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CAN/CGSB-187.2-99

ICS 01.040.01

WITHDRAWAL

March 2012

Project Performance Management

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Mars 2012

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Project Performance Management

National Standard of Canada

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PROJECT PERFORMANCE MANAGEMENT

Prepared by the
Canadian General Standards Board 

Approved by the
Standards Council of Canada 

Published June 1999 by the
Canadian General Standards Board
Ottawa, Canada K1A 1G6

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Acknowledgment is made for the translation of this National Standard of Canada by the Translation Bureau of Public Works and Government Services Canada.

FOREWORD

The Cost/Schedule Performance Management Standard (C/SPMS) CGSB-187.1-93 was developed for Major Crown Projects (MCPs) and other high profile government projects using the U.S. Department of Defense Cost/Schedule Control Systems Criteria as a starting point. C/SPMS was published as a Canadian standard in late 1993. With the introduction of C/SPMS for major projects, a need was recognized to define a core set of criteria suitable for a wider range of projects, while recognizing that additional requirements may be associated with government contracting.

Use of this standard is encouraged in a project environment whether or not a contractual requirement is involved. This standard is not recommended for projects with the sole purpose of delivering commercial products, services, or level of effort activities.

Withdrawn/Retirée

CANADIAN GENERAL STANDARDS BOARD

PROJECT PERFORMANCE MANAGEMENT

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CANADIAN GENERAL STANDARDS BOARD

PROJECT PERFORMANCE MANAGEMENT

1. SCOPE

- 1.1 This standard defines a core set of criteria and principles to be applied in the management of projects to ensure sound performance management and visibility into project status.

2. PRINCIPLES OF APPLICATION

- 2.1 This standard provides principles of application for effective project performance management. These principles include the following:
- a. Work scope breakdown and responsibility assignments that include joint technical, schedule and cost objectives
 - b. Establishment and maintenance of a "baseline" that integrates work scope, activity schedules, resource and cost targets
 - c. Evaluation of progress compared to the baseline, and analysis of resource and cost budgets for work performed ("earned value") compared to expended resources and costs
 - d. Reassessment and projection of schedules, resource needs and costs to completion, taking into account current project conditions, commitments and performance trends
 - e. Status reporting and management decisions that benefit from responsibilities for the joint control of technical, schedule and cost performance
 - f. Documentation and procedures to support the implementation of the standard, including periodic assessments of effective and efficient implementation.
- 2.2 In a contract environment, it is the intent of this standard that the contractor decides how best to comply with the requirements.

3. TERMINOLOGY

- 3.1 For the purpose of this standard, the following definitions apply:

Activity (Activité)

An item of work in support of the work scope. An activity consumes time.

Actual Costs (Coûts réels)

The costs actually incurred and recorded for work performed.

Baseline (Base de référence)

The work scope, the scheduled plan of milestones and activities, and their time-phased budgets together constitute a Baseline.

Cost Variance (Écart de coût)

A measure of the amount that Actual Costs vary from the Baseline. Cost Variance equals Earned Value minus Actual Cost.

Detailed Schedule (Calendrier détaillé)

A plan of activities for all work. The detailed schedule would typically cover activities up to at least the next major project milestone. The detailed schedule supports and is consistent with the Master Schedule.

Direct Costs (Coûts directs)

The costs specifically identified with the project.

Earned Value (Valeur comptabilisée)

The value of completed work expressed in terms of the budget assigned to that work.

Indirect Costs (Coûts indirects)

The costs for common or joint objectives that cannot be specifically identified with a particular project or activity; however, they may be allocated to projects on a prorated basis. Also known as overhead or burden.

Level of Effort (Participation)

Work of a general or supportive nature. Examples are supervision, project administration and contract administration. Level of Effort is measured only in terms of resources actually consumed within a given time period.

Management Control Point (Point de contrôle de gestion)

A point on the Work Breakdown Structure where budgeted and actual costs, schedule and work scope are integrated, planned and managed.

Management Reserve (Réserve de gestion)

A portion of approved project budget, under the control of management, which is reserved for unidentified or unexpected work inside the scope of the project. This reserve is excluded from the baseline until it is assigned.

Master Schedule (Calendrier principal)

The highest summary level schedule for a project showing the overall phasing and all major interfaces, key milestones and significant work elements.

