FRA EVMS CORRECTIVE ACTION PLAN

In response to the Surveillance Review Report of the Fermilab Research Alliance, LLC, Earned Value Management System (EVMS) dated March 7-8, 2016.

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Summary

This Corrective Action Plan (CAP) identifies the FRA/FNAL management actions and responses to the independent surveillance review of the certified FRA Earned Value Management System (EVMS) conducted at Fermilab on March 7-8, 2016. The Surveillance Review Team performed an examination of the FRA EVMS system and procedures, as well as the application of the EVMS to the Muon to Electron Conversion (Mu2e), Muon g-2, and Long Baseline Neutrino Facility/Deep Underground Neutrino Experiment (LBNF/DUNE) Projects.

Fermilab responses and plans for improvement have been identified at both the project-specific level and at the FRA EVMS system level for all recommended Corrective Action Requests (CARs), Continuous Improvement, Opportunities (CIOs), and Root Contributing Causes (RCCs) identified. In addition, this CAP addresses specific comments within the body of the review team's report.

Consistent with the guidance of the review team, the CAP focuses on actions that would have the greatest impact. While all CARs and CIO* items require tracking to closure under DOE EVMS guidance, Fermilab management has also chosen to track other CIO actions to closure.

On March 23-24, 2016, shortly following the EVMS Surveillance Review, an EVMS workshop was held in Washington, DC including participants from several labs and DOE's Office of Project Assessment (OPA). This workshop was the beginning of an effort to form a community of practice and develop acceptable EVMS practices amongst the science labs and DOE OPA. Some of Fermilab's responses below are based on the conclusions of this workshop, and Fermilab will continue to participate in this community and adjust plans based on input from the community.

CARs, CIOs, RCCs, and Fermilab Responses

CAR-01, GL 6: CAM Understanding of their Schedules and Schedule Integrity is Inconsistent and Incomplete. Issues with planning and schedule integrity including logic issues, sequencing of activities, use of schedule float, inconsistent development of "steps" for activities and inability of Control Account Managers (CAMs) to clearly articulate critical path and near critical path activities.

Additional text from review report:

1) "The most troubling aspect of the CAM interviews involved the general inability of the CAMs to identify their most critical path through their control account, or to assess their relationship to the project critical path or major project milestones. While the CAMs were very knowledgeable about their scope of work and demonstrated familiarity with their schedules, they did not appear to be comfortable, and could not easily utilize the schedules to answer questions regarding float or critical paths."
2) "Several findings surrounding schedule logic and status negatively impact the schedule integrity for both projects."
3) "The issue of high float numbers and CAM difficulty with discussing their schedules was a CIO in the previous review. With similar issues observed during this review, the seriousness of this issue has been elevated to a CAR."

Fermilab Responses to CAR-01:

1) OPSS has begun initiatives to improve schedule integrity and functionality including:
   - Projects are systematically correcting planning and schedule integrity issues through BCR and monthly update processes.
   - Periodic peer and OPSS reviews of schedule integrity. A peer review including staff from other projects has been conducted on the Mu2e schedule, and OPSS has reviewed the g-2 schedule.
   - Increased PCS focus and CAM awareness of schedule functionality and integrity during schedule status and change request development. OPSS is working with project staff to ensure that CAMs are directly involved in the schedule integrity assurance process.
   - Development and delivery of CAM focused schedule analysis training including critical path, float, and general schedule information. While these topics have been part of the training program, they will be further emphasized.

CAR-02, GL 7: Long Duration Activities with EV Method of % Complete without Quantitative Progress Measures. Need to establish, upfront, more rigorous basis for reporting % Complete including strengthening performance measures using objective measures.

Additional text from review report:

1) "During the CAM interviews for both projects, there were schedule activities with the PMT of % Complete with planned durations greater than two accounting periods that did not have objective measures for establishing status. This violates the FRA-FNAL EVM-SD."
2) "Additionally, there were many instances of activities with planned durations that were less than 2 accounting periods but had actual durations that had slipped to much greater length, which would then need some objective measure of % Complete. In many cases, these excessive durations were explained as schedule delays due to resource limits that "stretched out the activity."

