Recommendations to Improve Earned Value Management (EVM) and Project Management Integration in the Department of Energy (DOE)

Conducted for:

Office of Project Management Oversight and Assessments (PMOA)
PM-1

Prepared by:

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Table of Contents

Table of Figures

I. Background

Humphreys & Associates, Inc. (H&A) releases *Recommendations to Improve Earned Value Management (EVM) and Project Management Integration in the Department of Energy (DOE)*. The initiative was chartered by the Office of Project Management Oversight and Assessments (PMOA), formerly Office of Acquisition and Project Management (OAPM). The objectives of the study follow:

a. Provide an executable path forward to obtain Earned Value Management excellence for both DOE Federal and Capital Asset Project (CAP) contractor levels across the DOE complex in a structured, well-defined, and clear approach, and
b. Achieve a fundamental paradigm shift across the DOE enterprise (Federal staff and Contractors) in Departmental buy-in, accountability, and executability.

The purpose of the initiative is to determine the overarching application of EVM in the Department (inclusive of the National Nuclear Security Administration (NNSA)) in all aspects and to develop and deliver a plan inclusive of recommendations to improve EVM and Project Management integration. The task required an assessment of the current state of Earned Value Management Systems (EVMS) across DOE contractors and internal DOE stakeholders. This effort included a determination of the "As Is" state based on a study of current practices across several areas, benchmarking with other government agencies, and a gap analysis including alignment with Federal regulations, Departmental expectations, staffing, and skill sets. Communication with all levels of DOE Stakeholders involved in EVM on a day to day basis was accomplished with the aid of a comprehensive survey. The vast amount of technical talent represented by the 48 Federal and 47 CAP Contractor responders contributed heavily in the recommendations herein.

Enclosed is a Departmental plan for integrated project management. H&A believes that DOE can achieve their goals to have forward looking, predictive insight to support project success and to be recognized as "the best" in project management throughout Government by incorporating the Recommendations with involvement of the internal DOE staff as well as DOE's industry partners via Energy Facility Contractor's Group (EFCOG).

Karen Urschel
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II. Executive Summary

Significant improvements can be made by DOE to improve EVM and project management integration by focusing on two prevailing themes:

- Trust based project management approach, and
- Formal knowledge transfer process.

Many of the recommendations contained in this report relate in some aspect to one or both of these two themes. Both need to drive the cultural attitude and mission of the organization. To cause a true paradigm shift, these themes must be interwoven into the message from the top leadership.

Survey responses and interviews support the need to focus on these two areas. Survey responders report wide-spread manipulation of EVM data to delay the reporting of bad news and to help 'save the project' from Headquarters (HQ) scrutiny and possible cancellation. In the area of knowledge transfer, PARSII analysis reports and EVM training snippets were developed to enhance efficiency of operations. However, based on many comments from the survey, the culture of DOE Stakeholders is to ignore them since they 'are not mandatory'. A culture that recognizes the value of and applies knowledge transfer practices is essential.

The primary finding from this study was an across the board lack of consistency of EVM resulting in a fundamental lack of integration with project management. The root causes are many with an overarching impact of prevalent independent and often contradictory approaches at all levels of the DOE hierarchy, both between and within levels, e.g. Federal Site Offices, Project Management Support Offices (PMSO), and Project Management Oversight and Assessments (PMOA).

There is also a prevailing attitude that EVMS is ineffective and therefore, it is not considered to be a serious or effective tool in the PM's and FPD's toolbox. In its current state, it may be ineffective; however, the solution is to fix the root causes contributing to the unsuccessful implementation. EVM as a performance management tool has been proven successful in other Departments for providing accurate and reliable project management information for use in predictive analysis and making critical decisions. The

recommendations provided in this report will assist DOE in its efforts to comply with the Government Accountability Office (GAO) comments included in the following excerpt from GAO's High-Risk Series update to Congressional committees in February 2015:

> "Specifically, DOE must ensure that the corrective measures it is taking result in sustained improvements to the achievement of cost, schedule, and scope targets and that federal managers are receiving and validating accurate and reliable information from contractors that can be used to make decisions and to hold them and the department accountable for performance." (GAO-15-290 High-Risk Series)

A paradigm shift is vital to improving integrated project management. GAO looks specifically for this as evidenced by the following excerpt from the GAO High Risk Series update. While it is referring to the National Aeronautics and Space Administration (NASA), it could just have well applied to DOE.

> "In addition, NASA has taken action in response to our recommendations to improve the use of earned value management (EVM)—a tool designed to help project managers monitor progress—such as by conducting an EVM gap analysis to determine whether each center has the requisite skills to effectively utilize EVM. These actions have helped NASA to create better baseline estimates and track performance such that NASA has been able to launch more projects on time and within cost estimates." (GAO-15-290 High-Risk Series)

As in the quote "a house divided against itself cannot stand", in terms of EVM and project management integration DOE is clearly divided. This division drives up oversight and project costs from two different perspectives: 1) costs associated with employing an Office of Management and Budget (OMB) mandated EVM methodology that few use or maintain, and 2) loss of project insight by not reaping the project performance insight benefits derived from an effective EVM system.

H&A includes 26 recommendations in this report to overcome the barriers that currently exist within DOE. With a focused direction from the highest levels of DOE including a) responsibility for moving forward with an executable reconstruction and improvement plan and b) allowing for collaboration while demanding accountability and results, vast

improvements can be made. The improvement process will require a dedicated effort supported by all stakeholders. The execution plan within this report is recommended to achieve success.

Refer to Section IX. Path Forward for a suggested priority of recommendation implementation and to XI. Table of Recommendations for the complete list of recommendations. Full details supporting each recommendation can be found by clicking on the recommendation name in the Table of Recommendations or from the Table of Contents.

Note: The PMOA management team and EVMS staff met with Humphreys & Associates to discuss this report and recommendations. At that meeting PMOA developed a proposed implementation plan which is detailed in the Appendix to this report.

III. Introduction

The approach taken for this study was to focus on the components listed in Figure 1, presented as rooms in a building. Each of the rooms serves a purpose and structurally is dependent upon the other rooms. The analysis methods used in this study included one-on-one interviews, survey, benchmarking, gap analysis, SWOT (strengths, weaknesses, opportunities and threats) analysis, and root cause analysis. H&A determined that all rooms will benefit from updating to take advantage of improved methods and efficiencies. Recommendations provided in this report will cover each of these four areas: People, Processes, Systems, and Communication.

