# EFCOG Best Practice #175

**Best Practice Title:** Variance Analysis

**Facility:** Washington River Protection Solutions, Hanford Site, Richland Washington

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**Brief Description of Best Practice:** This best practice identifies a useful approach to variance analysis beyond the basic guidance contained in the ANSI/EIA-748 Intent Guide (current version).

**Why the Best Practice was used:** To enhance the usefulness of variance analysis as a primary earned value management tool in understanding variance causes, impacts and effective corrective action.  Variance analysis prior to implementation of the subject best practice lacked consistent, meaningful information that was clear, concise, and useful to management in making informed decisions.

**What are the benefits of the best practice:** Implementation of this variance analysis best practice consistently provides meaningful information using earned value terminology, that is; current, accurate, complete, useful to management in making informed decisions, and reflects the physical progress of the project.

**What problems/issues were associated with the best practice:** Variance analysis prior to implementation of the subject best practice lacked consistent, meaningful information that was clear, concise, and useful to management in making informed decisions.  In terms of implementation issues, the greatest challenge is getting the variance analysis author to write with the end user (management) and end use (informed decisions) in mind.  Variance analysis authors usually have a strong command of their project details, and assume the readers do as well. However, the readers and reviewers often do not possess the same level of detailed understanding as the authors, so if key information (conditions) is omitted in the written analysis, the variance explanation may introduce more questions than answers to performance issues.

**How the success of the Best Practice was measured:** Success is measured in reading a variance analysis that explains the performance issue with sufficient information that questions are answered, versus generated.  Impacts are identified and corrective action is assigned, recorded in the Corrective Action Log, and revisited each succeeding reporting period until closed or reevaluated for further effective action.

**Description of process experience using the best practice:** With the basic tenets of the ANSI/EIA-748 Intent Guide (current version) in place with respect to Intent Guideline 23 (below), the Variance Analysis form has been revised (as shown below) and is completed monthly for each Control Account that exceed established variance thresholds.

 **"Guideline 23 "Identify Significant Variances for Analysis"**

b) Identify, at least monthly, the significant differences between both planned and actual schedule performance and planned and actual cost performance, and provide the reasons for the variances in the detail needed by program management.

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| Variance Analysis - Cause |
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1. Identify and disclose the number of previous reporting periods this control account has exceeded the established variance thresholds. Likewise, make note if this is the first instance of the variance exceeding the threshold.
2. Identify and describe the cause(s) of the variance(s) through:
   a. disclosure and discussion of the earned value technique (including where applicable, discrete effort Rules of Performance and weighted factors used to measure performance) specifically addressing the effectiveness and appropriateness of the selected EVT as it relates to the scope and technical approach, i.e., is the EVT or technical approach a driver to the variance?
   b. disclosure and discussion of any EVT co-mingling…identify and discuss any variance masking that may be occurring as a result of the co-mingling, isolate variance explanations by EVT if co-mingling is present.
   c. disclosure and discussion of the variance by contributing element of cost, consistent with the Control Account Plan (CAP):
      i. Labor (direct labor/Staff Augmentation rates/quantities)
      ii. Subcontract Usage Based Services (UBS/ X Codes) Table J-3 (rates/quantities)
      iii. Subcontract P/O (Cost Element 21)
      iv. Material/Equipment (Cost Element 10)
      v. Other Originated Cost
      vi. Overhead Allocations (Rates)
   d. disclosure and discussion of schedule durations as it relates to the effectiveness of performance measurement. Short durations (less than four months) are more objective; long durations (greater than 4 months) are more subjective. Disclosure and discussion of schedule basis of duration, total float, and or critical path if appropriate.
   e. Disclosure and discussion of any budget without actual cost such as Inter Entity Work Orders (IEWO) shall identify the current cost reported by the performing site to understand the masking potential.
   f. disclosure and discussion of any actual cost without budget shall identify the specific reasons why budget is not assigned and under what authority the condition is allowed.
   g. disclosure and discussion of performance taken without budget shall include the amount and under what authority the condition is allowed.
   h. disclosure and discussion of Estimate To Complete (ETC) where there is no budgeted cost of work remaining and an explanation of why this condition exists.

**Note(s):**

1. *Variance explanation discussions must **focus on the deviation from the plan**. The variance cause/explanation should definitively address why the deviation occurred, consistent with the plan that is being used to measure performance.*
2. *Variance explanations are required to **answer questions, not introduce them**. As such, variance explanation authors are required to provide enough information to **contextually frame the analysis** in a manner that allows management to understand the issues and make informed decisions.*
3. *Identification of scope titles and values that contribute to a variance total are in and of themselves not valid variance cause(s) without the complete correlating explanations.*
4. ***Use earned value terminology** when expressing the deviation:*
   - ACWP
   - AUW
   - BAC
   - BCWP
   - BCWP
   - BCWS
   - CAM
   - CPI
   - CV
   - EAC
   - ETC
   - EV
   - EVT
   - NTE
   - LOE
   - MR
   - OBS
   - PMB
   - PP
   - RAM
   - SLPP
   - SPI
   - SV
   - TCPI
   - UV
   - VAC
   - WBS
   - WP