Fermilab Responses to CAR-02:

1) Projects will strengthen Performance Measurement objective measurements for future work.
2) Duration and PMT basis will be part of the periodic peer and OPSS reviews of schedule integrity.
3) FNAL will revisit how and when to deal with assigning PMTs to activities that have started, but exceed planned duration. Revisiting this issue will include discussions with Office of Science Laboratories to understand and resolve issues through generally acceptable practices. Appropriate procedural and functional process applications will then be undertaken to meet the intent of EVMS guidelines.

CAR-03, GL 12: Inconsistent Description of Use of Combined Level of Effort (LOE) and Discrete Activities (Process versus Practice)

Additional text from review report:

1) "The EVMS overview presentation stated no mixing of LOE and discreet tasks within same Control Account. FNAL procedures state there is no mixing of LOE and discrete EV methods in the Control Accounts. The RAM clearly shows a mix of LOE and discreet as indicated by the percentages. Data traces of schedule show mixing of LOE and discreet within same Control Account. Performance Measurement PMT Procedure 12.PM-004 Section 2 General Guidance. During several CAM interviews, the CAMs indicated they did not mix LOE and discrete. Several CAMs stated they did not have any LOE in any of their Control Accounts, that the management of their accounts were in a separate account, and all their work was discrete. Data Traces indicated this is not the case in practice."

2) "The corrective action from the February 2014 FRA-FNAL EVMS Surveillance Review indicated that rather than looking at a percentage of LOE for the project, the project would be better served in determining if "all discrete are properly identified." The project views all oversight as not discrete. However, in reviewing the EV methods indicated by work package in the schedule and comparing this to the RAM there were discrepancies. The RAM indicated there were not LOE-coded activities in the schedule but the schedule indicated there were LOE EVT techniques assigned. This illustrates a discrepancy between the stated process and the implementation of the use of LOE vs. discrete in practice in each project."

Fermilab Responses to CAR-03:
OPSS has verified that FRA EVMS procedures do allow limited mixing of LOE and discrete work within a control account, but that each type utilizes distinct cost codes or work packages. For example, although the Procedure 12.PM-004, identified in the report, does not address mixing of discrete and LOE activities, the FRA EVMS Description does state "within a control account, the mixing of LOE activities with discrete effort activities should be minimized to prevent distortions of the performance measurement data at the control account level. When unavoidable and LOE work is combined with discrete work within the same control account, segregated work packages should be established for the discrete and LOE portions." As the report suggests, FNAL will review the use of LOE on projects and ensure:

1) Consistency between the documentation and implementation of their process within the projects.
2) Consistency between the schedule and the RAM
3) Minimize the use of LOE activities within a control account where discrete work is planned.

CAR-04, GL 28: Ensure that Change Control Process "Bundling" is Consistently Performed with Traceable Results. The change control process includes bundling of baseline change requests (BCRs); however, there is a need to ensure that each BCR in the bundle is documented and traceable. A standardized process is desirable and the change control logs should include initiation date, approval date, and implementation date.

Additional text from review report: "When attempting to do data traces on BCRs, it was difficult to determine if the changes were incorporated into the performance baseline in a timely manner because the Mu2e change control log does not include the initiation, approval or implementation dates, only the submitted date; however, the approval date is on the BCR form with the appropriate signatures and the implementation date maybe included on the budget log although it is not labeled."

Fermilab Responses to CAR-04:

1) OPSS is working with projects to increase traceability of bundled BCRs. These measures include:
    - Coding improvements for clarity
    - Improvements in communication of provided data fields
    - Better presentation of data to reviewers

2) OPSS will update Standardized Change Control log templates to ensure initiation, approval, and implementation dates are incorporated.

CIO-01, GL 2: Inconsistent and Incomplete Documentation/Configuration Management. Information provided to the Surveillance Committee was sometimes different than the official schedules; organization charts need to be updated; there were outdated links between system description and procedures; and CAM organization should be identified on the RAM and key contractors in the organization description.

Additional text from review report: "FNAL is highly dependent on a matrix organization. The RAMs for all three projects can be strengthened by identifying the organizational element for designated CAMs who are responsible for managing that effort and ensuring that the status of this work is being accurately portrayed."

