

# FRA EVMS CORRECTIVE ACTION PLAN

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*In response to the Surveillance Review Report of the Fermilab Research Alliance, LLC, Earned Value Management System (EVMS) dated December 10-11, 2014.*

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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 December 10-11, 2014. 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) Project and the Compact Muon Solenoid (CMS) Detector Upgrade Project.

Fermilab has initiated several activities in response to the principal findings of this review. 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 and Contributing Causes (RCCs) identified. In addition, this CAP addresses specific comments within the body of report noted by the review team.

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.

## CARs, CIOs, RCCs, and Fermilab Responses

**CAR-01 Traceability** -The information provided to the reviewers lacked key elements to allow for a cradle-to-grave traceability to confirm that Baseline Change Requests were implemented in accordance with the EVMS System Description. (GL-28-29-31)

**Additional text from review report:** "Complete traces of the BCRs, through the project documentation, were not possible due to absence of requisite information to allow for traceability. Below lists missing information on various forms and logs that would be needed for complete traceability:

### BCR Form:

FNAL Change Control Procedure requires "on the CR form, a breakdown of the budgeted impact by control account shall be listed". This was not shown on the CR form nor was the WBS(s) affected listed on the form. In addition, CAM approval was missing although it was required per the responsibilities section of the Change Control Procedures. The procedures also state "The CAM shall include an impact assessment on the BCR form explaining the consequence of not approving the BCR." This was not included.

### BCR Log:

The log was missing pertinent details to assist in traceability and the log didn't conform to the procedure requirements with respect to required information (missing management reserve, contingency tracking and schedule impact).

### Work Authorizations Documents:

The work authorization documents would require a revision history to be included on the form for traceability purposes. Although, this is not specifically called out in the Work Authorization procedure, it is a standard practice and necessary. There were no signatures included on the WAD even though there was a signature block included on the form and the schedule information was missing...The CAMs interviewed stated the WADs are updated after each project change request. However, during a data trace the WADs for both projects were not always updated as required by the Change Control Procedure."

**Fermilab Responses to CAR-01:**

OPSS has initiated several initiatives to increase traceability and consistency within the Baseline Change Request (BCR) process including:

- 1) Development and use of a FNAL standardized WAD and BCR change log will ensuring WADs are updated in a timely manner after a BCR is approved
- 2) Improvements to BCR log
  - a. FNAL standardized BCR log for all projects
  - b. Establish and incorporate acceptable standard for including WAD update information
  - c. Clarify Contingency, Management Reserve (MR), Undistributed Budget (UB) tracking
- 3) Improvements to FNAL BCR Form
  - a. Identifying required approval level
  - b. Separate fields for BCR reason/justification
- 4) Standardized BCR reports
  - a. Schedule layouts
  - b. Budget Reports
  - c. Validation Reports – no change to history, trace to log data

**CAR-02 Properly identify and track MR, UB and contingency - Tracking for MR, UB, and contingency for CMS Project not in compliance with EVMS Change Control Procedure (GL-14-15).**

**Additional text from review report:** “While the Project (CMS) explained the log represented contingency, it was not clearly identified on the log. The log also does not include a beginning balance or remaining totals of funds. Therefore, the committee was not able to trace the contingency usage to ensure reconciliation. According to FRA Project Management Change Control Procedure 12.PM-007, Appendix E, the Change Request Log at a minimum should contain MR value, MR change, MR remaining value, original contingency value, contingency change, and remaining contingency value.”

**Fermilab Responses to CAR-02:** Utilization of and training on standardized MR, UB, and Contingency tracking, as outlined in CAR-01 responses, and further Desk Top Instruction (DTI) guidance documentation will ensure all projects are meeting established requirements per Appendix E of Project Management Change Control Procedure 12.PM-007.