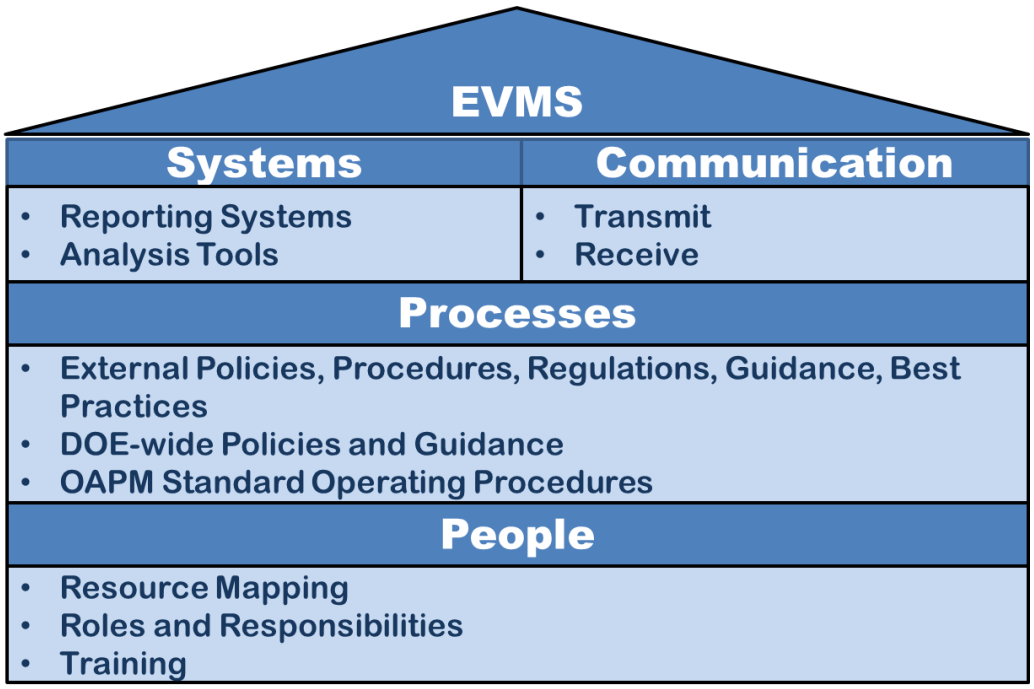

Figure 1: EVMS Structural Components for Successful Implementation

IV. Foundational Issues Identified

None of the recommendations provided in this report will improve EVM integration with project management until the primary barrier and root cause of the global issues with EVMS implementation in DOE are addressed. Looking deeper, H&A determined that the very foundation of EVMS in DOE is unstable. The DOE leadership is divided by their opinions and the various Under Secretarial levels issue separate and often conflicting instruction relative to EVM practices. There is no clear recognition of the key role EVMS plays in project reporting or acknowledgement of one group as fully responsible for development of EVMS functional expertise, policies and procedures, systems and tools, and communication. It is often viewed simply as a means to satisfy a regulatory requirement.

The primary barrier to successful EVM and project management integration is caused by different and often opposing opinions and interpretations of EVMS across all levels of the DOE complex and CAP contractors. This barrier is the faulty foundation, making the structure of components unreliable, unenforceable, and insufficient.

Comments and feedback from all functional and hierarchical levels, locations, and experience levels, including both Federal staff and contractors, show that instead of accepting EVMS as required via the OMB Circular A-11, Part 7, DOE Order 413.3B, the Federal Acquisition Regulation (FAR) clauses, and contract clauses and deliverables, a preponderance of resistance and conflict exists because of high levels of mistrust and general misunderstandings.

For example, when contractor's award fees and performance bonuses are based on near perfect cost and schedule indices, then that is often what results – favorable indices. Often the actions used to achieve those favorable indices contradict the requirements of a compliant EVMS. Survey responses showed that this practice is common regardless of whether an employee is part of the contractor staff, Federal site office, PMSO, or PMOA staff. Federal Project Directors (FPDs) are pressured to show favorable data to avoid their projects turning 'red' and PMOA is pressured to certify EVM systems when indications are that the system is inadequate for project management use.

The Confusion

EVM is often blamed as the source of the problem. Why? To answer that question it is worthwhile to discuss the basics of earned value and the impact of differing interpretations. Think of the EIA-748 32 Guidelines as a set of 32 building blocks, all different sizes that interconnect to provide output. EIA-748 provides a brief explanation as to content (think volume) of each block required. However, the specifics such as the size of each block (think dimensions) and where each block connects (integrates) with other blocks is explained further in various EVMS body of knowledge documents.

These specifics that support the guidelines have been written by various groups throughout the years, starting with each military service, then the Tri-Services (Army, Navy, and Air Force), next Defense Contract Management Agency (DCMA), then the National Defense Industry Association (NDIA), and more recently the Department of Defense (DoD) in conjunction with DCMA. Yet when conducting compliance reviews or when developing a compliant system, there often seems to be situations that either are not addressed in writing or conflicting guidance is found among the body of knowledge documents. Back to the scenario, as a result some of the 'structures' built with the 32 building blocks resembled towers, some resemble sprawling one story buildings, with no two structures sized or integrated the same. The question always came down to compliance, i.e. does the structure perform correctly. However, the compliance measurements taken were often based on several of the body of knowledge documents, or any mix thereof. This caused the confusion and inconsistencies in opinions.

In 2014 the DoD decided that using a set of compliance directions created by anyone outside the DoD was inappropriate, that being NDIA. DoD released the Intent Guide in January 2015. Because of a DoD-wide initiative to reduce the cost of compliance, their approach was to address only high level attributes of a compliant system with no identification of assessment measures. DCMA, charged with determining compliance, is currently creating a list of measures which has only been released in draft form. Because of the restrictions applied, this approach is somewhat arbitrary and leaves gaps in the interpretation of compliance to the EIA-748 guidelines. Going back to the building blocks scenario, a large percentage of the instructions are missing. DoD EVM experts will admit,

off the record, that it is a matter of time before the pendulum swings back the other way, and a complete set of instructions may be developed to fill the gaps.

With that history and level of concern in the path DoD was pursuing, H&A recommended in the fall of 2014 that PMOA pursue development of a DOE EVMS Interpretation Handbook (EVMSIH). The document is designed to resolve the quandary of conflicting guidance, the inefficiency of referencing numerous documents, and allows for a unified and consistent interpretation of 'building block instructions', including assessment testing methods, to maximize the value of the one reference. It further allows DOE to address specific project management differences that DOE has from DOD. H&A has been involved in the design of the document and believes it will serve as a 'best in class' means to explain how to achieve a compliant EIA-748 EVM system.

The benefits include a more efficient, thus less expensive compliance process primarily because:

- Subjectivity is minimized or eliminated,
- Expectations and measurements of compliance are provided to the contractor for maximized preparedness,
- Analysis costs are reduced by using UN/CEFACT XML Schema data and increased automation,
- Cost of oversight is reduced by having better prepared contractors and thus fewer compliance assessments by PMO, and
- DOE will have more time to manage the projects as the EVM system can become self-policing by the contractor via internal surveillance.

Reducing the Cost of Oversight

DOE has improved in the approach to surveillance over the past few years. While it takes time to see the results of these efforts, the advantages are clear. Prior to Fiscal Year (FY) 2012, the PMOA surveillance approach was aligned with the DOE Order 413.3B requirement to review compliance every 2 years after certification. What occurred was a step function of costs associated with the EVMS as contractors applied more resources prior to the 2 year mark to give them an internal measure of compliance, as well as the

costs associated with the Federal review process (less automated, larger data call, more time intensive). Contractor had little incentive to maintain the compliant system in the 2 year gaps between reviews. See the notional example in Figure 2.

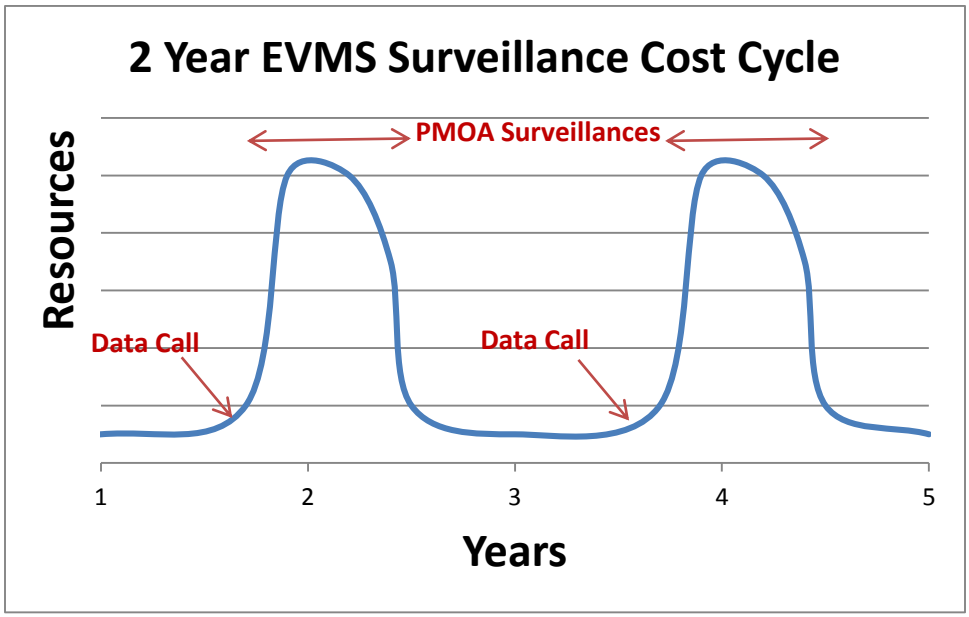

Figure 2: Impact to Project Costs with PMOA Mandatory 2 Year EVMS Surveillance Cycle (Notional)

