



Closeout Presentation

Fermilab Director's & DOE Fermi Site Office's

Performance Management System Review of the NOvA Project

June 19-20, 2007

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Executive Summary

The committee overall consensus is that the NOvA project has a considerable amount of the performance management system already in place, and is only lacking a few products or further development of existing materials. The performance management system consists of the software tools, EVMS descriptions, project management documents, and many processes which satisfy DOE Order 413.3A, DOE Manual 413.3-1 requirements, and the ANSI/EIA 748-A-1998 objectives. The committee interviewed eight of the nine NOvA Control Account Managers (CAMs) and found that their level of knowledge varied on earned value and the NOvA Earned Value Management System. It was also apparent that the CAMs are willing to increase their knowledge of EVMS and ready to exercise the system by practicing with monthly reporting as soon as possible. The CAMs also demonstrated ownership of their WBS scope, schedule and budget and had a good understanding of their roles and responsibilities. However, most CAMs lacked experience in working with a performance management system. Further training will enhance the CAMs ability to fully understand and benefit from this system. As the NOvA project begins to use the performance management system, and as experience builds among the CAMs and the management team, the committee expects that existing bugs will be worked out and that project management will benefit from a successfully executed system.

The NOvA Project Management Team has begun to work out the arrangements that will be necessary for Earned Value reporting for work covered under the Cooperative Agreement. The CA requires an MOU between NOvA/Fermilab and U of Minnesota (UMN). The agreed upon reporting arrangements will be described in the MOU. UMN has agreed to provide monthly status reports and financial information. Also, UMN has contracted with a professional project management organization to manage the CA activities. This organization could be the contact for NOvA to partner with on CA activities and establish appropriate EVMS procedures. The willingness of UMN to cooperate with FNAL was demonstrated with the selection of a professional project management contractor. The Committee believes this provides a strong basis for developing an agreement that will get appropriate EVMS reporting in place on the CA activities.

The issues discussed in this report include the NOvA project's current production of detailed narrative project reports, which provide significantly more information and details than required and is not appropriate for Fermilab and DOE senior management. The use of two EVMS description documents, a Fermi document and a NOvA document, could be confusing to the certification team making the certification difficult to obtain. The committee recommends that the project not maintain the NOvA document as a system description. This information may be preserved as a project-specific reference document. The Work Authorization Document as described in the FNAL System Description meets the intent of the ANSI standard. The NOvA project must implement a work authorization process that is compliant with the FNAL System Description. The project management team then needs training on the project's established work authorization process.

As the project moves forward with working the EVMS and evaluating the schedule, the CAMs should keep in mind how value will be earned as tasks are accomplished. There is evidence that in some areas of the schedule, the CAMs did not consider how EV would be implemented. NOvA has selected to use a limited number of available performance measurement techniques (PMTs); limiting the techniques to three: percent complete, milestone, and level of effort. The committee was informed that the most frequently cited technique by the CAMs was the percent complete method. Whenever possible PMT's should be assigned in a manner that provides for the best discrete measurement of progress.

Finally, to further the EVMS preparation for the certification review, a follow up EVMS review, similar to this review, should be conducted to assess EVMS implementation.

1.0 Introduction

A Fermilab Director's and Department of Energy FSO's Performance Management System (PMS) Review of the NOvA Project was held on June 19-20, 2007. The charge included a list of topics and questions to be addressed as part of the review. The assessment of the Review Committee is documented in the body of this closeout presentation.

Each section in this closeout presentation is generally organized by Findings, Comments and Recommendations. Findings are statements of fact that summarize noteworthy information presented during the review. The Comments are judgment statements about the facts presented during the review and are based on reviewers' experience and expertise. The comments are to be evaluated by the project team and actions taken as deemed appropriate. Recommendations are statements of actions that should be addressed by the project team. A response to the recommendations is expected prior to the DOE CD-2/3a Review and actions taken will be reported on during future Working Group Meetings and reviews.