**CIO-01\* Continue to improve the variance analyses to remove quality variability (GL-23).**

**Additional text from review report:**

1. “Of the 18 variances reviewed in this reporting period most were very well written. In some cases a more detailed explanation could be provided (in two cases a form was prepared but no analysis was provided). In other cases, reporting errors were identified (earned value or accrued/actual cost), but no action was identified to correct the error and the decision was made to carry the error until time naturally corrected the error.”
2. “The October variance report for 401.03.03.01 refers to the earning of an engineering order in July 2014, but not accruing the cost until October 2014. This discrepancy makes the data reporting in EVMS inconsistent.”

**Fermilab Response to CIO\*-01:**

1. FNAL CAMs and Project Controls staff will judiciously complete the incomplete variance reports and incorporate standardized expectations in all variance reports.

2. It is the position of FNAL that, once the reporting period has been closed, improperly or erroneously reported Earned Value should not be corrected or changed to eliminate variances. Although historical change for data entry correction is allowed by ANSI-748, FNAL considers erroneously reported performance as a reporting error and not a data entry error. Although carrying a variance caused by reporting errors may seem to unnecessarily impose a burden on the CAM or could cause false indications of project or control account health, control of these changes is prudent. FNAL will ensure FNAL guidance is consistent with ANSI guidelines regarding the correction of historical errors. Further, FNAL guidelines, such as DTIs, and procedural enhancements will be incorporated, as appropriate, to ensure consistency in the reporting of BCWS, BCWP and ACWP, as well as maintaining historical integrity.

**CIO-02\* Continue to examine the use of LOE tasks to ensure that they are being appropriately used (GL-12).**

**Additional text from review report:** “The CMS Project has a performance measurement baseline of \$34,313K with \$9,148K of LOE budget equating to 27%. The Mu2e Project has a performance measurement baseline of \$217,378K with \$45,212K of LOE budget equating to 21%. Higher LOE values can mask accurate project performance. LOE activities bias the project data toward an on-schedule condition and should be minimized to prevent distortions of the performance measurement data. One CAM interviewed stated some of the discrete work could actually be considered level of effort in his opinion, which would result in even higher percentages of LOE.”

**Fermilab Responses to CIO-02\*:** Current LOE usage standards are being addressed by FNAL and in consultation with other laboratories. FNAL has continually looked at this issue and finds reaching the 15% LOE portion problematic. In some cases, this is due to projects having multiple funding sources, off-project effort, and in-kind contributions which do not show as DOE funded activities. These non-DOE efforts often require DOE funded management oversight which increases LOE percentage. FNAL believes that rather than look at the percentage of LOE activities, the project would be better served in determining if all discrete and LOE activities are properly identified. If all identified LOE activities truly have “no measurable output or product that can be discretely planned” (ANSI 748B NDIA Intent guide, Aug 2012) and the project plan is reasonable, then the percentage of LOE is a less significant measure. It should be further noted that FNAL views all oversight (i.e. costs that do not directly contribute to the product or experiment) as not discrete activities. This philosophy is in accordance with intent guide 12 “Level of effort work packages contain tasks of a general or supportive nature that do not produce definite end products, must be separately evaluated from discrete work packages within the control account, and contain time-phased budgets for planning and control.” It should also be noted that the main concern with LOE activities according to the EVM guidance, is that they can skew control account indices. FNAL maintains separation of LOE and Discrete work at the cost coding, Control Account and Project levels to ensure LOE data does not skew Earned Value data of discrete work. FNAL will continue to explore options and sufficiently document LOE usage.

**CIO-03\* Continue to refine the calculation of Estimate at Completion (EAC) to be standardized across the projects and better reflect CAM/PM assessments (GL-27).**

**Additional text from review report:** “The CAMs stated that they “review” their Estimate-to-Complete (ETC) during the monthly reporting cycle. Mu2e and CMS projects are in the early stages of recording their EACs and have been using default formulas to calculate their ETC. Their review consists primarily of examining the output of that “generic” formula being applied by the cost tool. Some of the CAMs were unable to state which EAC formula was being used to compute their control account’s ETC. It is important that the CAMS/PMs be able to understand and explain the method being used to calculate ETC and EAC. The Mu2e

Project has developed and begun using a more robust and uniform method of determining the ETC and Fermilab stated that the method is being exported to the CMS Project.