An improvement was made using a data driven, risk based surveillance approach outlined in the initial issue of the EVMS Surveillance Standard Operating Procedure (ESSOP), September 2011. Improved diagnostics allowed for the change to data-drive surveillance as PARSII reports were created providing insight into possible systemic non-compliances. This approach actually caused an increase in the length of the surveillance process for some contractors because they were selected based on risk and data indicating non-compliant practices. The surveillance often resulted in Reviews for Cause (RFC). Further, interpretation of the Guidelines caused extensive debate relating to findings, corrective actions, and verification. See the notional example in Figure 3 of a typical surveillance initiated because of data driven concerns. Those contractors whose systems were producing compliant data experienced considerably less surveillance, with minor if any disruption to the project.

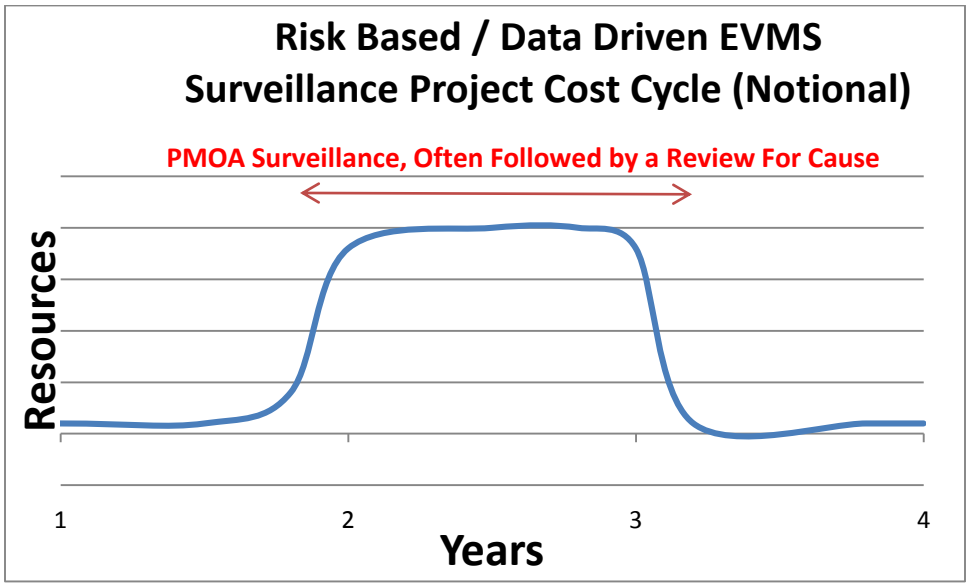

Figure 3: Resource Impact to Project Costs with PMOA Risk Based/Data Driven EVMS Surveillance (Notional)

With the EVMSIH, PMOA data-driven surveillance is still appropriate as an oversight method but contractor maintenance of the EVMS should improve, thus reducing the resources required to perform adequate oversight. The contractors can improve their internal assessment processes by applying the EVMSIH's Qualifying Expectation Lines of Inquiry (QE LOI) and validation steps. Consistency of expectations and interpretation is achieved as the EVMSIH is fully adjudicated, issued as draft (pending a piloting phase), embraced by the Energy Facility Contractor Group (EFCOG), and shared for contractor self-surveillance. By providing the answers to the validation tests, the contractors can run the tests themselves, reducing costs associated with pre-review preparation, and reduce the cost of Federal assessments as it puts the onus on the contractor.

This approach also helps maintain compliant EVMS for those contractors who abide by the contractual requirement to maintain a compliant system. PMOA surveillance oversight can become focused on contractor self-surveillance results to ensure contractor accountability and through monitoring of the data. See the notional example in Figure 4.

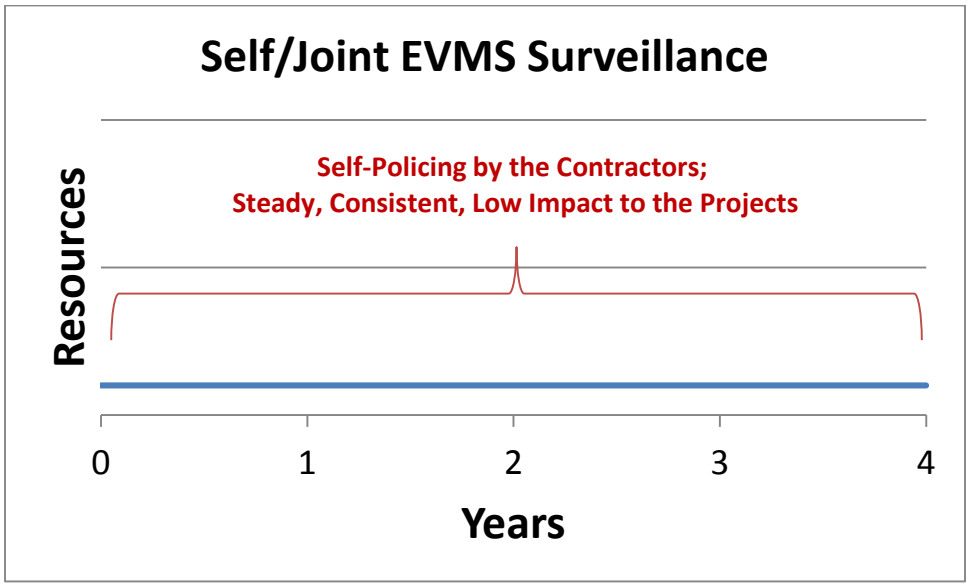

Figure 4: Impact to Project Costs with EVMSIH Based Contractor Self Surveillance (Notional)

Formal Knowledge Transfer Approach

Statistics collected from the EVM Survey show that over 84% of survey respondents had 20 plus years of experience; 35% of them having more than 20 years of experience in earned value management. Yet lack of consistency was the number one problem reported. These facts alone support the need for a formal knowledge transfer focus in DOE. Yet there are more reasons. DOE has relied heavily on consultants to augment the staff not only at HQ but also at Site Offices. This is due in part to challenges in attracting EVMS experienced applicants. Reliance on consultants causes some inconsistency with interpretation which then resonates throughout the organization unless DOE captures the knowledge in an organized manner to fully document the 'how to' for EVMS interpretation, compliance, surveillance, and analysis within DOE.

Knowledge Transfer was a topic presented at the DOE APM Workshop in 2015 by Mr. Mike Morgan, Government Relations Manager, for the Project Management Institute (PMI). Mr. Morgan stated that when organizations value knowledge transfer and implement good practices to support it, they improve project outcomes by nearly 35%. By implementing a foundational approach to knowledge transfer, DOE should see a shift in the culture. The key insights shared by Mr. Morgan included:

- Create a culture that values knowledge transfer,
- Set the tone from the top leadership, and
- Employees are generally willing to share, thus encouraging buy-in and trust.

DOE has demonstrated a 'success' by using this approach with the EVMSIH. The EIA-748 32 Guidelines, the NDIA Intent Guide attributes, and the DOD EVMSIG attributes were determined by DOE and EFCOG to be inadequate for crisp interpretation. When the idea of having detailed QE LOIs was first presented by DOE and EFCOG, the push back was intense because of the sheer quantity. However, by then engaging the workforce by soliciting input from all stakeholders and working as a team through designated representatives from NNSA, Environmental Management (EM), Office of Science, and EFCOG, the acceptance level has risen considerably as everyone has an opportunity to contribute their experiences and the benefits relative to consistency are now understood. This process of open communication and knowledge sharing must continue.