Milestone (Étape)

A significant project event.

Schedule Variance (Écart du calendrier)

A measure of the amount that schedule progress varies from the Baseline. Schedule Variance equals Earned Value minus Budget.

Time-Phased Budget (Budget fractionné)

The sum of budgets time-phased in accordance with the baseline schedule. When summed at selected higher level elements of the Work Breakdown Structure, this shall include both direct and indirect budgets.

Work Breakdown Structure (Structure de répartition du travail)

A family tree that organizes, defines, describes, and graphically displays the work scope to be accomplished.

4. REQUIREMENTS

The requirements for project performance management are contained in this section. Appendix A provides guidance for interpreting and implementing these requirements.

- 4.1 **Work Breakdown and Responsibilities** — These requirements provide for a structured breakdown of the total project work scope and the assignment of responsibility for the management of integrated technical, schedule and cost objectives.
 - 4.1.1 All work scope to be accomplished as part of the project shall be defined and described in a hierarchical structure called a Work Breakdown Structure (WBS).
 - 4.1.2 Management control points shall be defined at suitable points in the WBS. The project manager, individual managers, or team leaders shall be assigned and take responsibility for combined scope, technical, schedule, and cost performance for all work at their designated management control points.
 - 4.1.3 The breakdown of work shall be sufficiently detailed to provide visibility into major subcontracting work and likely problem areas (e.g. development). Where work cannot be defined as other than level of effort, it shall be sufficiently segregated from discrete effort work to maintain visibility into performance.
 - 4.1.4 Where summary level WBS elements are used to define work that is not yet planned in detail, this work shall be fully broken down to meet the above requirements and responsibilities accepted before the work is planned to start.
- 4.2 **Work Plan, Schedules and Budgets** — These requirements provide for the establishment of an integrated work scope, activity schedule, and resource or cost target baseline in order to provide a reference for evaluating work status and remaining work.
 - 4.2.1 A master schedule shall be prepared to show timing of significant project events, key milestones, high level or summary activities, and shall take into account associated dependencies.

- 4.2.2 A detailed schedule shall be prepared to show how the work scope defined in the WBS will be achieved. The activities in the detailed schedule are a further breakdown of work at or below management control points on the WBS. The detailed schedule shall support and shall be consistent with the master schedule.
- 4.2.3 Activities shall be planned in detail prior to their start. The level of detail shall be sufficient to allow objective assessment of work progress. Clearly defined products, milestones, technical performance goals, or other indicators shall be identified to allow objective assessment of full or partial completion status.
- 4.2.4 Activities shall have budgets established as required for the work. Different categories of budget, such as labour, material or other types of cost shall be separately identified.
- 4.2.5 The availability of resources associated with activity budgets shall be confirmed.
- 4.2.6 The units of measure used for budgets shall enable budgets for work performed and actual resources consumed to be compared at management control points. Budget units may be represented by labour hours, dollars, or other appropriate metrics.
- 4.2.7 The units of measure shall enable budgets for work performed and Actual Costs (including direct and indirect costs) to be compared at selected levels of the WBS.
- 4.2.8 The sum of the activity budgets shall provide a Time-Phased Budget at management control points and at higher level summary elements of the WBS. The baseline for measuring project performance shall include the work scope, the master and detailed schedules, and their Time-Phased Budgets.
- 4.3 **Progress Assessments and Forecasts** — These requirements provide for the evaluation of progress relative to the baseline, for projections of status at completion, and for visibility into project performance by both management and customer.
- 4.3.1 Project status and performance shall be assessed and recorded at a frequency and at a level of detail that is most effective for management visibility and for corrective actions.
- 4.3.2 Completion status, forecast completion dates and resource needs for activities shall be assessed and compared to the baseline.
- 4.3.3 Changes to master and detailed activity schedules and associated resource needs for future work shall be recorded separately from the baseline data.
- 4.3.4 An assessment shall be made of the value of the work performed (Earned Value).
- 4.3.5 At management control points and at the selected higher levels of the WBS, the following comparisons shall be made:
- a. Earned Value shall be compared with actual hours, costs or other measurable units to determine cost variance;
 - b. Earned Value shall be compared with the Time-Phased Budget to determine schedule variance;
 - c. Comparisons at the selected higher levels of the WBS shall include analysis at the total cost level, and shall take into account the impact of actual applied direct and indirect costs as applicable.
- 4.3.6 A periodic review shall be made of the updated schedule and associated cost forecasts to provide management with projections of schedule and cost at completion for the overall project. These projections shall consider project performance to date, commitments and estimates of future conditions.
- 4.4 **Baseline Management and Revisions to Data** — These requirements ensure that project performance will be compared to a realistic and approved baseline and to provide for control of changes to this baseline.
- 4.4.1 The baseline shall be updated to reflect changes to work scope, schedule or cost objectives as necessary to maintain a realistic reference. Frequent changes shall be avoided such as to preserve the integrity of performance measurement. All baseline changes shall be fully traceable.
- 4.4.2 Retroactive changes to reported data shall be limited to correction of errors and accounting adjustments. All such changes shall be fully traceable.