2.0 Management

Primary Writer: Bob Swale

Contributors: Frank Gines and Ed Temple

Findings

- The NOvA project has a comprehensive work breakdown structure that includes all project work scope.
- The NOvA project does not have a clear Responsibility Assignment Matrix (RAM) that integrates the project WBS and OBS, allows for reporting by WBS or organizational element or both or that clearly assigns management responsibility and accountability to individual WBS elements.
- The Fermilab EVMS Description discusses formal work authorization via Work Authorization Documents. Several of the CAMs were aware of this procedure and others were not. The Project Manager did not mention this as the trigger for CAMs to begin work.
- The NOvA Project has established variance thresholds at a greater level of rigor than required by the Fermilab EVMS Description document.
- NOvA has been submitting narrative monthly reports for more than a year.
- NOvA plans to analyze variances between planned and actual schedule and cost on a monthly basis.
- NOvA plans to prepare variance analysis reports and corrective action plans for management review and action where cost and schedule variances exceed threshold values established by the project.
- NOvA project scheduling and project controls tools are capable of providing earned value and actual cost data at several WBS levels and by the OBS.
- NOvA has many venues to ensure managerial control and action including weekly and monthly management meetings and an expectation that Level 2 managers are responsible for addressing and correcting unacceptable variances.
- The NOvA project has tools, procedures and guidelines in place to complete estimates to complete and calculate estimates at completion based on current, updated and new information.
- CAMs were aware of the project's Change Control thresholds.
- CAMs are aware that a change control process exists and understand its importance to relative to project control.

- NOvA escalates contingency assigned to future fiscal years.
- Planned costs (BCWS) are not categorized by expenditure type i.e. labor, subcontract, materials, etc.
- The project status report is described in the Fermi and NOvA EVMS Description documents. The Fermi document describes the purpose of the report to provide project, Fermilab, and DOE management monthly assessment the project. The NOvA document describes the report as a narrative summary of progress along with EVMS data and graphs. However, the monthly reports we reviewed provided significantly more information than required.
- The EVMS is well documented in the Fermi EVMS Description. EVMS implementation is further specified by NOvA in an additional supplemental document titled “EVMS Description for the NOvA Project.” The NOvA specific document is a large document which tailors the Fermi document to the NOvA project repeating many of the same requirements.
- NOvA has a well defined EVMS and most of the CAMs were familiar with how the EVMS is to be implemented, but lack the experience performing the EVMS processes—statusing progress, analyzing EV data and variances, etc.

Comments

- The project should develop a comprehensive Responsibility Assignment Matrix to the level of the WBS where a single organization is performing the WBS work scope. An example of this includes the PVC Extrusions Level 2 WBS Element, which is further broken down into the Resin and Extrusion elements, each led by a Level 3 manager managing a specific vendor.
- The project should develop CAM Notebooks at the control account level. Each note book should contain the control account technical baseline descriptions, assumptions, detailed schedule and budget and as a package, support the work authorization process. This will provide quick reference material for the CAM to use and show reviewers during the EIR and EVMS certification reviews.
- The project should include selected earned value PMTs (performance measurement techniques), major risks at an appropriate level and responsible organization. These items might be included in the schedule.
- To be prepared for an EIR and possible EVMS Certification Review, NOvA needs a work authorization system that meets ANSI/EIA 748 requirements, is auditable, and is useful.
- When EVMS Reporting begins following CD-2 approval, NOvA should reduce the narrative portion of the monthly report to a summary report and add the Cost Performance Report, Variance Analyses, and high level Milestone Status Report. The report should inform the reader of progress while taking a “management by

exception approach” to reporting issues and variances from the plan. The NOvA project should redesign the current monthly status report to satisfy the report description as defined in the EVMS Description document. Per the Fermi document, the status report should contain: financial summary, status of key milestones, summary progress narrative, baseline change control log actions, management comments, EVMS data, and variance explanations.

- The two EVMS System Description documents, Fermi and NOvA, created some confusion with the reviewers. It was the general opinion of the reviewers that the more generic system description, as the Fermi document, would function better to describe EVMS. And, if a project specific implementation description is required, this could be provided with a brief supplemental document or procedure which offers any additional information.
- NOvA should examine its change control procedures to ensure that several small changes authorized by the Level 2 managers are reviewed for cumulative and downstream impacts to overall project cost and schedule. The lead scheduler and financial officer are the natural place to cover these aspects of change control.
- NOvA (L2’s and CAMs) should ensure that the remaining work contains up to date estimates to complete; or that management has been made aware of impending changes and these are documented in the monthly progress report.
- As soon as possible, the project should begin exercising the EVMS process and statusing progress.
- NOvA should develop a specific procedure for university, subcontract and vendors to follow to report accrued costs and schedule progress. This may require a L2 or L3 manager or other NOvA representative to be integrally involved in developing the monthly accruals.
- Planned and actual costs should be categorized by expenditure type such as labor, subcontract, materials, etc.
- Due to the large dollar amounts involved with the purchase, delivery and manipulation of materials, NOvA should examine its proposed processes for recording earned value for materials received and accruing costs for same, since many of the materials will not be received at Fermilab.

Recommendations

1. Trim down the narrative portion of the monthly report to a summary when EVMS Reporting begins following CD-2 approval. Generally, redesign the project status report per the EVMS Description documents.
2. Convert the EVMS Description for the NOvA Project to a much smaller supplemental document, which provides additional information or requirements specific to the project.