Moving Forward

To facilitate an environment receptive to new ideas will require open minds. In DOE, the paradigms associated with the subject of EVMS are deeply rooted as indicated by the statistics cited earlier regarding the experience level of survey respondents. Comments provided indicated dissatisfaction with the current state of EVMS. Using that dissatisfaction as a means to engage in fixing key barriers, the paradigms will begin to change.

The path forward is only achievable when clearing away preconceived opinions and creating a willingness to pursue more cost effective implementations, to focus on a unified position of improvement with a focus on trust based project management. The pressure on project managers to be successful can drive bad behavior. While they may not deliberately direct changes to EVM data, they often seek other means to influence the data being reported which appears to have resulted in an ethical lapse. . They tend to be optimistic and convince themselves that the indirect methods to force higher indices are justified. While they are supposed to be using the EVM data analysis to arrive at management decisions to influence future efficiencies, they tend to take inappropriate actions to drive

cosmetic changes for the purpose of making the data appear better than it really is. Examples of cosmetic changes are being creative in ways to add budget to the performance measurement baseline (PMB) without scope. Another cosmetic change is to reduce scope without removing the commensurate budget associated with that scope from the PMB. Both of these actions are non-compliant with EIA-748.

Part of the pressure on the project managers is driven by personal consequences of reporting poor project performance. As long as that environment exists, they are more likely to hide or minimize them, which is enormously counterproductive.

Creating a culture where the project managers can be completely honest, trusting, and incorporate sound decision making requires an environment where they are supported by leadership. Otherwise the cultural paradigm to show success by whatever means necessary will prevail. The DOE top leadership should undertake an examination of their oversight processes to ensure that trust based decision making is embedded into all of its decision-making, project assessment, and oversight processes.

The next steps in moving forward is to get back to the basics of enforcing contractually compliant business systems, eliminating the confusion and debate, and providing a clear focus to use EVM data for decision making as opposed to using creative methods to manipulate the EVM data into showing near perfect performance indicators. The goal is one unified voice within DOE, vertically and horizontally organizational wide regarding EVM importance and accountability.

Recommendation #1: Establish Trust Based Project Management Environment

Establish an environment that supports trust based project management. Pressure to achieve project success caused an unintended and pervasive consequence of intentional suppression of poor performance and cost growth resulting in unreliable and unrealistic EVMS data, contributing to a widespread distaste for and distrust of EVM data. Shifting gears toward a trust based project management environment allows:

- EVMS to work the way it is intended, i.e. to accurately track current and past efficiencies and provide early warning indicators into the root causes of

performance issues so management can use that information to prevent reoccurrences and predict future performance,

- Encouragement for project managers (FPDs and Contractor PMs) to identify and report issues contributing to cost overrun and schedule slippage as it occurs, and
- Accountability for reporting accurate data and predictions as opposed to reporting favorable indices and suppressing cost overrun and/or schedule slippage.

Nearly three-quarters of the responders stated they had observed or were aware of pressure to avoid reporting 'bad news' in their EVM systems. The responses were fairly evenly disbursed between Federal Staff and CAP Contractors.

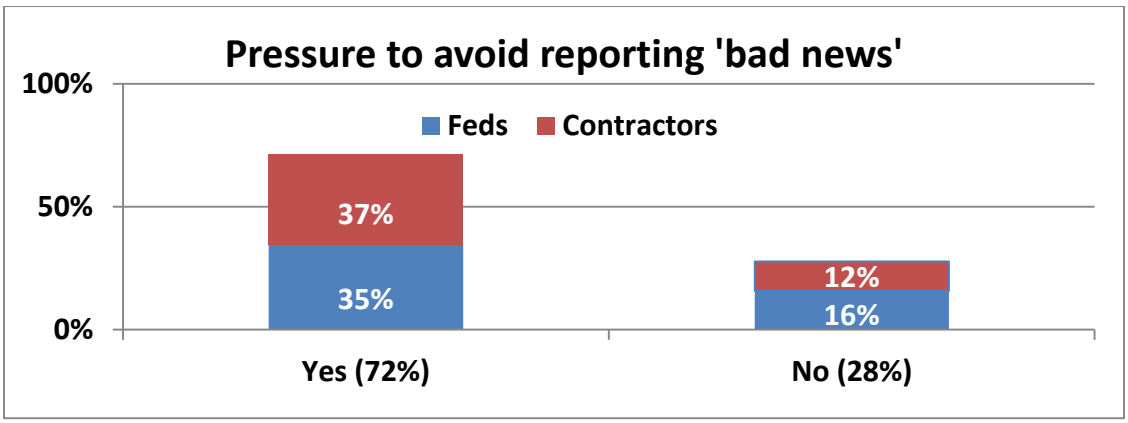

Figure 5: Pressure to Avoid Reporting 'Bad News': Source: Humphreys & Associates, Inc., *DOE EVMS Survey Results*, June 16, 2015.

Of the 72% who replied 'Yes' to the question, 34% had observed or were aware of a re-plan or some other action to avoid reporting impending poor schedule performance and 30% had observed or were aware of a re-plan or some other action to avoid reporting impending poor cost performance. Twenty-seven percent observed or were aware of a delay in reporting Estimate to Completion (ETC) increases, and lastly, 8% observed or were aware of 'other' bad news that was not reported.

When asked if the pressure was driven by Contractor Management or DOE Management, the response shows close to an even split. In total, 51% of responders said the pressure came from DOE management while 49% of responders said the pressure was driven by Contractor Management.

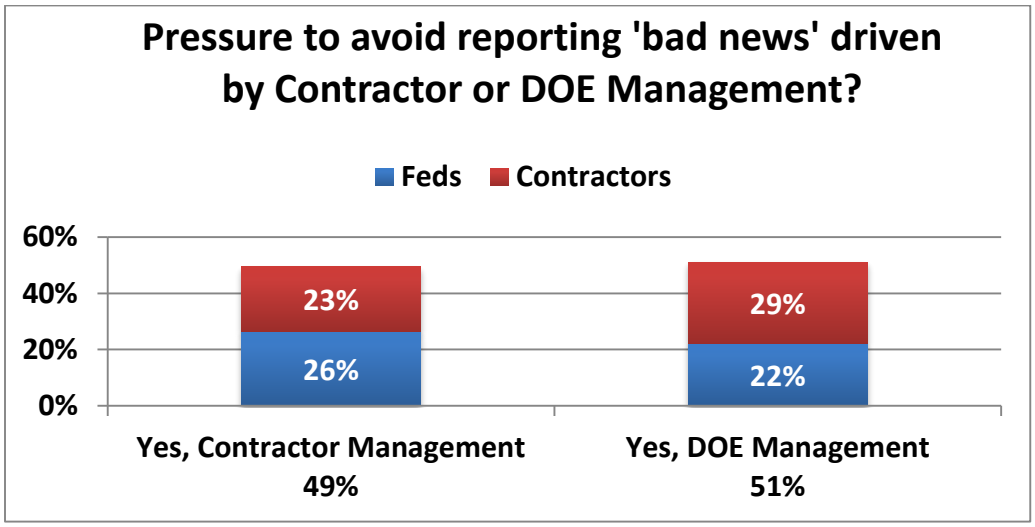

Figure 6: Pressure to Avoid Reporting "Bad News" Driven by Contractor or DOE Management? Source: Humphreys & Associates, Inc., *DOE EVMS Survey Results*, June 16, 2015.

Clearly there is an issue with accountability to report accurate and timely data, from both the Federal staff and Contractors. Several quotes are listed below to support the seriousness of this behavior that has driven the cultural paradigm of avoiding 'going Red' by any means necessary. The terms 'going Red' and 'BCP to Green' were heard often in interviews and in the survey responses as it pertained to the Department's methods for identifying problem projects with a Red, Yellow, Green distinction.

