integrated Master Schedule Description Document](#)

Download the VA Project Management Guide, EVM User Guide and other documents at:
<http://vawww.va.gov/OIT/CIO/ITPM/Default.asp>

Download the Primavera SOP documents at:
<http://vawww.va.gov/OIT/CIO/ITPM/PrimaveraSOPs.asp>

Download the Primavera Lesson documents at:
<http://vaww.vistau.med.va.gov/VistaU/teamplay/TrainingManual.htm>

Download the NDIA ANSI / EIA 748 Intent Guide at:
<http://www.ndia.org/Template.cfm?Section=Procurement&Template=/ContentManagement/ContentDisplay.cfm&ContentID=1109>

RESCISSIONS

None

FOLLOW UP DATE

June 2007

Appendix A – Detail Project Schedule

Detail schedules are the lowest level of project and contract tasks/activities that form the network. The detailed schedules shall contain horizontal and vertical integration, at a minimum, at the WBS element (and planning package) level. The detailed schedules shall include all activities/steps and WBS elements (work packages and planning packages) identified in the Performance Measurement Baseline (PMB). Every discrete task/activity, WBS element (work package and planning package) shall be clearly identified and directly related to a control account. The key elements of the detailed schedules include the following:

- Task/Activity-Element of work that is required by the project, uses resources, and takes time to complete. Activities have expected durations, costs, and resource requirements that may be subdivided into tasks. Steps are well defined component of project work; a discrete work item. There are usually multiple steps for one activity.
- Milestone-Event with zero duration and requiring no resources. Milestones are used to measure the progress of a project.
- Duration-Number of work periods required to complete an activity or other project element.
- Earned Value (EV) - is the quantification of the “worth” of the work done to date.
- Cumulative (EV)-is the sum of the budget for the activities accomplished to date.
- Current (EV)-is the sum of the budget for the activities accomplished in a given period.
- Earned Value Measurement Technique-Fixed Formula, Milestone Weights, Milestone Weights with Percent Complete, Units Complete, Percent Complete, Level of Effort.
- Fixed Formulas-Used for small duration tasks (2 months or less). Usually done in increments of 25%, such as 50 / 50 (accrue 50% of the expense when the work starts and accrue the other 50% when the work is completed).
- Weighted Milestones-Used for longer term deliverables that can be clearly measured. Divide the work into segments and assign a value to each milestone or work product.
- Percent Complete- Used when there is long term work that is difficult to measure until the end of the contract. Then estimate the percentage of completion over the life of the contract. Preferred approach is to use Percent Complete as setup and applied in the Primavera tool.
- Apportioned Effort-Used for support related work that is somehow linked to discrete, tangible work. For example, maybe there is a quality assessment / review of a milestone that costs \$ 150,000 and the estimate is that the quality review represents 10% of the \$ 150,000 costs. So as the milestone gets completed, apportion 10% of the costs to the quality review work.
- Planned Value (PV)- $\text{Planned Value} = \text{Physical Work} + \text{Approved Budget}$
- Cumulative Planned Value-is the sum of the approved budget for activities scheduled to be performed to date.

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- Current Planned Value-is the approved budget for activities scheduled to be performed during a given period. This period could represent days, weeks, months, etc.
- Activities/Steps and Milestone Descriptions-Identifies specific activities, steps and milestones that must be performed to produce the project deliverables.
- Activity/Steps Codes and Data Dictionary- Activity code is a set of numeric or alpha-numeric characters that uniquely identifies a particular activity. The coding structure is typically developed through the work breakdown structure. The data dictionary is creating a list of features and their associated attributes to be collected in the field.
- Relationship/Dependency- Logical relationship between and among tasks of a project's WBS, which can be graphically depicted on a network diagram.
 - FS (Finish to Start)-Relationship in a precedence diagramming method network in which one activity must end before the successor activity can start.
 - SS (Start to Start)-Relationship in a precedence diagramming method network in which one activity must start before the successor activity can start.
 - FF (Finish to Finish)-Relationship in precedence diagramming method in network in which an activity must end before a successor activity can start.
 - SF (Start to Finish)-Relationship in a precedence diagramming method in a network in which one activity must start before the successor activity can finish.
- Total Float/Slack-which tells you how much certain activities can slip without impacting the total project duration.
- Free Float/Slack-Amount of time that an activity may be delayed without delaying the early start of any immediate succeeding activities.
- Lag-Modification of a logical relationship in a schedule such that there is a delay in the successor task.
- Early Start (ES)-Earliest possible point in time when uncompleted portions of an activity (or the project) can begin, based on network logic and any schedule constraints.
- Early Finish (EF) - Earliest possible point in time when the uncompleted portions of an activity (or the project) can end based on network logic and any schedule constraints.
- Late Start (LS)-Latest possible point in time that an activity may begin without delaying the project finish date.
- Late Finish (LF)-latest possible point in time that an activity may end without a delay in the project finish date.
- Forward Pass-determines the early start (ES) and the early finish (EF) of each activity.
- Backward Pass-determines the late start (LS) and late finish (LF) of each activity.
- Planned Start-Point in time when work is scheduled to start on an activity.
- Planned Finish- Note that forecast finish dates should be calculated by the tool.