- 4.4.3 A part of the approved project budget may be assigned to a Management Reserve for unidentified or unexpected activities required to accomplish the defined work scope of the project. Any such reserve shall be kept separate from the baseline until it is assigned by the responsible manager to cover new or revised activities.
- 4.4.4 Customer or management approval as appropriate shall be required to allow the following changes:
- changes that significantly affect WBS content at summary reporting levels
 - changes that would make the new baseline schedule conflict with contractual milestones or other joint milestone objectives
 - increases to the total allocated budget approved by management or the customer.
- 4.4.5 A record shall be made of reasons for significant changes to the baseline and for changes to Management Reserve.
- 4.5 **Implementation Assurance** — These requirements provide for documentation and assessments to ensure that the standard is effectively implemented.
- 4.5.1 Documentation and procedures shall be established and maintained to enable practical and consistent implementation of this standard while not inhibiting reasonable flexibility and on-going improvements.
- 4.5.2 Assessments shall be conducted periodically to ensure effective implementation of the standard. Assessments are also recommended in the event of recurring major inconsistencies with reported or available data, or other indications of incorrectly reported status.
- 4.5.3 The assessments of implementation described above shall emphasize:
- management commitment to effective use of the standard;
 - confidence in the accuracy of status data;
 - use of associated status data in managerial and customer reviews;
 - identification of any shortcomings in implementation;
 - resolution of problems that have a significant impact on effective use of the standard.

5. NOTES

5.1 Related Publications

- 5.1.1 Canadian General Standards Board
CGSB-187.1-93 — Cost/Schedule Performance Management Standard (C/SPMS).
- 5.1.2 U.S. Department of Defence
DFARS Clause 252.242-7005, December 1991 — Cost/Schedule Status Report (C/SSR).
- 5.1.3 American National Standards Institute, Inc./Electronics Industries Alliance:
ANSI/EIA 748 — Earned Value Management Systems.
- 5.1.4 Australian Department of Defence
DEF(AUST)5658 — Cost Schedule Status Reporting (CSSR) Specification and Implementation Guide.

5.2 Sources of Referenced Publications

- 5.2.1 The publication referred to in par. 5.1.1 may be obtained from the Canadian General Standards Board, Sales Centre, Ottawa, Canada K1A 1G6. Telephone (819) 956-0425 or 1-800-665-CGSB (Canada only). Fax (819) 956-5644.
- 5.2.2 The publication referred to in par. 5.1.2 may be obtained from the U.S. Department of Commerce, National Technical Information Services, Springfield, VA 22161, U.S.A.
- 5.2.3 The publication referred to in par. 5.1.3 may be obtained from the American National Standards Institute, Inc. 11 West 42nd Street, New York, NY, 10036, USA.

5.2.4 The publication referred to in par 5.1.4 may be obtained from the Director, Acquisition Management Systems, Department of Defence, Campbell Park Offices (CP4-1-03 A), Canberra 2600, Australia.

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(This guidance is not mandatory and is not to be construed as an extension to the requirements of Section 4.)