Addresses the Cultural Barriers and Data Manipulation Concerns Reported by Survey Responders (note that (C) means the quote came from a Contractor while (F) means the quote came from Federal staff):

- (C) "Culture" is the single largest hurdle to get over for EVMS in the DOE environment. DOE-PMOA has done a great job of demonstrating the importance of EVMS. However, the DOE field offices have not embraced the same level of importance or understanding, and thus the Contractor Sr. management teams are unable and perhaps unwilling to invest the required changes in process and implementation required to make the change to a more EVMS complaint posture in this more structured and DoD- aligned environment.

- (F) DOE does not demand accountability on the part of its FPDs in terms of progress. Few problems strike out of the blue. There are almost always warnings. Those warnings are routinely ignored until the problem blows up in their faces.
- (C) Pressure to front load baseline to stay green for one year to avoid tripping threshold, so Feds could earn their bonuses.
- (C) Pressure by local DOE to issue Budget Change Proposals (BCPs) to add budget, i.e. 'BCP to Green'. They did not want the project to go Red in PARSII.
- (F) Rating projects (red/yellow/green) was the dumbest thing DOE ever did. An admiral once told me: If you make a man's destiny (i.e., career) dependent on a number, you will always get that number. It won't mean anything, but you will get that number. So many DOE projects fail because we will not accept bad news.
- (C) Drive to be 'Green' at all costs ('Call to Pocket', 'BCP to Green', etc.).
- (F) Use of EV data for award fee or contactor executive bonuses.
- (C) Failure to hold DOE and Contractor Project Managers accountable for effectively using EVM and managing their Projects consistent with EVM requirements.
- (F) Lack of desire to impose the rigor tight scope, budget, and schedule controls.
- (F) Contractor and FPD relationship is often too close for parties to maintain their objectivity.
- (C) Rationalizing and justifying that somehow the requirements have changed [in order to add budget], when in fact they have not.
- (C) DOE's unwillingness to approve realistic baselines.
- (F) Manipulation of data within the certified system to make performance look good.
- (F) Adjusting work activities not on the critical path to improve overall metrics.
- (F) Using EVMS data as a performance indicator as opposed to a management tool.
- (C) DOE gaming of EVM data for political reasons.
- (C) Too much trying to get around EVMS or trick the system with huge work. packages and control accounts with long durations that cannot be used for real analysis. Too many claims that we have "lower level" tracking tools – if EV is used and kept correctly, those tools and waste of budget may not be needed.

- (F) DOE PMs and other program representatives' tendency to request the contractor to "move budget" and use the Level of Effort (LOE) Earned Value Technical (EVT) to improve performance data is still prevalent within the DOE.
- (F) FPDs are evaluated on current performance metrics rather than on accurate performance reporting (or performance at the end of project), thereby perpetuating inflated performance reporting until it is too late to do anything about it.
- (F) My management is not interested in the EV data because it isn't accurate.
- (F) Current results from EVMS surveillance reviews indicate that some projects and/or sites do not follow EVMS implementation procedures as required causing lack of credibility in the data provided. Lack of credibility taints project status reports causing necessary corrective actions to be too late to be effective in steering the projects to successful completion.
- (F) Contractor's corporate board interferes with "doing the right thing" [reporting accurate data and projections].
- (F) Contractor set baseline to late finish date and executes to something different to create positive Schedule Variance (SV)/Cost Variance (CV) to avoid bad Contract Performance Assessment Reporting System (CPARS) reporting.
- (C) Fear of reporting negative performance data for fear of over-reaction and application of extensive attention and scrutiny with a lack of understanding and willingness to readily accept recovery plans.
- (C) Use of Undistributed Budget (UB) to avoid poor performance of contractual delays.

When organizational leadership directly or indirectly participates, either by taking no action to ensure the bad behavior ceases or by creating an environment where the project manager fears reprisal when reporting accurate data, the perceived participation by leadership impacts the culture. Eventually the practice of suppressing or delaying bad news becomes a generally accepted part of the day to day practices. In the case of project management, the message heard at the lowest level is 'do whatever you have to do to keep the project alive'. "The leadership is responsible for the set of ethics or norms that govern the behavior of the people in the organization. Leaders set the moral tone" (Bennis, 1985, p. 186).With this comes the responsibility to foster an environment that encourages realistic

reporting so that the data can be used by both Contractor PMs and FPDs to take appropriate mitigation actions early on to avoid huge overruns in the end. Authoritative structures are in place to review project performance but there is no clear authority for ensuring performance baseline integrity is maintained.

Until a trust based project management approach is established and enforced based on zero tolerance for suppressing unfavorable data, the crucial shift in the cultural paradigm will not occur. Survey responses indicate that within the Department, people are resisting the EVMS requirement by giving direction to manipulate EVM data, particularly via inappropriate transfers of budget without the associated work scope, in order to keep pressure off the project.

Research: As stated in the Deputy Secretary of Energy Daniel B. Poneman's memo, Subject: Project Assessment and Reporting System (PARS II) Data Quality, June 19, 2012:

- If we are to demonstrate long-term improvement in contract and project management, we must insist on project information that facilitates management, not impedes it.
- The FPD must assure project cost and schedule performance reflects reality.
- EVMS gamesmanship should not be tolerated.
- The contractor must be held accountable for providing timely, accurate, reliable and actionable project and contractor cost, schedule, performance, risk, and forecast data, reports and information.
- The Federal project team must be accountable for its oversight and validation of the data.

Although the memo is three years old, DOE continues to fail in this area as evidenced by the EVM Survey Results Report and EVMS reviews. Accountability is absolutely essential to facilitate change. While the responsibility for project management policy, training materials, supporting procedures is the Office of Project Management Oversight and Assessments (PMOA), PM-1, this group does not have the authority to direct or responsibility to assess internal compliance. As a result, the primary offices responsible for implementation of the policy, such as NNSA, EM, and Office of Science, have taken

somewhat differing approaches regarding EVMS that have contributed to inconsistency of the message.

There must be a clear line of authority responsible for internal audit of DOE Project Management Support Office (PMSO) and/or FPD actions that cause reporting of false data, such as misuse of DOE contingency as a means to provide 'get well' budget to mask poor performance, sometimes referred to as 'BCP (Baseline Change Proposal) to Green'.

Two more recent memos on this topic are listed below; however they do not specifically address who is responsible for ensuring accountability at all levels.

- The Secretary of Energy Ernest J. Moniz's memo, Subject: Improving the Department's Management of Projects, December 1, 2014.
- The Secretary of Energy Ernest J. Moniz's memo, Subject: Project Management Policies and Principles, June 8, 2015.

Addresses Survey Responder Suggestions:

- (F) Estimates at Completion (EACs) have been notoriously unrealistic on many DOE projects. Where the DOE Project Analyst detects schedule and/or cost performance trends in the Schedule Performance Index (SPI)/Cost Performance Index (CPI) that indicate future performance will be worse than the past, and the PM does not address this in his/her Estimates at Complete (EACs), the PM should be challenged on it by the FPD in monthly reviews. Too often this is overlooked or not addressed and the PM EACs continue without challenge and correction. This is likely part of the reason senior DOE leadership is surprised with cost/schedule overruns late in the projects.
- (F) On a large, complex design-build project, it seems to be easy to get out-of-line with the baseline – especially with funding and technical design issues constantly changing or not being resolved in a timely manner. This leads to significant cost and schedule variances – not all necessarily the contractor's fault – but the mentality seems to be that variances are "bad" and should be avoided at all cost (especially when contractor's bonuses are tied to CV & SV performance, or worse yet, DOE incentivizes for fee based on CV & SV performance).

