



NOvA Lessons Learned and Corrective Actions

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- Brief summary of NOvA since November following low-point in contingency
 - Review commissioned
 - Lessons learned and actions taken
- CAR's and CIO's from 2012 EVMS Surveillance review



Cost-to-complete Assessment

- Commissioned in late November
- Team made up of the most senior people at the laboratory with project and line management experience
- The principle finding was that we were not calculating and reporting the ETC correctly. Although there had been careful and up-to-date tallies of potential contingency draws maintained.
- Following the team's report we implemented several recommendations for NOvA and also communicated lessons learned to other upcoming projects
- Report is on the web site for this review



Cost to Complete Assessment review identified deficiencies in the oversight and reporting

- ETC calculation not correct in monthly reports. Costs for some items known as needed were still in the reported contingency column awaiting final determination of value.
- Over the summer months in 2012 especially, many new tasks were starting up, albeit a bit late. Project controls team was overburdened with 'just-in-time' changes reflecting these changes



NOvA – ETC committee

Membership

- Senior scientist with project and line management experience assigned to lead a team of quality assurance and project controls specialists

Objectives:

- Update the BOEs and cost-to complete estimates for each of the level 2 tasks with monthly interviews with L2 managers
- Follow up findings and recommendations of the *Internal Nova Assessment Committee* of DEC 2012.
- Examine remaining risks with L2 managers and update the risk register as needed.
- Report to the ALD and the Project the projected ETC each month

Status:

- Functioning since January and continuing



NOvA Lessons Learned Working Group established

- Working group, starting in January 2013, with members from NOvA/ANU, LBNE, and Mu2e
 - L2, L3, and L4 managers of all projects present
- Series of 10 presentations (anticipate 1 or 2 more)
 - From L2, L3's, most L4's from NOvA/ANU, and the NuMI and MI Installation coordinators
 - Topics covered by the L2
 - Project History, Organization, Cost & Schedule metrics, Status Update Cycle, Variance Analysis, Contingency and Change Requests
 - Each L3 and L4 made similar presentations
 - History, Cost & Schedule, Earned Value, Areas of Problems and Solutions (both technical and estimates and management)
 - Lively discussions and interactions at each presentation
 - All presentations captured in the LBNE document database
- Already other projects are taking the lessons to heart:
 - LBNE has commissioned a detailed laser scan survey of existing accelerator tunnels
 - A 'deep dive' review of accelerator costs associated with the upcoming muon projects was held and found "The BOEs were very well prepared, realistic and consistent with recent similar work at Fermilab. Contingency is appropriate."
 - ETC of all projects is presented now at the Project Oversight Group meetings



CAR and CIO Overview

#	Description	Status
CAR-01	Estimate at Completion is Not Utilized-Understood-Owned by CAM	closed
CAR-02	Implementation of Change Request (CR's)	closed
CAR-03	Timing of VAR's and Quality Needs Improvement	closed
CAR-04	Objective Measurement of EV for Percent Complete Method	closed
CAR-05	Schedule Integrity	closed
CIO*-01	Accrual Procedure Needs Clarification	closed
CIO*-02	Corrective Action Log not used Effectively	closed
CIO*-03	Major Subcontractors Should be Included in Organizational Breakdown Structure (OBS)	closed
CIO*-04	Additional CAM Training	closed
CIO-05	Disclosure Statement is Not Current	closed



No.	Committee Recommendation	NOvA Response
CAR-01	<p>Estimate at Completion is Not Utilized- Understood-Owned by CAM –</p> <p>The CAMs continue to have difficulty understanding and taking full ownership of the EAC calculations based on responses during the CAM interviews. Some CAMs EAC were directly impacted by the problems with accruals.</p>	<p>Closed. Additional training was provided to the CAM's to deepen their understanding of this management concept on April 30, 2013.</p> <p>In addition to training, NOvA now has an "ETC Committee" who holds monthly meetings with each active CAM, going over their ETCs and any additional changes that would affect their ETC.</p>



No.	Committee Recommendation	NOvA Response
<p>CAR-02</p>	<p>Implementation of CR's –</p> <p>Change Requests are being implemented in the baseline prior to final approval. Administrative changes not part of CR process e.g. CAM change. The full cost/schedule impact from the proposed change request is not fully documented in the change request documentation package.</p>	<p>Closed. The Change Request (CR) form has been updated to include administrative changes. CR implementation does not occur until all approvals have been obtained. This is done over email and then saved on DocDB, starting with CR479 on April 20, 2012.</p> <p>When a CR is proposed, we examine not only the specific tasks initially proposed for baseline adjustment, but also any unstarted successor tasks in the task sequence(s) that might be driven by the proposed changes. We "walk down" the task sequence(s) to identify the point(s) where sufficient free-float exists to ensure that successors beyond those points will not be driven by the proposed changes.</p>



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CAR-02 (continued)	Implementation of CR's -	We also look for unstarted tasks in the sequence whose baseline dates are in the past and therefore cannot be updated, per the guidelines of our EVMS policy. Thus we do try to assess the full impact of the change as best we can and we document every activity that we include in each CR.