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| Variance Analysis - Impact | |
|---|---|
| 1. Identify and separately describe as applicable, variance impact(s) to:<br>    a. Scope (technical approach, completion, acceptance)<br>    b. Schedule (duration, basis of duration, integration, sequencing, predecessors, successors, logic ties, milestones, total float)<br>    c. Budget<br>        i. Labor (direct labor rates/quantities)<br>        ii. Subcontract Usage Based Services (UBS/ X Codes) Table J-3 (rates/quantities)<br>        iii. Subcontract P/O (A/G Code and Cost Element 21)<br>        iv. Material/Equipment (Cost Element 10)<br>        v. Other Originated Cost<br>        vi. Overhead Allocations (Rates)<br>    d. Identify and disclose impacts to performance-based incentives, recovery plans, or other commitments/contractual deliverables/drivers not listed above.<br>    e. Identify and disclose efforts to determine impacts to other control account scope, schedule, or budget.<br>    f. Disclose and discuss the To Complete Performance Index (TCPI) and provide an assessment of its reflection of the control account(s) required performance relative to the physical progress of the scope. State whether the TCPI is accurately reflecting the performance required to complete the scope within the current EAC.<br>    g. Identify and quantify impacts to the current EAC in correlation to the TCPI. | Note(s):<br><br>1. Variance impact explanation must focus on the deviation from the plan. The impact explanation should definitively address what the impacts of the deviation are, consistent with the plan that is being used to measure performance.<br>2. With integrated tools and processes, i.e., schedule, it is unlikely that there would be no "Impact" to the subject scope and other control account scope. Do not mark "N/A" under "Impact" unless it can be demonstrated.<br>3. Given #1 above, if there is no impact identified, there must be a stated basis or reason.<br>4. Again, when providing the deviation impact against the approve plan, use the earned value terminology…see #4 above. |
| Variance Analysis – Corrective Action | |
| 1. Identify corrective action required to mitigate recurrence of variances that have exceeded established thresholds.<br>    a. Corrective actions must be:<br>        i. deliberate and specific action(s)<br>        ii. assigned to specific individual(s)<br>        iii. with implementation, follow-up, completion, and close-out dates identified<br>        iv. approved by the Project Manager<br>        v. documented/recorded in the Corrective Action Log.<br>    b. If no corrective action is required, there must be a stated basis or reason | Note(s):<br><br>1. Corrective actions shall be in accordance with the WRPS Problem Evaluation Request (PER) Procedure TFC-ESHQ-Q –C-01 current version.<br>2. Corrective Actions Logs shall be the focus of Project Managers/Control Account Manager weekly meetings to status and track corrective actions to closure through validation of completed actions. |

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This EFCOG EVMS Subgroup "Best Practices" paper is based on the tenants of ANSI/EIA-748-C Intent Guide.

**"Guideline 23 "Identify Significant Variances for Analysis"**

b) Identify, at least monthly, the significant differences between both planned and actual schedule performance and planned and actual cost performance, and provide the reasons for the variances in the detail needed by program management.

Intent

The purpose of this guideline is to ensure both significant schedule and cost variances are analyzed, at least monthly, at a level of detail required to manage the effort; i.e., to enable management decision-making and corrective action.

Comparing the budget value of work completed to the budget value of work scheduled during a given period of time provides a valuable indication of schedule status in terms of dollars-worth of work accomplished. This schedule variance (SV) may not, however, clearly indicate whether or not scheduled milestones are being met, since some work may have been performed out of sequence or ahead of schedule while other work has been delayed. Schedule variance does not indicate whether a completed activity is a critical event or if (or by how much) delays in an activity's completion will affect the completion date of the project.

A formal time-phased, time-based scheduling system, therefore, must provide the means of more clearly determining the status of specific control accounts (or lower-level tasks/activities), milestones, and critical events. Schedule analysis must address the time impact to the schedule plan when a significant variance exists. By addressing the time impact for each significant variance, a true and representative impact to the schedule plan is quantified. A key concept required to support schedule analysis is to ensure that work is planned in discrete elements that reflect actual accomplishment. This helps to ensure that time-based schedule variances are ultimately reported. The analysis should identify potential schedule accomplishment and milestone problems with respect to the integrated network schedule and thus help to ensure routine evaluation of the critical path, as applicable.

Comparing the budgeted value of work completed to the actual cost of that work provides a valuable indication of the cost efficiency of work accomplished. This cost variance provides management an indicator of actual cost problems and may be trended to see future impacts. Cost variance may be discussed in terms of rate impact versus volume (hours) impact for the significant elements of cost. Only variances that have a significant impact on the execution of the project should be analyzed in detail. Project procedures defining thresholds are normally used to define the significant level applicable to that situation.