- (F) It is well known that some DOE senior leaders are frustrated that EVMS data too often does not provide accurate/reliable performance information and/or does not provide early advanced notice that projects are in cost and/or schedule trouble. As a result, such leaders claim EVM doesn't work. EVM works, but requires that rigor and discipline be applied continuously, otherwise shortcuts are taken, noncompliant practices are followed and the integrity of the data suffers and becomes misleading and unreliable. Through effective analysis techniques, performance problems and trends can be detected, even though SPI and CPI are near perfect and EAC is near BAC. The following is an example:
    - (F) When it was discovered that a project was going to be $250M over budget, senior leadership was surprised and upset that the EVMS data did not provide early warning of the impending overrun. However, if the analyst or FPD had been more familiar with the data and used effective analysis techniques, they would have discovered a significant and recent negative cost variance trend, unrealistic EACs and a very high cost technical risk that had already been realized but was not being reflected in the EAC. When the performance trend is calculated and added to the cost of the realized technical risk they equal the value of the overrun. Therefore, senior leadership should not have been surprised.
- (F) Given the current situation with EM projects, identified by internal and external audits and reports, EVMS needs to be tightened up and mandate specific accountability at low enough levels to be timely and informative into corrective measures.
- There were many comments relating to contractor frustration that the FPD and staff seldom comment on the EVMS Contract Performance Report (CPR)/Integrated Project Management Report (IPMR) they submit monthly. The root cause of this may be related to Federal staff lack of confidence in the data being reported, or in the predictive analysis process that is based on EVM data. Again, this seems to be an accountability issue.

Recommendation #2: Remove Inappropriate Performance Incentives from all Contracts and Performance Plans

Issue a directive with accountability, such as a requirement to provide a notice of compliance response, to ensure contractual award fee language, performance incentives, and Federal Project Director (FPD) performance awards are not based on EVM cost and schedule performance indicators (CPI/SPI). Through poor selection of award fee incentives, DOE has caused a consequence where EVMS is not allowed to work as intended. Award fee criteria should be based on the health of the EVMS as demonstrated through internal compliance surveillance and external DOE surveillance. Recommend the approach be modeled after the DCMA approach which follows (see Benchmarking) and incorporated into the Order 413.3 update and/or via contract modification.

Benchmarking: DCMA's Earned Value Management Implementation Guide, October 2006, Appendix E provides Award Fee Criteria. Each criterion (listed below) is then assessed based on requirements listed for five ratings: Unsatisfactory, Satisfactory, Good, Very Good, and Excellent.

- "Management #1: EVM is effectively integrated and used for program management.
- Management #2: Management of major subcontractors.
- Management #3: Realistic and current cost, expenditure, and schedule forecasts.
- Management #4: Adequacy of cost proposals submitted during award fee period.
- Management #5: Cost control.
- Management #6: Variance analysis in performance reports.
- Discipline #1: Accuracy, timeliness, and consistency of billing and cumulative performance data; and integration of subcontractor data.
- Discipline #2: Baseline discipline and system compliance."

Addresses the Concerns Reported by Survey Responders:

- (F) I do feel that there are many pre-reviews and filters that are either intentionally or unintentionally added to the [project assessment] process at each of these steps that can have the effect of diluting the true message. The motivation / reward

system for the information provider can and does influence how information is provided to the receiver of that information.

- (F) In the past DOE has made (and may still make) SPI and CPI part of the fee determination. As a result, it has incentivized the contractor to inflate performance reporting.
- (C) In my opinion, there will always be a desire to re-plan to avoid variances. That said it is incumbent upon contractors to adhere to a rigorous change management process that ensures this does not occur.
- (C) The most honest and meaningful reporting will be the result of an environment in which it is understood and accepted that projects can and will have issues, challenges, changes, delays, setbacks, etc. that will result in negative performance data at times. In such cases, the issues and resulting recovery plan need to be clearly understood and communicated without fear of blame, punishment, over-reaction or application of extensive auditing, inquiry or extensive oversight.

Addresses Survey Responder Suggestions:

- (F) Emphasis has to be on recovery / corrective actions rather than punitive response.
- (C) Remove the SPI/CPI incentives from the contracts ASAP. This incentivized metric drives the elimination of variance through change control and the use of management reserve. The objective should be to report an SPI/CPI that reflects the actual physical project progress/performance.
- (F) My biggest concern here is the linkage between performance and reward for the contractor, and how it impacts the "honesty" in providing true project status to the Federal stakeholders. I think it is improving, but a process for de-coupling rewards for project performance and for reliable/honest reporting may need to be established.

V. People

This section covers the following elements related to people:

- Resource Mapping,
- Roles and Responsibilities, and
- Training.

The H&A recommendations in this section focus on identifying the most efficient and effective course of action to identify where the resources should be placed, clear identification of responsibilities, and how to ensure the resources are trained to provide a consistent application of skills, knowledge, and abilities vertically and horizontally across DOE.

Resource Mapping

Having the right people in the right places with the right skills is essential. H&A looked at the optimal spread of EVMS-related resources for the mission. Benchmarking was done with DCMA because there are similarities with having Federal staff located at the contractor locations and Headquarters (HQ) oversight functions offsite of the contractor locations. The DCMA model has an identified EVM focal point at each site where there are EVMS applicable projects. The EVM focal point may be dual hatted with other responsibilities outside the EVM duties, or may be assigned more than one project for EVM analysis purposes. In the case of a particularly small project with EVMS, the focal point may be assigned to more than one location, in the same general proximity to minimize travel costs. Flexibility is required based on workload logistics.

In the DOE structure, the identification of the EVM focal point for the Federal site offices is inconsistent. Some sites have a designated EVM focal point, but many seem to rely on the FPD to serve as the EVM focal point. While it is important that the FPDs have EVMS skills, there is significant benefit to having an EVM Subject Matter Expert (SME) on location is to conduct project EV predictive analysis on a monthly basis and physical verification and provide the FPD with insight into performance trends and potential impacts to future cost and schedule performance. The EVM SME also serves as the focal point for monitoring closeout of compliance review Corrective Action Requests (CARs) with PMOA.

From a PMOA perspective, staffing shortfalls have caused dependence upon support contractors when conducting compliance reviews. The expertise provided does not always understand the DOE differences and has varying degrees of experience for a risk based, data driven reviews.

Roles and Responsibilities

To mitigate the issues involved because of inconsistent application of EVM, roles and responsibilities should be established for EVM-related duties across the DOE enterprise subject to the number, complexity, and sizes of capital asset projects at each site, PMSO, and at PMOA. Benchmarking with DCMA, DOE could apply some of the same logic to establish which EVM(S) related responsibilities could be done more efficiently at each level of the organization.

Training

Well-trained resources are a key to success. Sixty-three percent of the Federal Staff responders said 'no', they felt that DOE does not have sufficiently trained labor resources to conduct analysis of EVMS data. While this response is an indication of both insufficient resources and lack of training, the issue seems prevalent and warrants attention.

Recommendation #3: Re-Establish One Certifying Authority in DOE

PMOA should be re-appointed as the only Certifying Authority for EVMS compliance. Order 413.3B divided the certification and surveillance responsibilities by thresholds between the PMSO and PMOA organizations. However, the recurring theme voiced throughout this study is the need for consistency in applying EVMS compliance processes by the Federal staff. Capital Asset Project contractors want uniformity from all levels of DOE that they deal with. Frustrations run high when contractors feel they are serving three different masters in terms of expectations, i.e. FPD, PMSO, and PMOA.

The Federal staff also voiced concerns and is pushing for consistency in oversight operations. Responders do not understand why the expectations and interpretations of the EIA-748 differ from one level of review (Site, PMSO, PMOA) to the next, one type of review to the next (EVMS Certification, EVMS Surveillance, EV Peer Reviews, etc.), and between one review team lead to another. Some Federal responders reported an internal conflict of

interest that sometimes arises with the Under Secretary organizations such as NNSA, Environmental Management (EM), and Office of Science (SC) from pursuing a successful project at all costs versus compliance to the EIA-748 standard.

Benchmarking: DoD separates project management from EVMS compliance to avoid this potential for conflict of interest by having DCMA perform compliance reviews for all of the military services. DoD's position is consistent with this recommendation in have PMOA serve that role for DOE.