Fermilab Response to CIO-01:

1) Projects and OPSS will undertake processes to improve or eliminate review documentation issues including:
   - Removal of links in procedures to avoid linking out outdated information.
   - The EVMS System Description and Procedures Documents are now in a formal document control system, which provides traceable version control. The website migration that was in process at the time of the review, causing some confusion, is now complete.
   - Implement changes in how information is provided to reviewers to ensure materials provided are vetted, consistent, and directly applicable to the review.
   - Development of schedule filtering guidance to aid reviewers in understanding FNAL coding.
2) FNAL will revisit identifying the CAM organization and key contractors in the organization description and RAM. Revisiting this issue will include discussions with Office of Science Laboratories to understand and resolve issues through generally acceptable practices. Appropriate procedural and functional process applications will then be undertaken to meet the intent of EVMS guidelines.

CIO-02, GL 9: Negative Budgeted Values. Continue to refine the process for establishing the baseline without use of negative values.

Additional text from review report:

1) "GL 9 states that each Control Account should contain the resources necessary to complete the assigned effort and the budgets reflecting these resources. The negative values diminish the objective evidence that should be found in a resource loaded schedule."
2) "Project Management explained that these negative values resulted during the baseline process when setting Budgeted Cost of Work Scheduled (BCWS) and Budgeted Cost of Work Performed (BCWP) equal to actuals. These negative values are designated as 'CD-2 Baseline Single Point Adjustment'. Project Management stated this practice is currently in the process of being refined. These same data traces also identified negative values that may or may not be a result of establishing the CD-2 Baseline (no reference to CD-2 Single Point Adjustment). With the exception of certain BCRs, negative budget values are not typical. However, negative budget values were evident throughout the Mu2e schedule."

Fermilab Responses to CIO-02: The de-scoping and re-planning efforts can be accomplished utilizing one of two basic processes. One process requires manipulation of the Cobra database, where resources are deleted or by Cobra creating negative adjustments, which are visible only in Cobra. The other method, which has been chosen by FNAL OPSS, is to have negative resource reduction activities in P6 that will reflect changes in both the P6 and Cobra databases. OPSS has chosen the latter because this practice prevents or minimizes manipulation of the Cobra database. The practice also increases the visibility of de-scope and re-

plan adjustments. However, the process of de-scope and re-plan is being refined to reduce the number of activities needed to reflect the necessary resource reductions and streamline the de-scope and re-plan processes. To ensure consistent application, the improved process will be documented via a Desk-Top-Instruction guidance document.

CIO-03, GL 8: Define Process for Closing Control Accounts

Additional text from review report: "During interviews it was revealed that the CAMs were unsure of how to close a Control Account once all work was completed in that account. FNAL Project Management confirmed that there is no control account closure process defined and acknowledged there should be a process."

Fermilab Responses to CIO-03: Process for closing Control Accounts will be documented via a Desk-Top-Instruction guidance document.

CIO-04, GL 22: Lack of Visibility on "Contributed" or Un-costed Project Effort

Additional text from review report: "Un-costed effort is not reported on separately, which may prevent management from accurately assessing performance on contributed work scope. CAMs may be unable to determine status, analyze variances, and effectively make managerial decisions regarding contributed effort. While monitoring the schedule provides some visibility, a report calculated in hours showing EV and variances for only contributed effort would be beneficial."

Fermilab Response to CIO-04: Visibility for "Contributed Effort" will be reviewed by the Projects and OPSS. The review of this issue will include discussions with Office of Science Laboratories to understand and resolve issues through generally acceptable practices. Appropriate procedural and functional process applications will then be undertaken to meet the intent of EVMS guidelines. FNAL will document the FNAL process of dealing with and understanding of contributed effort in a DTI.

CIO-05, GL 25: Reporting Calendar Included in Project Management Plan (PMP)

Additional text from review report:

1) "The FRA-FNAL EVM-SD (version 8.0), section 5.3.2, Monthly Reporting Cycle states, 'In its Project Management Plan document each project must include a calendar for producing internal and external reports that allows for both quality checks and adjustments to the project plan'."
2) "While neither PMP includes a specific reporting calendar, section 7.3, Reporting and Review, of each PMP states, 'The Project provides reports on a regular basis to FNAL and DOE management. The objective of the reporting is to provide for the collection and integration of essential technical, cost, schedule and performance data into reports to aid in the monitoring and management of the Project.' Both projects have reporting calendars available electronically to the project team. These calendars include due dates for PARSII/OHEP, Variance Analysis Report approval, and PMG/POG meeting dates. CAMs interviewed were familiar with the calendar and understood the timing of the reporting cycle."