GUIDANCE ON INTERPRETATION AND IMPLEMENTATION

A1. WORK BREAKDOWN AND RESPONSIBILITIES

(Reference par. 4.1)

- A1.1 **WBS Dictionary** — The work scope for each WBS element is often defined in a document referred to as a WBS Dictionary. Definitions should clearly state boundaries and key interfaces between the work scope of individual WBS elements. Cross referencing to key technical and contractual documents assists with verifying the completeness of the work scope definition.
- A1.2 **Project WBS (PWBS)** — The owner or customer of a project may provide a structure for bid solicitation and reporting requirements by specifying the upper levels of the WBS, which define the entire project. Depending on the acquisition strategy, the PWBS may be used to define the starting points for one or more contract Work Breakdown Structures.
- A1.3 **Contract WBS (CWBS)** — Contractors will extend the (PWBS) to the levels necessary to fully define and complete the contract scope.
- A1.4 **Solicitation Phase WBS** — To facilitate a comparative evaluation, the CWBS submitted with a proposal may be required to be an extension of PWBS included in the solicitation. However, for purposes of contract implementation it is important that the final CWBS reflects the management approach of the performing organization. The final structure should therefore be a matter for contract negotiation.
- A1.5 **WBS Development** — Levels of WBS breakout and Management Control Points should be suited to the particular type of business or management approach to be used. The number of levels across a WBS need not be uniform, but within particular areas (e.g. development work areas) should reflect the complexity and risk.
- A1.5.1 **Management Control Points on the WBS** — Management Control Points may be defined at any suitable level of the WBS, typically at summary levels. Breakdown of work below Management Control Points to the level of individual activities may be implemented using further extensions of the WBS. Management Control Points could be compared to Cost Accounts or Control Accounts in C/SPMS or EVMS terminology.
- A1.5.2 **Responsibilities for Management Control Points** — In some organizations, responsibilities may be assigned to functional areas of the organization as well as or instead of to individuals. Depiction of the assignment of WBS element responsibilities according to a hierarchical "Organization Breakdown Structure" (OBS) may be presented as a simple listing, or as a "Responsibility Assignment Matrix" (RAM).
- A1.5.3 **Level of Effort** — Work designated as Level of Effort provides limited useful schedule or cost performance status information. Such effort should be minimized in proportion to other activities under the same summary reporting WBS elements.

A2. WORKPLAN, SCHEDULES AND BUDGETS

(Reference par. 4.2)

- A2.1 **Schedules** — Project schedules may consist of a hierarchical structure, from detailed activity schedules up to a master schedule. In a "rolling wave" approach schedules would typically cover activities at a detailed level up to at least the next major project milestone, or as otherwise agreed.
- A2.2 **Schedule Dependencies and Networks** (Reference par. 4.2.1) — A Schedule Network and associated Critical Path Method analysis is not a specific requirement of PPMS, although it may be a contract requirement. Automated or manual techniques should be used to ensure that logical dependencies of activities and milestones are acknowledged.
- A2.3 **Activity Breakdown for Effective Earned Value Assessment** (Reference par. 4.2.3) — Trends in cost or schedule variance should be apparent when earned value and costs are summarized at management control points, and when activities are sufficiently detailed for effective schedule and resource management. Breakdown of activities into

objectively measurable elements of not more than two or three months duration may suffice. When based on other discrete information, such as from other more detailed schedules or from detailed manufacturing and materials planning systems, the use of a percentage complete method may suffice. It may also be appropriate to assess progress on tasks in direct proportion to the progress on other discrete activities that they support (i.e. as “apportioned effort”).

A2.4 Methods of Representing Activity Budgets and Earned Value (Reference par. 4.2.4 to 4.2.7) — The method for setting up and comparing budgets, earned value and actual costs should ideally result in zero variances if everything goes according to plan. Assigning baseline budgets in the same units of measure and projected timing that actual costs will be recorded will facilitate this aim.

A2.5 Material Budgets (Reference par. 4.2.4) — Typical project accounting methods capture actual costs for project-specific materials either on receipt or on incorporation into an assembly. The timing of project material budgets should reflect the timing of actual costs associated with the accounting method to be used.

A2.6 Subcontractor Data (Reference par. 4.2.4) — Methods for incorporating subcontractor data into a prime contractor’s data depend on the type of subcontract and methods of payment to the subcontractor.

Possible methods include:

- a. Prime contractor activities could reflect specific subcontractor payment milestones and/or activities, with associated budgets reflecting anticipated timing and amounts of these payments. This approach if used, should include an adequate basis for schedule progress assessment.
- b. Incorporation of reported subcontractor data directly into the prime contractor’s budget and earned value data is possible when the subcontractor is also using PPMS compatible earned value measurements. However in this case, the subcontractor’s data would need to be at their sell price level for the required comparisons with actual costs to apply at the prime contract level.