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- Resources-People, equipment, or materials to accomplish an activity.
- Pay Rates.
- Budget-Quantitative expression of management's plans to perform specified work.
- Actual Cost (AC) - also called actual expenditures, is the cost incurred for executing work on a project.
- Cumulative (AC)-is the sum of the actual cost for activities performed to date.
- Current (AC)-is the actual costs of activities performed during a given period. This period could represent days, weeks, months, etc.
- Costs-The Cost performance Index (CPI) - The CPI is a measure of cost efficiency. The CPI measures the value of actual work against cost.
Cost Performance Index (CPI) = EV/AC
If the result is less than 1.0, cost is GREATER than budgeted
If the result is greater than 1.0, cost is LESS than budgeted
Example:

$$\begin{aligned}PV &= \$1100 \\EV &= \$1000 \\AC &= \$1200 \\CPI &= \frac{\$1000}{\$1200} = .83\end{aligned}$$

- Critical Path-In a project diagram, this is the series of activities that determine the earliest completion of a project.
- Constraints-Limits applied to network start and finish dates (e.g., "finish no later than"). (Note: Certain types of constraints should be used judiciously because they may impact or distort the network critical path.)
- Actual Start and Finish Dates-Point of time when work was actually started or actually finished on an activity. In certain cases the activity may be," finished" when work is "substantially complete."
- Progress Line- The progress line depicted in a Gantt chart shall be applied to the current schedule. In Primavera, the Progress Line is the same as the Data Date.
- Retention of Data for Completed Activities/Steps- Historical performance on completed activities/steps shall be maintained electronically for analytical use. Historical performance shall be maintained at the time of key program events (Integrated Baseline Review, Critical Design Review, etc.) for all critical tasks/activities. Data to be retained includes logic, actual and baseline durations, actual and baseline start and finish dates, and the three-point estimates that were used before the task/activity started.
- External Dependencies- The Integrated Master Schedule (IMS) shall identify significant external dependencies that involve a relationship or interface with external organizations, including all Government furnished items (e.g., decisions, facilities, equipment, information, data, etc.). The determination of significant shall be agreed to by the Government

and contractor and shall be defined and documented in the SOW. The required or expected delivery dates shall also be identified in the IMS.

- Schedule Risk Assessment- A schedule risk assessment predicts the probability of project completion by any required or contractual dates. The schedule risk assessment shall explain changes to the critical path and mitigation plans. It shall be incorporated into the program risk management process. The schedule risk assessment shall be submitted as specified in the SOW and prior to the Integrated Baseline Review. The risk analysis may be performed within the IMS or within a separate risk tool as appropriate based on the capability of the automated scheduling tool.
- User Defined Fields- All user defined fields in the IMS shall be identified by providing a mapping of all fields used in the scheduling software application.
- Reserved Fields- The Government may reserve some fields and/or require the contractor to use certain fields for specific information. The requirement for reserved fields shall be specified in the SOW.
- Calendar- The arrangement of normal working days, together with non-working days, such as holidays, as well as special work days (i.e., overtime periods) used to determine dates on which project work will be completed.
- Level of Effort Activities- For discrete work packages accomplishment can be measured based on the completed pieces of work but LOE is "measured" through the passage of time. LOE activity should be separately identified from discrete work packaged effort to avoid distorting that which is measurable. Some general guidelines for LOE are:
 - (1) The amount of LOE activity will vary among performing organizations, but it should be held to the lowest practical level.
 - (2) LOE budgets should be separately substantiated and planned as direct labor, material/subcontract, or other direct costs. LOE activity should be budgeted on a time-phased basis for control and reporting purposes.
 - (3) When LOE and discrete effort are mixed within the same control account, the control account manager must ensure visibility into the performance of the discrete effort.