3. Develop process for recording earned value for materials not received at Fermilab.

3.0 Schedule

Primary Writer: Fran Clark

Contributors: Dean Hoffer and Greg Hanson

Findings

- CAMs, working with their technical teams and the Fermi schedulers, developed the schedules contained in their WBS elements, understand the contents, and have taken ownership.
- CAMs and their teams used best judgment and real data (time and motion studies) to develop task durations. Learning curves on task durations were applied when needed.
- CAMs believed that milestone links between subsections were sufficient to alert them of problems resulting from late handoffs.

Comments

- Committee did not have time to sit with the schedulers to review the schedule, but the Director's Review comments on schedule were provided. The main focus right now is to scrub the schedule and bring it into line with the budget. In some cases the planning for the collection of earned value and actual costs has not been considered.
- The WBS Dictionary resides in the notes field of the Open Plan Schedule. However, no Milestone Dictionary was provided.
- Committee did not have time to do control account traces from the resource-loaded schedule to control account plans to work authorization documents, so consistent values could not be verified.
- Basis of Estimate (BOE) information resides in the notes field of the Open Plan Schedule. It is separated from vendor or other information that was used to develop the estimates. Also, information on how the estimate was developed, e.g., engineering estimate, budgetary quote, WAG, etc. was not accessible.

Recommendations

4. As the schedule is being scrubbed, CAMs should work with the schedulers to review task durations and resource loading spreads to facilitate the accurate reporting of planned and earned value and actual costs.
5. A Milestone Dictionary should be produced that presents milestones in a tiered view together with completion criteria.
6. Project staff should run trace exercises to verify that values in all project documents, from schedule on up, are consistent.

7. CAM Notebooks should be prepared and maintained in advance of the DOE EVMS assessment. These Notebooks should include all items/documentation that a CAM may need to refer too during an assessment interview – Project Schedule; CA Schedule; WBS; RAM; Control Account Plans; Work Authorization Documents; BOE support; Monthly Reports, to include the Cost Performance Report, earned value metrics and performance indicators, variance analysis and corrective actions planned, etc.; Change Requests; etc.

4.0 Earned Value

Primary Writer: Ann Nestander

Contributors: Greg Hanson and Fran Clark

Findings

- The project will utilize Deltek Cobra software, the laboratory's standard tool for integrating actual costs, schedule data and cost estimate data for Earned Value reporting.
- The Deltek Cobra database is the official repository for the project cost estimate.
- The database appears to be fairly well developed and the Project Financial Manager seems to have a sound understanding of the software.
- Performance Measurement Techniques (PMT) have not been assigned. Instead the intention is to do this concurrent with the work authorization process.
- The project plans to only use three of approximately a dozen Performance Measurement Techniques: Milestone, Percent Complete and Level of Effort. The predominant choice appears to be Percent Complete.
- Time-phasing of costs, at the activity level, appears to be linear.
- Estimates to Complete will be generated monthly using standard Deltek Cobra functionality in addition to periodic "bottoms-up" assessments.

Comments

- The tools chosen to support Earned Value reporting are appropriate.
- Utilizing Deltek Cobra as the official repository for the project cost estimate is appropriate since this tool provides the functionality to calculate laboratory burdens and indirects in the same manner as the laboratory enterprise system, Oracle Project Accounting. In addition, rates are easily updated when necessary and rate adjustments can be applied with an effective date.
- It is not possible to make an assessment as to whether or not Performance Measurement Technique assignment are appropriate since this will not be done until the Work Authorization process is initiated. However examination of the Earned Value Management System Description for the project, and the above findings, suggest that the methodology could be improved to allow for more objective measurements.
- Postponing the assignment of Performance Measurement Techniques until the Work Authorization Process typically occurs when Planning Packages are used.

- Many of the project activities clearly lend themselves seamlessly to the use of the Units Complete PMT.
- Whenever possible PMT's should be assigned in a manner that provides for the best discrete measurement of progress. As a result, the use of the Percent Complete PMT should be the exception rather than the rule.
- This review did not provide sufficient time to review time-phasing of costs in detail so it is not possible to make an assessment as to whether or not this has been done in a manner that will support accurate Earned Value reporting. The general impression of the committee is that this has been done in a linear fashion. However, if activities have been defined in sufficient detail this may not pose a problem.
- The standard Deltek Cobra functionality for generating Estimates to Complete (ETC's) is heavily reliant on the ability to make comparisons of budgeted values to actual values at the expenditure type and/or resource level. At this time the laboratory enterprise system does not fully support this and therefore the committee is concerned that generating ETC's in this manner may not yield useful and accurate forecasts.