Recommendation #4: Establish a Model for EVM SME Site Level Staffing

Establish guidelines for a model Federal Site Office structure to determine when a segregated EVM SME is needed (based on amount of EVMS-required project value for example). Applying the model will help ensure that the expertise is available at various levels within the organization based on roles and responsibilities.

Benchmarking: Although the Office of Personnel Management (OPM) has no dedicated series specific to EVM, the series most commonly associated with EVM analysis and compliance oversight functions used in Federal Agencies include: Engineering (0800 series), Program Manager (0340 series), Management and Program Analysis (0343 series), and Operations Research (1515 series). The Position Descriptions (PDs) must specify EVMS-related responsibilities. DCMA approached this by working with their Human Capital organization to create a PD for an EVMS Specialist for full time EVMS responsibilities. The PDs vary in series and grade levels for an EVMS Specialist based on grade determining factors allowing for flexibility in hiring.

EVMS Specialist Responsibilities: There is a broad mix of staffing levels with EVM expertise, particularly in the Site Offices. While obviously the size and complexity of capital asset projects determines staffing levels, each site needs to have resources responsible for two key tasks: 1) EVM project level data monthly analysis including predictive analysis, and 2) EVM system level surveillance.

These EVM SMEs have the responsibility to conduct EVMS project level analysis, with the focus of being able to physically verify that the data being reported reflects reality in terms of performance earned and performance variances to the baseline. For each EVM-

applicable project, the EVM SME should issue a monthly project level analysis report to the FPD, focused on an assessment of data validity, physical verification of performance claimed reflects reality, investigation of variances, corrective actions, baseline change incorporation, schedule forecast changes, and EAC realism, for the FPD's use in managing the project.

The EVM system level surveillance may be done jointly with the contractor, and the schedule for the review should focus on 32 guidelines per year using the EVMSIH (pending release) to assess implementation of the system across all EVM-applicable projects at the site. However, based on the project analysis, the EVM SME should focus on any issues that indicate a problem with the EVMS. The same EVM SME resource may be responsible for both of the key tasks, depending on workload. At a large site with several EVM contractors, the resources may be assigned to one or more contractor EVM systems, one or more EVM projects.

Incorporating this recommendation may justify an update to DOE G 413.3-19, Staffing Guide for Project Management, in the group 'Project Planning, Control and Management'. This group includes: project planning, cost estimating, scheduling, risk management, performance measurement and earned value management, and project direction.

Provides a Solution to Survey Responses:

- (C) Reporting requirements not enforced/understood at DOE Field Office level.
- (C) Lack of EVMS understanding and enforcement by local DOE management.

Recommendation #5: Ensure a Vertical Depth of EVM Competency in DOE

Building upon the staffing model, this recommendation addresses the need for DOE to ensure that the projects are adequately staffed with skilled resources, not only at the Site level but also at the Business Center, PMSO, and PMOA levels. As stated best by a Federal survey responder, "EVMS can provide key insight to contractor or site performance. In that regard, it makes sense to **have a vertical depth of competency** that is validated early and often by HQ to ensure sites have and maintain this critical skillset." Based on survey responses and networking via past PMOA EVMS and PARSII outreach training-related

sessions (referred to as "Road Shows") and Project Management Workshops, H&A has identified varying levels of EVM expertise within the Department, i.e. site offices, Business Centers, PMSOs, and PMOA.

As a first step in accomplishing this recommendation, DOE needs to establish clear swim lanes relating to EVMS to eliminate duplicative or contradictory activities by organizations outside the organization having authority. PMOA has the authority for EVMS policy, training, and best practices (templates, standard operating procedures (SOPs), etc.). Consequently no other organization should be issuing any EVM-related procedures to avoid the potential for inconsistencies. If one organization identifies a need for clarification of policy, then they should notify PMOA so that the clarification can be provided to all.

PMOA's authority should include development of EVMS compliance policy and procedural development, compliance oversight processes (inclusive of interpretation, analytical methods, review structure), training courses and approved providers, subject matter experts to provide responses to questions, training materials (Snippets, Webinar sessions, Roadshow content, etc.), Departmental EVMS analysis tools, creation and maintenance of the EVMS central data repository including CAR and Corrective Action Plan (CAP) database, maintain EVMS library (SharePoint), and establishment of recommended EVMS Specialist knowledge, skills, and abilities (KSAs).

Provides a Solution to Survey Responses:

- (C) PMSOs issuing guidance that is in conflict with EIA-748 or PMOA.
- (C) Confusion among local DOE and Contractor on what constitutes a compliant usage of Management Reserve (MR), definition of within-in scope and out of scope, application of DOE contingency.
- (C) The largest issues stem from getting different direction from local office, PMOA and other sites. Example: "Local office says why are you focusing on EVMS? Focus just on your schedule." There are lots of issues with interpretation of the requirements that leads to conflicting information.
- (F) Contractors often use deceptive practices to avoid disclosing cost and/or schedule problems until late into the project. Most can be detected early through analysis techniques, exposed, and corrected to ensure accurate performance

reporting and to prevent surprises later in the project. However, just like the rigor and discipline required of the contractor in their EVMS implementation, the DOE EVM analysts must apply rigor in their monthly analyses to identify deceptive or noncompliant practices that may ultimately result in performance surprises by the customer.

Applicable Survey Responses:

- 77% of the Federal Staff responders said they have sufficient skill labor resources to conduct analysis of EVMS data; 21% said they do not. Of that 21%:
    - 80% of the Federal Staff responders stated that they are unable to hire the appropriate quantity and talent for EVMS staff because of funding constraints.
    - 20% said it was because they are unable to attract qualified EVMS candidates.

Provides a Solution to DOE Concerns:

- (F) I would say that senior leadership has not found it important to ensure their analysts/FPDs are sufficiently trained to perform their jobs at a high level of proficiency. Far too many FPDs do not understand how to interpret EVMS data and do not use it to assess performance.
- (F) The department has not fully committed to acquiring trained resources across all of its offices.
- (F) Position, job series, and training significantly vary for those involved with EVMS within DOE.
- (F) Regarding the sufficiency of skilled EVMS resources in DOE, I believe this area is lacking for the most part. There are certain pockets of expertise in all situations, obviously.

Addresses Survey Responder Suggestions:

- (F) DOE HQ should focus more on getting the right EVM people (knowledgeable and experienced) on the projects and replace or retrain the ones that are not performing to standards.

- (F) Speaking only for my site, I believe we do have adequate resources to analyze EVMS data. The difficulty is trying to unnecessarily apply a "one size fits all" approach to every activity in the same manner, and we've lost the common sense and flexibility on which project management is truly based.
- (F) PMOA does not have enough resources.

Recommendation #6: Establish an EVMS Joint-Surveillance Program at the Site Level (Contractors with Only Projects in $20M-$100M Range)

The Site level EVM SME should enter into a joint surveillance program with the contractor subject to the $20M - $100M threshold. This recommendation is only for EVMS surveillance. Copies of the surveillance reports would be provided to PMOA. Engagement by PMOA would be on a case by case basis within that dollar threshold.

EVMS compliance oversight should begin at the site level for two overarching reasons: 1) Visibility into the day to day performance can be compared to the reported data to assure valid data is being reported, and 2) DOE participation provides assurance and accountability that the contractor is maintaining their EVMS in a compliant manner. This process is not meant to supplant PMOA's data driven, risk based surveillance responsibilities, but rather to augment the contractor's internal EVMS surveillance whereby the contractor ensures its management control system continues to meet the EVMS guidelines, is implemented, and used correctly on all applicable projects.

Benchmarking: A Joint Surveillance approach has been used by DCMA since the mid 1990's, and has been published as a best practice in numerous forums. While DCMA has its own process, the National Defense Industrial Association (NDIA) Integrated Program Management Division (IPMD) maintains a Surveillance Guide that addresses Joint Surveillance Reviews (JSR) for use in other Civilian Federal Agencies.