Fermilab Response to CIO-05: As suggested in the review report, FNAL will remove the requirement for PMP documentation to include monthly reporting calendar from FRA EVMS System Description section 5.3.2.

CIO-06, GL 21: CAMs Unaware of Invoice Payments Impacting their Projects. CAMs should be informed of contract terms and copied on correspondence to Technical Representatives for invoice approvals.

Additional text from review report: "One CAM explained that, though he knew about the work to be performed on his WBS, he was unaware of progress payments that were being made to the vendor and did not expect any cost until the work was complete. He stated that he never saw the contract or the invoice and never approved the payments. The CAM requested the services of a Power Supply Engineer to assist with the power requirements for the project. The engineer developed the statement of work (SOW), requested the services through the Laboratory's procurement system and was named as the Technical Representative on the contract. The contract was awarded with progress payments. As invoices for progress payments were received, they were routed to the Technical Representative (the Power Supply Engineer) for review and approval, who approved the invoices. This is the standard process at the Laboratory and a typical process found at most organizations."

Fermilab Response to CIO-06: Notification of CAMs concerning Contractual terms, invoicing, and payments will be reviewed with FNAL procurement department. Appropriate actions and agreements will be implemented to improve communication.

CIO-07, GL 19: Application of Indirect Expense. Consider apportioning the appropriate indirect costs to all projects associated with the contract as opposed to burdening a single project with the costs.

Additional text from review report: "When comparing financial information reported in the financial system to the EVMS for WBS 475.03.04.01 'Mu2e Detector Service Building & Hall Fixed Price,' it was observed that there was no indirect expense applied to the project cost. The cost in this WBS was associated with one contract, which was awarded first to another project and modified to include the work for this Detector Service Building & Hall. In accordance with the Lab's Disclosure Statement, indirect expense was assessed on the first $500K of contract cost only. The first $500K was charged to the first project and all of the indirect expense was assessed to the first project too. Therefore, no indirect expense associated with this contract will be charged to the Mu2e project even though the project benefitted from the work of the FNAL's indirect organizations (e.g., Procurement and Accounting) in awarding and administering this contract modification."

Fermilab Response to CIO-07: With FNAL's manual process (on >$500K exempt expenditure type purchase orders) it would be administratively complex to accommodate the suggestion given that costs on the second project might be separated from the costs on the first by a significant period of time. Also, it would take significant IT resources to implement the suggestion that the cap restarts each year, and those IT resources are not available. In addition, in response to recent DOE communications with respect to Cost Accounting Standards, the lab is studying alternate indirect allocation methods that would eliminate the cap and which would likely be implemented in the next 1-3 years. Since the finding occurred as a result of an unusual situation that is not likely to recur, FNAL has determined the cost-benefit of changing processes at this time is not justified.

CIO-08, GL 23: Variance Thresholds May Not be Set at Appropriate Level

Additional text from review report: "Muon g-2, Control Account 476.02.03, Beamlines (BAC=$11.9M, 54% complete), January 2016 Stoplight report shows cumulative positive SV of $513k or 9%, which does not require a VAR because the threshold is set at $400k and 20%. This control account had the largest cumulative schedule variance for the project for the December 2015 – February 2016 reporting periods but did not require a VAR."

Fermilab Response to CIO-08: The scale and appropriateness of VAR thresholds have been reviewed for all FNAL projects. This review concluded that Muon g-2 is the only project that does not utilize the FNAL standard VAR thresholds. However, Muon g-2 did follow the approved process for adjusting VAR thresholds including a presentation to Project Management Group (PMG). The PMG including the FPD approved the non-standard thresholds which are reflected in the project's Project Management Plan. Because of the concerns noted by the committee in this review, stricter discipline will be followed for future proposals of threshold changes by other projects.

CIO-09*, GL-22: Lack of Face-to-Face Meetings between CAMs and Project Controls Staff.

