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Earned Value Reporting – Guidance on definitions and acceptable practices

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1 Purpose

This guidance note forms part of the suite of documents comprising the Planning and Programme Controls standard and supports the series of documents relating to the use of Earned Value within Investment Projects.

~~Application of Level of Control Project Codes define the level of detail project schedules should have. They aid in the auditing of P3e plans in terms of outlining the expected planning detail. For example, projects classified LoC 1 would be expected to have detailed fully logic linked plans, and all activities in the plan would be expected to have at least one predecessor and one successor.~~

2 Scope

The Network Rail standard NR/L3/INI/PG115/PS/015 specifies the process for using Earned Value on projects delivered within the Network Rail Investment Projects group.

This guidance note provides supporting supplementary information with regards to the acceptable approaches and methods that could be utilised by the project.

- What variations apply to its use across the defined spectrum of projects, e.g. small projects compared to Major Projects/Programmes.
- Define the detailed processes that assure the integrity of the information in baselines and for progress and forecasts in and out of the planning system.
- The measurement of progress and variances from the baseline cost and schedule plan.
- Defining the reporting and analysis requirements. Commonly these contain tables of information, Gantt charts, S-curves and variance analysis (this is covered later).

NR/L3/INI/PG115/PS/017, *Earned Value Reporting – Guidance on set up and maintenance of Primavera schedules* covers the set up and use of the Primavera Planning application to support EV use within Investment Projects.

3 Definitions

For the purpose of this standard the following terms and definitions apply.

Planned Value (PV) or Budgeted Cost of Work Scheduled (BCWS)

is the budget allocated to implement a piece of work. It is the agreed cost estimate planned to be spent on the piece of work (activity) and when it is time phased what should have been achieved/spent by a specific point in time can be established. This is then summated through the structures, Oracle Project Contract Tasks and the Work Breakdown Structure, for example. It is the basis for the Authority request at the start of the project/stage. At the project level, it is the time phased budget for the

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project, representing the project scope and schedule objectives, and is there as the basis for both time and cost assessment of the progress on the project.

Cost of Work Done (COWD) - Actual Cost (AC) or Actual Cost of Work Performed (ACWP)

is the actual cost incurred in completing a piece of work. At the project level, it is the valuation of the liability of the project for all goods and services to that project at a point in time. This is provided at the Oracle Project Contract Task level, rather than the work (activity) level. This represents what it has actually cost to do the work achieved. It covers the cost of, resources (man hours * labour rates), expenses, 3rd party invoices and approved claims for work not yet invoiced. It is a measure of what the work achieved actually cost.

Earned Value (EV) or Budgeted Cost of Work Performed (BCWP)

is the percentage of the Planned Value equal to the percentage of the work actually completed/achieved to date. This can be measured in a number of ways, and this will be explained in the next section. It is what the amount of work achieved should have cost according to the Planned Value, the earned value of the work actually achieved.

Budget at Completion (BAC)

is the project level summation of the planned cost of all the work required on the project.

Anticipated Final Cost (AFC)

is the sum of the Cost of Work Done (COWD) and the Estimate to Complete (ETC), and is the most knowledgeable estimate of the final project cost. Oracle Projects also includes a check amount (Current Contract Value (or CCV)), plus unapproved changes and claims. If there is a difference between the AFC and CCV plus claims, this indicates that change control may be required.

Cost Performance Index (CPI)

is a measure of efficiency against the budget for the project/stage/work package and is calculated as Earned Value divided by Cost of Work Done. A value that is greater than 1 indicates efficiency.

$CPI = EV/COWD$.

Cost variance (CV)

is calculated as Earned Value – Cost of Work Done. This quantifies the £ value of over or under spend and, when used with the Cost Performance Index (CPI), helps focus on those projects/stages/work packages that require the most help. If negative, it suggests cost overruns. Schedules tend to be front end loaded, thus if we overrun

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in the early well defined stages, how can we expect to recover later when the plans/budgets are more uncertain.

$$CV = EV - COWD$$

Schedule Performance Index (SPI)

is a measure of time performance against the plan and is calculated as Earned Value divided by Planned Value. It is calculated from the activity start to the Project Data Date, this being the date to which the progress update is being performed, in the Project Baseline. A value greater than 1 suggests the project/stage/work package is ahead of schedule and a value of less than 1 suggests the project/stage/work package is behind schedule or less work than expected has been completed.

$$SPI = EV/PV.$$

Schedule Variance (SV)

is calculated as Earned Value – Planned Value. This quantifies the value of variance against between the Planned Value and Earned Value. When used with the Schedule Performance Index (SPI), helps focus on those projects/stages/work packages with the most adverse variance. This determines the schedule position for the period being measured and also the cumulative position.

$$SV = EV - PV$$

Estimate to Complete (ETC)

is the most knowledgeable estimate of the remaining work on the work package/stage/project. It can be based on performance to date (e.g. cost to date, previous ETC/EAC trends, required efficiency to recover), the impact of any corrective actions, known/anticipated downstream problems (e.g. using risk reviews, anticipated changes to scope of work), this can also be called the Latest Revised Estimate (LRE). It is important that $ETC = BAC - COWD$ is not used, as this will inevitably provide a false picture of project status. The Estimate to Complete should be an objective assessment of the work to go, in the same way as Earned Value is an objective assessment of work completed.

Estimate at Completion (EAC)

is calculated as Cost of Work Done (COWD) + Estimated Cost to Complete (ETC), the latter is the most knowledgeable estimate of the remaining requirements scope, schedule and cost.

$$EAC = COWD + ETC.$$

Future Efficiency - To Complete Performance Index (TCPI)

is calculated by the formula, $TCPI = (BAC - EV) / (EAC - COWD)$. If this indicates an unrealistic level of efficiency for the rest of the project, it suggests the Estimate to Complete for the project may also be unrealistic/optimistic, as $EAC = COWD + ETC$.