

Earned Value Management Systems 32 Criteria

Category 1: Organization

Number	Criteria Discretion	Description on how NOvA complies with the criteria
1-1	Define the authorized work elements for the program. A work breakdown structure, tailored for effective internal management control, is commonly used in this process.	<p>1) NOvA uses Deltek Open Plan™ project planning software to generate the WBS structure. The WBS is defined to appropriate levels for all subprojects, typically to between levels 5-7.</p> <p>2) PPEP Section 5 describes the WBS to Level 2</p>
1-2	Identify the program organizational structure, including the major subcontractors responsible for accomplishing the authorized work, and define the organizational elements in which work will be planned and controlled.	<p>1) PPMP figure 3.1 describes the OBS to Level 2. The WBS and OBS from Level 1 down are very similar.</p> <p>2) The NOvA organizational structure is further defined in NOvA-doc-533, which needs to be updated for the recent changes made to the project organizational structure.</p> <p>3) The Collaborating universities are major sub-contractors in the Project. Universities or Argonne National Laboratory (ANL) are the lead institution for 8 of the 11 Level 2 projects, which are led and staffed by collaborators from those universities. The MOU and SOW process for the universities and Fermilab will specify the authorized work, the organizational structure and detail all required reporting and accounting practices required.</p>
1-3	Provide for the integration of the company's planning, scheduling, budgeting, work authorization and cost accumulation processes with each other, and as appropriate, the program work breakdown structure and the program organizational structure.	<p>1) PPMP Section 9.2 describes the use of Deltek Open Plan™ and Deltek Cobra™ for integrated cost and schedule management.</p> <p>2) PPMP Section 9.3 describes the work authorization process.</p>

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Number	Criteria Discretion	Description on how NOvA complies with the criteria
1-4	Identify the company organization or function responsible for controlling overhead (indirect costs).	1) The Fermilab Directorate is responsible for controlling overhead. 2) Fermilab's CASB Disclosure Statement Part IV described Fermilab's treatment of indirect costs. 3) Allowable indirect costs at universities will be specified and agreed to in MOU's between the universities or ANL and Fermilab.
1-5	Provide for integration of the program work breakdown structure and the program organizational structure in a manner that permits cost and schedule performance measurement by elements of either or both structures as needed.	1) The implementation of the NOvA EVMS using the Open Plan™ and Cobra™ tools allows for performance measurement by either or both WBS and OBS. 2) PPEP Section 5 describes the WBS to Level 2. 3) The project structures in Open Plan™ and Cobra™ are based on the WBS. Using Cobra® it is possible to extract budget information based on WBS or institution or both.

Category 2: Planning and Budgeting

Number	Criteria Discretion	Description on how NOvA complies with the criteria
2-1	Schedule the authorized work in a manner which describes the sequence of work and identifies significant task interdependencies required to meet the requirements of the program.	1) PPMP Section 6.2 describes methodology used to create the schedule in Open Plan™, from identifying all work to be done, to resource loading, and identifying significant task interdependencies.
2-2	Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress.	1) PPEP Section 7.4 Identifies the Level 1 milestones agreed upon by the DOE, Fermilab management and the NOvA Project. 2) PPMP Section 9.5 describes project performance measurement. 3) PPMP Appendix B lists the Level 1, 2 and 3 milestones for the project.
2-3	Establish and maintain a time-phased budget baseline, at the control account level, against which program performance can be measured. Budget for far-term efforts may be held in higher level accounts until an appropriate time for allocation at the control account level. Initial budgets established for performance measurement will be based on either internal management goals or the external customer negotiated target cost, including estimates for authorized but undefinitized work. On government contracts, if an over-target baseline is used for performance measurement reporting purposes, prior notification must be provided to the customer.	1) PPMP Section 9.4 describes the project baseline development. 2) PPMP Section 6.2 describes the development of the resource-loaded schedule. 2) The higher level “planning package” budge allocation method is not used at Fermilab. Everything is planned in detail at the outset for the duration of the project. If more effective or efficient methods of performing the work are identified before work commences, the level 2 managers will use NOvA’s formal change control process to update the baseline plan. 3) The Project Scheduler is responsible for maintaining the detailed schedule baseline in Open Plan™, and the Project Budget Officer is responsible for maintaining the cost estimate in Cobra™.