Table A-1: Earned Value Measurement Techniques

Objectivity	Method	Application	Work Packages
1	Equivalent Units	Duration > 3 months Units can be mapped to discrete portions of product	Business Process Reengineering, Requirements Gathering, Software Builds
2	0/100	Duration < 1 month	Formal Reviews, Stress Tests, IV&V
3	Weighted Milestones	Duration > 2 months when discrete, measurable milestones can be identified	System Design
4	X/Y Percentages	50/50 for duration > 1 month and < 2 months 25/75 for durations >2 months and < 3 months	Acceptance Testing
5	As Consumed	Materials and discrete ODCs.	Hardware, Travel, Training Courses
6	Apportioned Effort	Work packages tied to task that has discrete product	Quality Assurance, Rework
7	Percent Complete	Work Packages >3 months for work that does not lend itself to the milestone method, the 50/50 technique, or the 0/100 technique	Systems Engineering
8	Level of Effort	Work that produces no tangible products	Program Management Contract Management

Appendix B – Cost Performance Report (CPR)

The VA Cost Performance Report Description Document explains that PM's are responsible for preparing and reviewing the Cost Performance Report or CPR. The CPR is required on a monthly basis. Reports may reflect data either as of the end of the calendar month or as of the contractor's accounting period cutoff date, provided it is consistent with the Integrated Master Schedule (IMS).

Unless otherwise directed or provided for in the contract, data reported in the CPR will pertain to all authorized contract work, including both priced and un-priced effort. The CPR data elements shall reflect the output of the VA Project Manager's and Contractor's ANSI/EIA Standard 748 compliant integrated program management system.

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There are five formats of the CPR. The CPR should be prepared on a monthly basis. The five formats of the report provide a summary of cost, schedule and technical performance on the program which is useful to the project manager.

<u>CPR Format</u>	<u>Format No</u>
Work Breakdown Structure	1
Organizational Categories	2
Baseline	3
Staffing	4
Explanations and Problem Analyses	5

The report's five formats are described below:

CPR Format 1

The CPR Format 1 shows performance data from the negotiated WBS reporting level up to the total program level. The following performance indicators are provided for the current period and cumulative to date:

- Budgeted Cost of Work Scheduled (BCWS). The BCWS is the planned cost of work scheduled to be performed before the milestone date.
- Budgeted Cost of Work Performed (Earned Value). The BCWP is the planned (not actual) cost to complete the work that has been done.
- Actual Cost of Work Performed (ACWP). The ACWP is the cost incurred to accomplish the work that has been done to date.
- BAC- The Budget at Completion (BAC) is the sum of all budgets allocated to a project scope. The Project BAC must always equal the Project Total PV. If they are not equal, your earned value calculations and analysis will be inaccurate.
- LRE/EAC- The Estimate at Completion (EAC) is the actual cost to date plus an objective estimate of costs for remaining authorized work. The objective in preparing an EAC is to provide an accurate projection of cost at the completion of the project.

EAC formula: **$EAC = AC + [1/CPI (BAC-EV)]$**

This calculation uses the Actual Cost (AC) Budget at Completion (BAC), Earned Value (EV) and the Cost Performance (CPI) Index to calculate EAC.

LRE- Latest Revised Estimate- **Estimate At Completion = Latest Revised Estimate**

$EAC = AC + [1/CPI (BAC-EV)]$

$EAC = \$32,400 + [1/1.02 (\$165,467 - \$33,149)]$

$$EAC = \$32,400 + [.98 (\$132,319)]$$

$$EAC = \$32,400 + \$129,726$$

$$EAC = \$162,073$$

$$VAC = BAC - EAC$$

$$VAC = \$165,467 - \$162,073$$

$$VAC = 3,394$$

Using this EAC calculation, the project is projected to underrun by \$3,394.

The second EAC formula is as follows:

$$EAC = AC/EV \times BAC$$

$$EAC = \$32,400/\$33,149 \times \$165,467$$

$$EAC = .98 \times \$165,467$$

$$EAC = \$162,158$$

This calculation uses the Actual cost, Earned value and Budget at Completion for the project.

This formula is the easiest to use, but it assumes that the “burn-rate” will be the same for the remainder of the project.

The third EAC formula is as follows:

$$EAC = BAC/CPI$$

$$EAC = \$165,467/1.02$$

$$EAC = \$162,222$$

This calculation uses the Budget at Completion (BAC) and the Cost Performance (CPI) Index to calculate EAC.

This formula is also easy to use and assumes that the “burn-rate” remains constant for the remainder of the project.

This formula is derived from the previous formula and thus should result in the same EAC figure. Note that with this formula you need additional information than the previous formula.

The fourth EAC formula is as follows:

$$EAC = AC/EV \times [Work\ completed\ and\ in\ Progress] + [Cost\ of\ work\ not\ yet\ begun]$$

$$AC/EV = \$32,400/\$33,149$$

$$AC/EV = .98$$

This calculation uses the Actual cost, Earned value, the value of work completed and in process and the cost of work not yet begun.

This formula assumes that the work not yet begun will be completed as planned.

This calculation uses the Actual cost, Earned value, the value of work completed and in process and the cost of work not yet begun.

This formula assumes that the work not yet begun will be completed as planned.