No.	Committee Recommendation	NOvA Response
CAR-03	<p>Timing of VAR's and Quality Needs Improvement –</p> <p>The quality and timeliness in preparation and approval of the Variance Analysis Reports (VARs) are not adequate for providing effective analysis of cost and schedule variances for proper use by the CAMs and project management.</p>	<p>Closed. The Project Office has made significant reductions in the time it takes to write and approve VAR's and has improved the content of the variance explanations. Quality was improved by having a Project Controls Specialist review the reports and communicate with the CAMs to get relevant information on the report before getting Project Manager approval. In addition, VAR's written by the Project Manager are now being approved by the Fermilab Directorate.</p>



No.	Committee Recommendation	NOvA Response
CAR-04	Objective Measurement of EV for Percent Complete Method – The use of percent complete for performance measurement is subjective per the CAMs for many activities particularly those with durations longer than 2 months. While Peg Points are used they are not providing objective performance measurement.	Closed. The CAMs and Scheduler have worked together to insert peg points, as appropriate, for open tasks.



No.	Committee Recommendation	NOvA Response
CAR-05	Schedule Integrity – The NOvA Project Schedule contains open relationships, constraints, lags and based on some CAM interviews, the CAMs did not seem to “own” the schedule, in particular, they were not sure why constraints were used in the schedule.	Closed. The CAMs and Scheduler have worked together to rectify open relationships and constraints where possible. We recently reviewed the schedule and added successors and predecessors to the remaining incomplete tasks/work packages where we identified relationship "holes".



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CAR-05 (continued)	Schedule Integrity –	(Note these modifications are not reflected in the Jun13 schedule that is the most recent one to be reviewed by the committee. Nevertheless, we have made the fixes to the current working file, so they are in there going forward.)



No.	Committee Recommendation	NOvA Response
CIO*-01	<p>Accrual Procedure Needs Clarification –</p> <p>The Accrual procedure is inconsistent in providing valid estimates of current cost incurred. The CAMs need to be held responsible for accruals to ensure the actual cost of work performed and the estimate at completion are both accurately represented in the monthly reports.</p>	<p>Closed. The CAMs and NOvA Financial Office work with the various vendors each month to understand what work was done during that month, to ensure that accruals are made based on actual work performed during the month.</p>



No.	Committee Recommendation	NOvA Response
CIO*-02	Corrective Action Log not used effectively – A corrective action log has been created which tracks corrective actions required as stated in the variance analysis reports. Improvements are needed to provide effective tracking the identified corrective actions to close. There has been progress made in this area (from the last review) but additional improvement is needed.	Closed. Corrective Action Log has been revamped to better address the concerns of the review team.



No.	Committee Recommendation	NOvA Response
CIO*-03	<p>Major Subcontractors Should Be Included in OBS – The Organizational Breakdown Structure needs to identify major subcontracts that are performing the work.</p> <p>A determination is needed as to what constitutes a major subcontract.</p>	<p>Closed. NOvA has added the appropriate subcontractors to the RAM in accordance with the criteria listed in the FRA Program description.</p>



No.	Committee Recommendation	NOvA Response
CIO*-04	<p>Additional CAM Training - CAM Training is still needed in a variety of process areas within EVMS, in fact a more comprehensive approach is recommended. A few examples include: Opening/Closing process for CA, Terminology e.g. EAC, WAD, CAP, and the use and purpose of the Corrective Action Log. This list is not an inclusive list.</p>	<p>Closed. Additional training was provided to the CAM's to deepen their understanding of relevant EVMS concepts. Training was developed and presented with the assistance of the Fermilab OPMO.</p>



No.	Committee Recommendation	NOvA Response
CIO-05	Disclosure Statement Is Not Current Disclosure Statement has not been updated by recent DOE change in capitalization threshold to \$500K.	Closed. The latest Disclosure Statement approved by DOE on 15-Jan-2013 includes the change in capitalization threshold to \$500k.