The integration of subcontractor data into prime contractor data and reporting does not negate the utility of evaluating subcontractor status reports by themselves.

A2.7 Units of Measure for Budgets (Reference par. 4.2.6 to 4.2.8) — Budgets at Management Control Points may be represented in any suitable form such as labour hours, material dollars, subcontract dollars, or other appropriate units, providing that the required comparisons can be made between earned value and actual units expended. However, at higher selected (reporting) levels of the WBS it should be possible to show and compare budgets, earned value and actual costs in total dollars including overheads.

A2.8 Separation of Indirect Costs (Reference par. 4.2.7) — The term “General & Administrative” (G & A) is often used to describe indirect expenses incurred for the administration of a company. Some fraction of indirect costs such as G & A may be budgeted and accounted for at the top summary level of WBS, while other indirect costs are incorporated at other WBS levels.

A2.9 BCWS and BCWP (Reference par. 4.2.8) — The Time-Phased Budget is known as the “Budgeted Cost of Work Scheduled” (BCWS), and Earned Value is known as the “Budgeted Cost of Work Performed” (BCWP).

A2.10 Project Budget or Total Allocated Budget (Reference par. 4.2.8) — The project budget consists of the sum of the following items:

- a. the Time-Phased Budget (total in dollars, including indirect budgets)
- b. the Undistributed Budget. It may be desirable to temporarily identify the Undistributed Budget (UB) for new project scope that has yet to be included in the Baseline.
- c. the Management Reserve.

A2.11 Budget at Completion — The “at completion” value of the Time-Phased Budget is also known as the “Budget at Completion” (BAC). The sum of the BAC and UB is known as the “Performance Measurement Baseline” (PMB).

A3. PROGRESS ASSESSMENTS AND FORECASTS

(Reference par. 4.3)

- A3.1 **Schedule and Resource Updates** — A primary objective of regular progress assessments is to update schedules and associated resource requirements for current activities, and to identify impact on future work. The extent to which detailed schedule and resource updates for future work are reassessed is discretionary, and may be determined by the need for a reasonable management projection of schedules and costs to completion.
- A3.2 **Cost Variance** — Cost Variance is calculated as Earned Value less Actual Cost (BCWP - ACWP). A positive value indicates that work has been accomplished for less cost than planned in the baseline. A “Cost Performance Index” is often expressed as $(\text{Earned Value to date})/(\text{Actual Cost to date})$, with values higher than unity indicating a below budget cost performance trend.
- A3.3 **Schedule Variance** — Schedule variance is usually calculated as Earned Value less Time-Phased Budget to date (BCWP - BCWS). A schedule variance with a positive value is usually good as it represents an aggregate work status ahead of the baseline. Schedule variance based on earned value could alternately be expressed as a difference in weeks or days between the BCWP and BCWS curves. A “Schedule Performance Index” may be defined in a similar way to the Cost Performance Index as $(\text{Earned Value to date})/(\text{Time-Phased Budget to date})$. It is very important to note that schedule variances derived from earned value data may not reveal slips in low budget activities that are affecting key milestones.
- A3.4 **Reconciliation of data with accounting systems** — It is recommended that actual cost data used for performance management reconcile to formal project accounting records. Differences due to the systems or methods used should be explained if they significantly affect cost variances. Government contracts calling for PPMS may require actual cost data to be reconcilable to formal project accounting records.
- A3.5 **“Calculated Estimate at Completion”** — Formulae based on Cost and Schedule Variances are often used to predict costs at completion. One example is to calculate projected cost at completion as: $[(\text{Actual cost to date}) \text{ plus } (\text{Budget at Completion minus Current Earned Value})/(\text{Cost Performance Index to date})]$. It is recommended that such projections be used to determine the need for bottom-up estimates to completion, which incorporate knowledge of current and future conditions.
- A3.6 **Cost at Completion, or Estimate At Completion (EAC)** — Evaluations of the EAC are recommended at major project milestones. Total or partial evaluations should also be considered when there are significant changes to project conditions or when there is a significant discrepancy with a Calculated EAC. Evaluations should take into account actual costs to a point in time and objective estimates of costs for remaining work (also known as Estimate to Complete).
- A3.7 **Graphic Performance Data** — The use of graphs to show cost and performance data is recommended. The enhanced visibility of changes to baseline totals and management reserve, along with other end-to-end cost and earned value data, can simplify assessments of status and trends to completion.