Additional text from review report: "The 'EVMS Implementation in Mu2e' presentation indicated that 'Local CAMs have face-to-face meetings with Project Controls' to status schedule and milestones, review Estimate to Complete (ETC), and look ahead at new activities scheduled to begin soon to make sure resources are available. All three CAMs interviewed from the Mu2e project indicated that they report status via a spreadsheet received from Project Controls rather than attend face-to-face meetings. It is important for project management to understand that Mu2e project CAMs are not having face-to-face meetings with Project Controls to actively status milestones, review the ETC and assess resource needs. It may be beneficial for CAMs to have face-to-face meetings as intended and/or actively discuss the topics surrounding schedule status during the monthly Project Management Group meeting."

Fermilab Response to CIO-09*: OPSS has concluded that the root cause of this CIO is communication of the intent, rigor, and process of status updates. Since the review OPSS has verified that indeed the Mu2e CAMs do have face-to-face meetings, with relatively minor exceptions, to complete the status turnaround reports. However, to improve communication OPSS will ensure flow diagrams of the specific processes that each project or CAM utilizes in the schedule update process are included in training and presentations.

CIO-10*, Section 1.4 Cross-Cutting (below): Training.

Additional text from review report: "CAM training is needed for improved response/better understanding of details of FRA-FNAL EVMS with targeted training on scheduling, critical path analysis, and trend charts."

Fermilab Response to CIO-10*: Scheduling, critical path analysis, and trend charts will be added to DTIs and Targeted Training.

RCC-01 Cross-Cutting Issues: The Surveillance Review Team identified a set of cross-cutting issues that, if corrected, should minimize the re-occurrence of the identified corrective action requests. The Fermilab EVMS Corrective Action Plan should address these cross-cutting issues.

Additional text from review report:

1) "Root and Cross-Cutting Issue (see CIO-10* below)—CAM training involves CAR-01, CAR-02, and CAR-03; and CIO-09* and CIO-10*. Although progress has been made, additional CAM guidance and training would be beneficial in improving the level of rigor in the (detailed) planning the project work. Some CAM performance practices differ from the FRA-FNAL EVMS policy and procedures (e.g., CAM Project Status Meetings). Also, additional guidance/training is needed concerning the application of LOE and the method for measuring the amount of work completed, such as % Complete. The CAM training issue also involves a more complete review of the project schedules to ensure that logic and other issues do not remain in the baselined schedule. A checklist might also be helpful for this latter issue."
2) "Portions of CAR-01 and CAR-04 include a repeat issue from previous surveillance reviews. FNAL management needs to ensure that formal closeout of corrective actions are documented and provide for the effective implementation of the FRA-FNAL EVMS, as well as ensure that the results are sustainable. Schedule logic, traceability, and tracking management reserve (MR) and contingency usage were issues identified in the February 2015 surveillance review (which resulted in two CARs), and although the tracking of MR and contingency usage has been resolved, traceability and schedule logic issues continue to be a concern (although progress has been made). Additional effort is needed to ensure sustainable solutions."
3) "CIO-02, CIO-04, CIO-06, and CIO-08 each focus on areas where different projects handle data differently, such as contributed effort or specific thresholds. It may be valuable for the FNAL Project Office to examine these differences (primarily because FNAL utilizes a matrix organization) and determine if this practice creates a lack of clarity."

Fermilab Response to RCC-01:

1) As addressed earlier in this corrective action plan, additional CAM training will be emphasized or developed, and conducted including:
    - Developing the details in planning
    - Additional Visual Aids to graphically demonstrate processes
    - Practical application of Performance Measurement Techniques (PMT)
    - Schedule Review and analysis including critical path and float
    - Schedule functionality including general schedule information
2) As addressed earlier in this corrective action plan, additional guidance will be provided via Desk-Top including:
    a. Process for closing Control Accounts
    b. Dealing with activities that have started, but exceed planned duration
    c. Process of de-scoping and re-planning
3) Additional emphasis will be provided to CAMs during monthly status update cycle by PCS including:
    - Schedule review and analysis including critical path and float
    - EVMS trend charts
4) FNAL will continue efforts to standardize processes, procedures, and training.
5) FNAL will implement lessons learned for review organization and preparation provided by the EVMS Surveillance Review committee and in a separate discussion with the FRIB project.

6) All CARs and CIOs from this report will be formally tracked to closure using the Fermilab iTrack system.