Recommendations

8. Performance Measurement Techniques should be assigned now using the most discrete method available given the nature of the activity. In those cases where a Percent Complete PMT is assigned, the methodology for making the assessment should be documented for each assignment.
9. The Work Authorization Process should include an evaluation of the PMT assignment and if necessary changes should be made at this time prior to initiating work on the activity.

5.0 Charge Questions

5.1 Is the system effectively documented?

Two system documents were presented, one for Fermilab and one specific to the NOvA project. This may be confusing to reviewers. The EVMS description should represent a system that any project at Fermi would follow. This document can be supplemented by procedures (2-3 pages in length) that may be specific to one particular project.

There are documents mentioned in the NDIA Intent Guide that reviewers will be expecting that provide objective evidence that guidelines are being covered. These are: control account plans structured as a scope/schedule/budget integrating document, work authorization documents, RAM (responsibility assignment matrix), project organization/reporting structure charts.

5.2 Will the system produce timely and accurate reports in a readable and meaningful format?

The tools selected for Earned Value reporting will facilitate the ability to do this however since the accuracy of the reports hinges on the underlying data, the determining factor from an accuracy perspective, will depend entirely on the accuracy of the cost estimate, the time-phasing of costs, having appropriate PMT assignments and objective progress assessments.

5.3 Will the system satisfy Fermilab's and DOE's information needs?

Yes, provided the committee's recommendations are implemented. This is especially true in terms of putting into place objective Performance Measurement Techniques. The project should set aside techniques that are considered subjective (that is, use of the percent complete method, which the EVMS community largely considers to be a subjective technique) and severely limiting the use of level of effort techniques to only those which truly cannot be practically measured. Overall, the impression is that the project controls staff are knowledgeable and experienced and when combined with the presented processes and software systems, will be quite capable of providing useful and timely reports and information.

5.4 Are the relevant personnel adequately knowledgeable about operation of the system and do they make use of the information?

No. However, the CAMs appear ready, willing and eager to make the necessary improvements, as spelled out in other portions of this report, to make the system as implemented on NOvA compliant with the ANSI EVMS Standard. In addition to these improvements, some general project management/earned value training and CAM-specific coaching could prove useful.

5.5 Has the NOvA Project addressed how Earned Value will be handled for the work covered under the Cooperative Agreement (CA) and will it give project management the information needed to monitor progress?

The NOvA Project Management Team has begun to work out the arrangements that will be necessary for Earned Value reporting for work covered under the Cooperative Agreement. The CA requires an MOU between NOvA/Fermilab and U of Minnesota (UMN). The agreed upon reporting arrangements will be described in the MOU. UMN has agreed to provide monthly status reports and financial information. Also, UMN has contracted with a professional project management organization to manage the CA activities. The Committee believes this provides a strong basis for developing an agreement that will get appropriate EVMS reporting in place on the CA activities.

5.6 Does the NOvA Project meet the objectives of the ANSI/EIA-748-A-1998 EVMS Guidelines under the:

5.6.a Organization category?

The NOvA project has a well defined and comprehensive WBS.

The project does not have a well defined and comprehensive responsibility assignment matrix that ensures traceability of integrated scope cost and schedule to a definitive organizational or WBS element.

The project has not implemented a formal work authorization process which will be a recommendation of any independent review of the project's EVMS.

5.6.b Planning, Scheduling and Budgeting category?

A lot of work has already gone into meeting the objectives of the ANSI guidelines. Revision of documents reviewed at the Director's Review and producing documents that are required in the Intent Guide will satisfy this category.

5.6.c Accounting Considerations category?

Yes

5.6.d Analysis and Management Reports category?

As spelled out elsewhere in this report, Fermilab's current status against the six criteria in the Analysis and Management Reports category require improvement in the following areas:

Monthly reporting, at an appropriate level, of:

- Planned Value
- Earned Value
- Actual Costs
- Cost Variances, with underlying supporting detailed explanations with proposed corrective action(s) tracked to closure

- Schedule Variances, with underlying supporting detailed explanations with proposed corrective action(s) tracked to closure
- Estimates at Completion

5.6.e Revisions and Data Maintenance category?

The NOvA EVMS meets the ANSI/EIA-748-A-1998 objectives for Revisions and Data Maintenance category. A clear change control system is documented in the NOvA Configuration Management Plan. Upon approval of a CR the baselines are modified to reflect the scope, cost, and schedule impacts of the change. Clear controls, policies and processes are in place to prevent retroactive changes.

5.7 Does the proposed performance management system meet current DOE Earned Value Management System (EVMS) assessment and reporting requirements?

The performance management system as described in the EVMS description documents, the project management documents, and the review presentations will be able meet the DOE EVMS assessment and reporting requirements, once the committee's observations, comments, and recommendations made in the report are properly addressed.