Category 2: Planning and Budgeting

Number	Criteria Discretion	Description on how NOvA complies with the criteria
2-4	Establish budgets for authorized work with identification of significant cost elements (labor, material, etc.) as needed for internal management and for control of subcontractors.	<p>1) PPMP Section 6 describes the technical, schedule and cost baseline development by the managers and states that the estimate consists of the cost of items and services to be purchased plus an estimate of the labor effort (time and type) for work planned by Fermilab and personnel at universities and other national laboratories.</p> <p>2) NOvA EVMS Section 3.3 describes escalation rates</p> <p>3) PPMP Section 6.4 describes the contingency calculation process. The project contingency is not part of the base cost.</p>
2-5	To the extent it is practical to identify the authorized work in discrete work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire control account is not subdivided into work packages, identify the far term effort in larger planning packages for budget and scheduling purposes.	<p>1) The resource loaded schedule in Open Plan™ is used to describe all work in project down to lowest level. All efforts can be rolled up to any level desired. Information from Open Plan™ is imported into Cobra™.</p> <p>2) All Control Accounts are made up of one or more Work Packages.</p>
2-6	Provide that the sum of all work package budgets plus planning package budgets within a control account equals the control account budget.	<p>1) Cobra™ generates control account budgets by rolling up the budgets of all of the work packages associated with the control account.</p> <p>2) The Cost Performance Report generated in Cobra™ provides a method to verify that the roll up of work package budgets is equal to the control account budget.</p>
2-7	Identify and control level of effort activity by time-phased budgets established for this purpose. Only that effort which is unmeasurable or for which measurement is impractical may be classified as level of effort.	<p>1) Fermilab's EVMSD Section 2.1.2 describes the LOE method for performance measurement.</p>
2-8	Establish overhead budgets for each significant organizational component of the company for expenses which will become indirect costs. Reflect in the program budgets, at the appropriate level, the amounts in overhead pools that are planned to be allocated to the program as indirect costs.	<p>1) Fermilab's EVMSD Section 3.2 describes Fermilab's indirect cost planning and control.</p> <p>2) Overhead is applied in Cobra™ to generate the project cost.</p>

Category 2: Planning and Budgeting

Number	Criteria Discretion	Description on how NOvA complies with the criteria
2-9	Identify management reserves and undistributed budget.	1) The baseline does not include a management reserve. 2) The baseline does not have any undistributed budget.
2-10	Provide that the program target cost goal is reconciled with the sum of all internal program budgets and management reserves.	1) The CPR will provide monthly verification of budgeted costs for the life of the project.

Category 3: Accounting Considerations

Number	Criteria Discretion	Description on how NOvA complies with the criteria
3-1	Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.	1) Financial data accumulation and costing will be done using the Fermilab standard financial systems. 2) Fermilab's EVMSD Section 3.1 describes how actual costs for labor, vendor invoices for materials and subcontracts and overhead are entered into the accounting system.
3-2	When a work breakdown structure is used, summarize direct costs from control accounts into the work breakdown structure without allocation of a single control account to two or more work breakdown structure elements.	1) There is a one-to-one relationship between Oracle Project Accounting tasks and Cobra™ control accounts.
3-3	Summarize direct costs from the control accounts into the contractor's organizational elements without allocation of a single control account to two or more organizational elements.	1) There is a one-to-one relationship between Oracle Project Accounting tasks and Cobra™ control accounts. Additionally, the OBS mirrors the WBS so no control account is rolled up to more than one element of the OBS.
3-4	Record all indirect costs which will be allocated to the contract.	1) Indirect costs are allocated to the project and recorded in the Fermilab Oracle project accounting system at the close of each month in accordance with Fermilab's established accounting practices. 2) Indirect costs will be uploaded into Cobra™ at the same time and in the same manner as direct costs to the project. Cobra™ facilitates analysis of budgeted versus actual indirect costs by individual control account and/or rolled up to any level of the WBS above the CA level.
3-5	Identify unit costs, equivalent units costs, or lot costs when needed.	Not applicable.