There was also a concern when it was determined that a generic formula was being used to calculate the ETC when the CAM had additional information concerning an increased financial impact. The CAM included that impact in the variance analysis explanation, but did not reflect that specific information in the ETC (refer to 401.03.03.03 Components - Mechanical Structures & Cooling VAR for October 2014). The log stated that there was going to be an increase in cost due to underestimations of labor and the associated rate for that labor. The CAM was aware of this increase in cost, based on a bottom-up estimate, but did not modify the ETC to reflect this knowledge. It is important to reflect the latest available information that is available to most effectively monitor and manage the project's EAC and ETC. The system default does not provide the most accurate and useful information to understand the financial implications of previous or ongoing work"

**Fermilab Responses to CIO-03\*:** As noted by the committee, these projects are in early stages, either pre-baseline or just received baseline approval, and as such the EAC may not have received the focus it should. The EAC process is continually being refined to ensure projects will be proactively engaged with cost and schedule impacts. More guidance, training, and oversight of the process will be developed to improve EAC implementation. It is noteworthy that the project CAMs and PMs have already taken the concerns prompting CIO-03\* seriously and are verifying their respective ETCs are reflective of known conditions and impacts.

**CIO-04\* The Corrective Action Logs, that reflect corrective actions identified during the variance analysis process, require standardization of the methodology so they can be tracked to completion by the PMs/CAMs and provide a single source of issues for Fermilab Management (criteria, process, and timely updates) (GL-26).**

**Additional text from review report:** "The Mu2e and the CMS projects currently prepare corrective actions logs for each of their projects. The corrective actions included in these logs is derived from the variance analysis process. If corrective actions are identified, they are recorded on the variance analysis sheets and recorded in their respective logs for follow-up and action. Both projects have logs with corrective actions. Some of those actions were identified from earlier periods, but did not reflect any progress/status (specifically the CMS project). The Mu2e Project includes the status in their log. While having a Corrective Action Log is an important first step, these logs need to reflect regular updates through completion to ensure that the projects are using this information to ensure that identified issues are corrected in a timely manner and that they do not jeopardize project success. The methodology for developing these logs and managing those actions through completion needs to be standardized across all projects to ensure effective management of corrective actions."

**Fermilab Response to CIO-04\*:** FNAL has taken an initiative to standardize its forms and logs, including the Corrective Action Log. All projects will adopt a standardized form.

**CIO-05\* Recommend options for PARS II reporting to the FPD and obtain FPD approval or further direction (GL-25).**

**Additional text from review report:** "According to FRA's EVM-SD, the projects are required to define the level, frequency and distributing of reporting in their Project Execution Plan (PEP). Upon review Mu2e and CMS documentation, the PEP refers to the Project Management Plan (PMP) for that definition. This is not consistent with the Fermilab EVMS System Description. In addition, when the CMS PMP was reviewed,

references to level, frequency, and report distribution were not defined. During the CAM interviews, it was determined that the CAMs were unsure of the reporting expectation. Based on discussions with the respective project controls representative concerning reporting requirements; additional coordination is still needed between the CMS project management and the Federal Project Director. The Federal Project Director agreed with this assessment.”

**Fermilab Response to CIO-05\*:** Each project is working with their respective Federal Project Director to develop the reporting level, reporting thresholds, and documentation requirements. Additionally, once these requirements have been mutually determined and understood, the reporting requirements will be documented in the PEP.

**CIO-06\* Review and validate the accuracy of the schedule logic. Perform schedule clean-up (including integrity checks) on a regular basis. CAMs should be trained to better understand how their sub-projects roll up into the master project schedule and which high level project milestones they impact (GL-6).**

**Additional text from review report:** “High float values were observed in the CMS and Mu2e Project schedules and at least some of these appear to be the result of incorrect logic ties. Several activities were constrained, both milestones and task dependent which resulted in zero float for these activities. Logic issues within a schedule can produce incorrect critical path calculations and can greatly reduce the accuracy and usefulness of the schedule. It is essential that the entire schedule logic is clear and correct, and that the logic is checked regularly/maintained often as the project progresses to ensure it remains accurate.”