- VAC- EAC is the best estimate of the total cost at the completion of the project. It is also used to determine the Variance at Completion (VAC) for the project. The VAC is calculated as follows:

$$\text{VAC} = \text{BAC} - \text{EAC}$$

If the result is POSITIVE, project is projecting an “Underrun”

If the result is NEGATIVE, project is projecting an “Overrun”

Example: The VAC for a project is determined as follows:

$$\begin{array}{rcl} \text{BAC} & - & \text{EAC} & = & \text{VAC} \\ \$165,467 & - & \$165,569 & = & -\$102 \end{array}$$

$$\text{VAC} = \text{BAC} - \text{EAC}$$

$$\text{VAC} = \$165,467 - \$162,158$$

$$\text{VAC} = 3,309$$

Schedule Variance (SV) (Current Period and Cumulative-to-Date). The schedule variance is the (BCWP-BCWS). SV is a comparison of an amount of work performed at a given time to what was scheduled to be performed. A negative variance means the project is behind schedule.

$$\text{Schedule Variance (SV)} = \text{EV} - \text{PV}$$

If the result is POSITIVE, project is on schedule or exceeding the schedule

If the result is NEGATIVE, project is behind schedule

$$\text{Example: } \text{SV} = \text{EV} - \text{PV}$$

$$\text{SV} = \$33,149 - \$38,269$$

$$SV = -\$5,120$$

The project is behind schedule.

$$\text{Schedule Variance (SV) \%} = SV/PV$$

Tells what percentage schedule varies from what has been planned to date.

$$SV = EV - PV$$

$$SV = \$33,149 - \$38,269$$

$$SV = -\$5,120$$

$$SV\% = SV/PV$$

$$SV\% = -\$5,120/\$38,269$$

$$SV\% = -.134 \text{ or } -13.4\%$$

To date the project has a Schedule Variance of -\$5,120 or -13.4%

Cost Variance (BCWP-ACWP) (Current Period and Cumulative-to-Date).
CV is a comparison of budgeted cost with actual cost. A negative variance means the project is over budget.

$$\text{Cost Variance (CV)} = EV - AC$$

If the result is POSITIVE, project is experiencing an “Underrun”

If the result is NEGATIVE, project is experiencing an “Overrun”

EXAMPLE: the Cost Variance (CV) for a project.

$$CV = EV - AC$$

$$CV = \$33,149 - \$32,400$$

$$CV = \$749$$

The cost variance is an under-run.

Another calculation for reviewing Cost Variance (CV) Percentage is CV%.

$$\text{Cost Variance (CV)\%} = CV/EV$$

The calculation above shows what percentage cost varies from what has been earned to date.

Using the example above, what is the CV%?

$$CV = EV - AC$$

$$CV = \$33,149 - \$32,400$$

$$CV = \$749$$

$$CV\% = CV/EV$$

$$CV\% = \$749/\$33,149$$

$$CV\% = .023 \text{ or } 2.3\%$$

To date the project has a Cost Variance of \$749 or 2.3%

CPR Format 1 also contains summary program information related to Undistributed Budget, Management Reserve and Overhead.

CPR Format 2

The CPR Format 2 presents the same performance data as in the CPR Format 1 organized by Program/Project area instead of by Work Breakdown Structure.

CPR Format 3

The CPR Format 3 displays the baseline against which performance is being measured. Format 3 includes cumulative to date Actual Cost (ACWP) data, a forecast for the next six monthly increments, a forecast for the balance of the fiscal year, and a forecast by fiscal year to completion of the program. Additionally, the Performance Measurement Baseline (PMB) at the beginning of the reporting period is compared to the PMB at the end of the current reporting period, and any changes that may have occurred during the period (to the PMB, Management Reserve or Undistributed Budget) are explained.

CPR Format 4

The CPR Format 4 presents the manpower staffing projections for the program by Program/ Project organization (at the same level as Format 2). The format contains actual labor hours for the current period and cumulative to date, a forecast of the next six months staffing, and projections for the balance of the fiscal year and for subsequent fiscal years. The manpower forecast shown in Format 4 reconciles with the latest EAC shown in Format 2. The forecasts reflect the equivalent man-hours forecast by the revised baseline.

CPR Format 5

The CPR Format 5 presents BCWP, BCWS, ACWP, BAC, LRE/EAC and the associated cost and/or schedule variances for WBS elements which have exceeded the contractual variance thresholds. The format also contains a narrative analysis of the problem(s), an assessment of the impact on this or other WBS elements and a discussion of corrective actions.

As required by the contract, CPR Format 5 may also contain explanations of:

- LRE best and worst case estimates
- Differences between the calculated EAC $[(CPI \times BCWR) + ACWP]$ and the LRE, if the LRE is lower. (Note: BCWR is the Budgeted Cost of Work Remaining)
- The top five WBS cost and schedule problems in order of criticality