Category 3: Accounting Considerations

Number	Criteria Discretion	Description on how NOvA complies with the criteria
3-6	For EVMS, the material accounting system will provide for <ul style="list-style-type: none"> — accurate cost accumulation and assignment of costs to control accounts in a manner consistent with the budgets using recognized, acceptable costing techniques; — cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of progress payments or actual receipt of material; and — Full accountability of all material purchased for the program including the residual inventory. 	1) Costs of materials purchased are accrued in the lab financial system when the materials have been received and recorded by the lab’s receiving department. 2) The cost of services received but not invoiced are accrued at each month end on the basis of either sound estimates provided by appropriate personnel or unrecorded invoices that have first been validated by appropriate project personnel. 3) Service requests to Fermilab support organizations are also use to procure materials, charges for which are recorded by cost transfer at month end.

Category 4: Analysis and Management Reports

Number	Criteria Discretion	Description on how NOvA complies with the criteria
4-1	<p>At least on a monthly basis, generate the following information at the control account and other levels as necessary for management control using actual cost data from, or reconcilable with, the accounting system.</p> <ul style="list-style-type: none"> — Comparison of the amount of planned budget and the amount of budget earned for work accomplished. This comparison provides the schedule variance. — Comparison of the amount of the budget earned to the actual (applied where appropriate) direct costs for the same work. This comparison provides the cost variance. 	<p>1) Deltek Cobra™ will be used to produce monthly, standard, EVMS reports and graphs that will present both cumulative and monthly BCWS, BCWP, ACWP, cost and schedule variances, and other information as needed. The data will be used by the project office to determine project status and to determine corrective action when needed; and will be provided to all Level 2 managers and any interested Level 3 managers for use in measuring subproject status.</p>
4-2	<p>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.</p>	<p>1) Monthly reports showing variances between both planned & actual schedule performance and planned & actual cost performance will be generated by the project office.</p> <p>2) In cases where both the dollar threshold and the CPI/SPI limits are exceeded, written variance reports are required. It is the responsibility of the appropriate WBS manager to provide the required variance reports to the Project Manager, and to develop and implement corrective action plans, if needed.</p> <p>3) The variance analysis section of the monthly report to DOE will contain the Project Manager's summary of significant variances, their causes, their likely impacts, and a description of corrective action(s) taken or planned. Significant cost variances likely to be sustained will be reflected in the EAC.</p>

Category 4: Analysis and Management Reports

Number	Criteria Discretion	Description on how NOvA complies with the criteria
4-3	Identify budgeted and applied (or actual) indirect costs at the level and frequency needed by management for effective control, along with the reasons for any significant variances.	<p>1) Planned and Actual indirect costs will be reported in the monthly CPR prepared by the NOvA Budget Officer. This information will be given to the Project Manager and the Level 2 managers.</p> <p>2) Indirect rates are controlled by the lab, and any changes in indirect rates will be communicated to NOvA project management via the Budget Officer. Any cost variances should be the result of cost variance in the procured material or labor.</p>
4-4	Summarize the data elements and associated variances through the program organization and/or work breakdown structure to support management needs and any customer reporting specified in the contract.	<p>1) Cobra™ will be used by the NOvA Budget Officer to produce monthly, standard EVMS reports and graphs that will present both cumulative and monthly BCWS, BCWP, ACWP, schedule & cost variances, and other information as needed.</p> <p>2) These monthly reports with both planned versus actual schedule performance and planned versus actual cost performance and variances, will be distributed to the project manager and all Level 2 managers.</p> <p>3) The report described above will be used as the basis of the monthly report submitted to DOE. In addition to the financial data, the report, generated by the Project Manager, will contain a summary of the variances, their cost and schedule impact, their causes and a description of the corrective action needed.</p>
4-5	Implement managerial actions taken as the result of earned value information.	<p>1) The Technical board meeting following the production of the monthly CPR will be devoted to reports and discussion of all cost and schedule variances. Plans for needed corrective action will be developed in the Level 2 manager's weekly meetings and presented to the Technical Board for discussion and approval by the PM. It is the Level 2 manager's responsibility to understand, monitor, and report on the corrective actions to the Technical Board until the variance is resolved.</p>