**Fermilab Response to CIO-06\*:** FNAL projects are continuing to perform schedule clean up and integrity checks. A detailed critical path analysis is also being performed by the projects to ensure the integrity of the critical path. FNAL has identified the risk of CMS Project utilizing one project scheduler, who performs the initial schedule input and all data integrity checks. This risk is being addressed by the project and OPSS for additional schedule support. CAMs’ understanding the use, risks and interactions of sub-projects is being addressed in future training.

**CIO-07\* Continue CAM training to include accruals and information on Lab indirect expense (GL-4, GL-16, GL-19).**

**Additional text from review report:**

1. “Typically, the Lab indirect rates require an adjustment (to actual) at year end and new indirect rates are established at the beginning of the fiscal year, which may require an adjustment to the baseline. Though some Control Account Managers were aware of the adjustments, others were not and could not explain how or why adjustments to indirect rates affect their projects”
2. “There was a large variance on the CMS project that was the result of a missed accrual...In addition to this accrual error, there was one other missed accrual indicating that more CAM training is needed on recording actual cost and the accrual process. Though two errors were identified in the review, these errors are considered isolated events and are not indicative of system weaknesses.”

**Fermilab Response to CIO-07\*:**

1. Future CAM training, to include information on the indirect budget and rates with an increased focus on how they impact projects, is being planned.
2. Future accrual and status training for CAMs is being planned.

**CIO-08\* Continue to ensure that there are no retroactive changes to the BCRs (GL-30).**

**Additional text from review report:** "During the CMS data trace of CR-0041, it was noted that the Sept-14 BCR changed budget back to May-14. During the Mu2e data trace of CR-007, it was noted that the Nov-14 BCR changed the start date of MS TX3 – 2015 Accelerator Maintenance Shutdown Start to Sept-14, a date prior to the CR submittal date. This also occurred with BCR 10, with T5-Target Proton Beam milestone date moved from 8/25/14 to 1/15/15."

**Fermilab Response to CIO-08\*:** FNAL understands the importance of maintaining historical integrity during BCRs. The standardized BCR reports described in the response to CAR-01 will demonstrate and ensure history is not changed.

**CIO-01 The number of cost and schedule reports supporting the BCRs varied across the projects. A Fermilab Change Control Process/Procedure should be standardized for consistent implementation across the projects (GL-9, GL-32).**

**Additional text from review report:** "There are several documents included in the change request backup, providing traceability of before and after changes."

**Fermilab Response to CIO-01:** As described in the response to CAR-01, FNAL has taken an initiative to standardize its forms and logs including BCR documentation and attachments.

**RCC-01 There is a continuing need to develop standardized Fermilab EVMS processes and procedures (that allow tailoring) to ensure that direction/guidance is provided to the project staffs, regardless of the projects.**

**Additional text from review report:** "Because of the heavy reliance on the matrixed organization at Fermilab, standardized EVMS processes and procedures are needed to ensure the effective use of the matrixed staff in contributing to the Project mission. A common set of processes and procedures and/or desktop instructions would provide a logical and consistent set of guidance/direction for the matrixed staff and would assist in reporting information to Fermilab management. Training to these Fermilab processes and procedures would also be needed. A common Fermilab-wide set of processes and procedures would also simplify training and allow a more efficient exchange of Fermilab staff, including the Project Controls staff. The eCAM Notebook, being developed by Fermilab, would represent a collection of the individual project data from the standard processes into a single source for the CAMs and would be helpful to the CAMs."

**Fermilab Response to RCC-01:**

Planned and ongoing improvement initiatives include:

- 1) With input from the Project Managers, develop a prioritized list of procedures, processes, DTIs and training that need updates or development because they do not exist or do not adequately perform their function.

- 2) Based on the priority of need, prepare a schedule for developing or revising the procedures, processes, desktop instructions, and training.
- 3) Identify lead people for developing/revising the procedures, processes, desktop instructions, and training.
- 4) Update the existing procedures, processes, and desktop instructions to provide the most current and up-to-date information.
- 5) Track and report progress against the plan.