A4. BASELINE MANAGEMENT AND REVISIONS TO DATA

(Reference par. 4.4)

- A4.1 **Updates to Baseline** — It may be appropriate to update the baseline following a significant change in scope or approach to the project, or in the event of a major change to the Estimate at Completion. Assessments of a plan that is significantly out-of-date can severely degrade the value of status data, and undermine ownership of the data at the working manager level. However, frequent changes to the reference baseline may cause false impressions of progress and performance, and should be avoided.
- A4.2 **Updating the Baseline for “In-process Activities”** — One recommended method is to close the in-process activity, reduce its budget to match the current earned value, and redefine baselines for remaining work in one or more new activities.
- A4.3 **“Re-Planning”** — The term “Re-planning” is often used to denote a change in the baseline while staying within the current overall technical, cost and schedule targets.
- A4.4 **“Over Target Baseline”** (Reference par. 4.4.4) — It may be advisable for management and the customer to allow changes in baseline budget and/or schedules to exceed approved values. This would ensure measurement of progress

and useful variance reporting against meaningful revised objectives. This type of re-planning indicates a significant overrun problem for which management and the customer agree that there is no practical recovery option. The resulting baseline is known as an "Over Target Baseline" (OTB).

A5. IMPLEMENTATION ASSURANCE

(Reference par. 4.5)

- A5.1 System Documentation** — The documentation and procedures may include a consolidated "System Description" that describes at high level how the standard is implemented. Such a document should avoid inclusion of details that could change during normal system updates and that would not impact on the ability to meet PPMS requirements. References to separate detailed documents or procedures can make ongoing changes or process improvements easier.

A6. RECOMMENDED CONTENT OF STATUS REPORTS

(Reference par. 4.1 to 4.4)

- A6.1 Report Types and Contents** — In order to encourage efficiency and consistency, customer report requirements relating to this Standard should be aligned with contractor internal management reporting. Performance data should be provided at a mutually agreed upon level of the WBS. An approach that supports open access to status data and expanded levels of detail on an exception basis is recommended.

- A6.1.1** Suggested items for Initial and As Required submissions are the WBS, the Master Schedule, and the Time-Phased Budget. Initial submission of the Baseline reports should allow sufficient time for realistic incorporation of actual conditions at the start of the project.

- A6.1.2** Suggested items for inclusion in Periodic Submissions are the Master Schedule Status relative to the Baseline, cost and schedule performance data, and a narrative problem analysis that addresses the top technical, schedule, cost or other concerns of the project.

- A6.2 Report Formats and Methods of Submission** — Most of the references listed in this standard contain example reporting formats. However, emphasis should be on timely and accurate data content rather than on prescribed formats. The use of graphs for presenting schedules and top level cost performance is encouraged. Methods of providing status data include:

- a. direct on-line electronic access to appropriate areas of the project management database. Such access should be associated with notification when data has been finalized for the specific report period.
 - b. provision of, or access to, electronic "snapshots" of data at each reporting period.
 - c. formatted hard or soft copy (i.e. documented) reports.
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A6.2 **Formats des rapports et méthodes de présentation** — La plupart des références énumérées dans la présente norme contiennent des exemples de formats de rapports. Cependant, l'accent devrait être mis sur le contenu de données opportunes et justes plutôt que sur le respect de formats déterminés. L'utilisation de graphiques pour la présentation des calendriers et du rendement des coûts au niveau supérieur est encouragée. Les méthodes utilisées pour présenter les données d'état comprennent:

- a. l'accès électronique en ligne direct aux endroits appropriés de la base de données de gestion de projet. Un tel accès devrait être associé à un avis annonçant que les données ont été finalisées pour une période de rapport déterminée;
 - b. la fourniture d'«instantanés» électroniques des données à chaque période de rapport ou l'accès à ces instantanés;
 - c. des rapports formatés sur papier ou sur support informatique (c.-à-d. documentés).
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Withdrawn/Retirée