Category 4: Analysis and Management Reports

Number	Criteria Discretion	Description on how NOvA complies with the criteria
4-6	Develop revised estimates of cost at completion based on performance to date, commitment values for material, and estimates of future conditions. Compare this information with the performance measurement baseline to identify variances at completion important to company management and any applicable customer reporting requirements including statements of funding requirements.	1) Each month, Cobra™ provides projections and reports the EAC as the sum of the actual costs to date plus the current BCWS for remaining work. 2) A comprehensive “bottoms-up” reevaluation of ETC may be initiated at any time at the discretion of a WBS manager (for his/her system), of NOvA Management, or of DOE. The method used to prepare this estimate is the same as was used to prepare the original base estimate. 3) It is expected that the NOvA Project will make such estimates prior to annual or semi-annual DOE reviews.

Category 5: Revisions and Data Maintenance

Number	Criteria Discretion	Description on how NOvA complies with the criteria
5-1	Incorporate authorized changes in a timely manner, recording the effects of such changes in budgets and schedules. In the directed effort prior to negotiation of a change, base such revisions on the amount estimated and budgeted to the program organizations.	<p>1) After a CR is approved at the appropriate level, as described in the CMP, the Project Manager is responsible for the administrative operation and coordination of the overall baseline change control system in support of all NOvA Project participants.</p> <p>2) Upon approval of the CR, the baselines will be modified to reflect the scope, cost, and schedule impacts of the directed change.</p> <p>3) For directed changes by the DOE, where the real impact may not be known for some time, estimated amounts will be used in planning and management.</p>
5-2	Reconcile current budgets to prior budgets in terms of changes to the authorized work and internal replanning in the detail needed by management for effective control.	<p>1) Updating of the baseline cost and schedule will be done prior to reviews. It is expected that reviews will occur semi-annually, which will provide an opportunity for reconciliation and re-planning at least twice per year.</p> <p>2) The CR form, shown in the NOvA Configuration management Program (NOvA-doc-131), is used to evaluate the cost and schedule impact of the proposed change.</p> <p>3) The Level 2 manager of the affected subproject will make the initial review of the CR and provide an analysis of the differences between the baseline work packages, cost and schedule, and the proposed new ones.</p>
5-3	Control retroactive changes to records pertaining to work performed that would change previously reported amounts for actual costs, earned value, or budgets. Adjustments should be made only for correction of errors, routine accounting adjustments, effects of customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data.	<p>1) Retroactive changes to records will be limited to correction of errors. In general, baseline changes are only able to change future work, and are not allowed to retroactively change previously reported EV calculations.</p> <p>2) A function of Cobra™ will be used that prevents retroactive changes to records.</p>

Category 5: Revisions and Data Maintenance

Number	Criteria Discretion	Description on how NOvA complies with the criteria
5-4	Prevent revisions to the program budget except for authorized changes.	<p>1) CR's must be documented, reviewed, and approved at the appropriate levels before the baseline will be modified at any level, as described in the NOvA CMP, Section 7.2.</p> <p>2) Only when the CR is approved by the appropriate level change official does it becomes a Change Order and is submitted to the Project Manager. The PM will update the Change Log, ensure the baselines are modified appropriately, and communicate the action to all affected project participants.</p> <p>3) Access to both Open Plan™ and Cobra™ applications are controlled through server and software password requirements. Only authorized personnel will have access to these programs. They will make only those approved changes communicated to them by the PM.</p>
5-5	Document changes to the performance measurement baseline.	<p>1) Each CR is assigned a unique identifier, and after approval, a change log entry tied to that identifier is made. The CR identifies each affected WBS task in the baseline and documents the effect of the change on the technical, cost and schedule baseline.</p> <p>2) Entry of CR's will be electronically tracked by the Cobra™ software in the program change log.</p>