While Joint Surveillance is not intended to be mandatory, it should be offered as supplement to required contractor self-surveillance. If DOE and the contractor execute the review as a JSR, then both parties are participants (not observers) of the review. It is cost effective as it shares resources, builds trust provided each party maintains the integrity

that comes with their respective responsibilities, and it is more efficient as the surveillance responsibilities of each party are done simultaneously.

For further explanation relating to the dollar thresholds mentioned, refer to Recommendation #11.

How It Can Work in DOE: The following is provided based on excerpts from historical DCMA documents including a Joint Surveillance Charter and Joint Surveillance plans. The contractor enters into a Memorandum of Agreement with the local DOE to establish ground rules for Joint Surveillance. The joint agreement is established to:

- Assess the contractor's commitment and ability to use and apply its EVMS as an integral part of its management activities and to ensure that external cost and schedule reports provide DOE with:
  - Timely and reliable cost, schedule, and technical performance measurement information that depicts actual conditions.
  - Information derived from the same database as that used by the contractor for management of its business.
  - Timely indications of actual or potential problems.
  - Proper maintenance of baseline integrity.
  - Comprehensive variance analysis and corrective action reporting regarding cost, schedule, technical and other problem areas, as well as proposed date(s) for cost and schedule recovery.
  - Insight on actions taken to mitigate identified risks to the program and manage cost and schedule performance.
- Ensure that the contractor's EVMS continues to be compliant (as the contractor self-certified) with the EVMS guidelines contained in EIA-748 by:
  - Training designated project personnel in the use of EVMS.
  - Accomplishing early, comprehensive planning to provide a quality baseline ready for examination in the initial baseline review process.
  - Integrating cost, schedule and technical planning into a single, well-controlled performance measurement baseline.

    - Establishing clear lines of authority and responsibility for accomplishment of work elements.
    - Using problem identification information early, and continuously, to formulate corrective action/work around plans to mitigate significant variances from the baseline plan.
    - Providing valid and timely management information.
- Encourage continuous improvement and innovation of the EVMS.
- Maintain a disciplined management process using EVM, including effective teamwork between contractor and DOE.
- Effectively communicate surveillance findings/results including areas where the contractor demonstrates effective use of its EVMS to appropriate contractor and DOE individuals and follow-up on the findings/results to assure early correction of system problems.
- Maintain metrics to determine the effectiveness of the performance measurement system and to distinguish between systemic and non-systemic problems.
- Reduce the cost of surveillance by combining resources to achieve common goals.

Recommendation #7: Establish a DOE EVM SME Development/Certification Program (Train from Within)

Establish a program to develop and/or improve the skills, abilities, and knowledge of the DOE workforce responsible for (1) EVM data project analysis and (2) EVMS compliance assessments. The program would use a variety of methods, including training courses, on-the-job training with cross-training opportunities in the field and at HQ, mentoring, participation and assumption of different roles in conducting EVMS Compliance, Surveillance, and Peer Reviews from an EVMS perspective, as well as assignments in EVM predictive analysis of monthly project EV data. This recommendation supports knowledge transfer practices.

The EVM SME Development/Certification Program will:

- Help standardize EVMS functionality across DOE,
- Build EVMS competency within DOE,
- Promote EVMS excellence across the DOE and industry EVMS teams, and

- Instill confidence in DOE as the EVMS experts and standard upon which Government agencies and industry partners can depend for accurate, consistent, repeatable, and defendable results.

The program must be documented to address all aspects of EVMS, including a complete listing of EVMS training courses, beyond those already listed in the Project Management Career Development Program (PMCDP) catalogs.

Applicable Survey Responses:

- 69% of responders selected 'yes', they would favor an internal DOE EVMS Development / Certification Program.
    - (F) Yes, heavily favor an internal DOE EVMS Development / Certification Program.
- 71% of responders selected 'yes', participation in a DOE review team should be a requirement as part of an EVMS development program.
    - (C) Yes, if the participation is towards the end of the development phase. These reviews should not include folks who are learning concepts with little or no actual implementation experience.

Provides a Solution to DOE Concerns:

- Difficulty in finding qualified candidates for vacancies.
- HQ generally lack DOE field experience which contributes to the lack of EVMS knowledge; Site Offices generally lack HQ oversight experience.
- Inconsistency in experience perspectives of EVM between field level project EVM analysis and HQ level EVMS compliance.

Addresses Survey Responder Suggestions:

- (F) An EVMS development and certification program would assure a core of EVMS qualified personnel by site and programs. However, certification should be incentivized and rewarded at the employee performance plan.

- (F) On the job learning is critical to achieving a constantly learning organization. And, having strict requirements for entry to the federal workforce would further help to eliminate those who can articulate well, but not perform in line with the all expectations of a job. After placement in a federal position though, continued certification-type requirements should be mandated as well as opportunities for participation in reviews of other sites, review and development of clarification or direction documents, etc.
- (C) PMOA should come to the field to work with DOE and Contractor EVMS experts when not doing surveillance to broaden PMOA's experience.

Benchmarking: DCMA had a similar problem in 2006 with insufficiently skilled EVMS SMEs, both internal and through hiring. They resolved it by creating a formalized EVMS Specialist Certification Program (ESCP) within the Agency (DCMA-INST 206; latest update January 4, 2013). Through the program, they have experienced success in meeting their skill level needs across the Agency. They not only trained current employees, but also hired employees through a career progression program, who spend three to four years gaining specific DCMA experience and completing courses to acquire the knowledge and skills to perform at the expert level. Guidelines were established for equivalency credit.

How it can work in DOE: Tailoring DCMA's program to meet DOE's needs, a DOE EVM SME Development/Certification Program will enhance DOE's performance by developing and deploying the necessary knowledge, skills, and abilities through a three phase credentialing process. Each phase has expected outcomes that must be met prior to advancing to the next phase. A DOE EVM SME is defined as an employee who is responsible for performing one or more of the EVM functions, regardless of the specific job series of their position. Areas of focus include:

EVM Predictive Analysis (focused on project-specific EVM data analysis and Project Peer Reviews), and

EVMS Assessment (focused on EVM System compliance reviews including certification, surveillance, and corrective action plan closeout actions).

Depending on the site or office, participants could be members of the support staff who are responsible for one or more projects or a contractor's EVMS. This mix will facilitate cross-training opportunities.

The program develops the EVM SME into a fully qualified and skilled EVM professional (the "full up round") through a Five Vector Model that emphasizes:

- Qualifications and Certifications – including an internal three step credentialing progression (Entry, Journey, and Expert Levels) and/or professional certifications.
- Leadership – including key EVM-related roles on Compliance/Surveillance/Project Peer Reviews, participating in process/policy/training revision team.
- Professional Development – including recommended internal and external based courses.
- Performance – including on-the-job training and voluntary protégé/mentor.
- Personal Development – actively participate in an EVM-related conference/working group/technical interchange meeting, participate in a professional membership, and present EVM-related briefings.

Recommendation #8: Assign PMOA Responsibility for Development and Currency of EVM Training Materials Used in DOE

PMOA should be responsible for development and content review of EVM training courses provided within DOE. PMOA would maintain a list of accepted course trainers who use only the authorized training materials for a variety of EVM courses and other training materials including Snippets. With that responsibility comes the obligation to ensure budget is available to maintain, update, and deploy the training, with thought given to travel required for on-site courses, and easy access for computer-based training.

The training materials produced to date are an effective means to convey specific lessons learned and 'how to' instruction. Feedback from those who have used the EVMS Training Snippets is mostly positive, with requests for additional topics. They have not been embraced by some within the Department for reasons relating to the question of mandatory versus non-mandatory that are addressed in a later recommendation. Survey

respondents were very outspoken with regard to inconsistency within DOE, and with general EVM training that did not address DOE peculiarities. Using traditional EVM training materials that have been carefully tailored to incorporate DOE specific challenges will reduce confusion in implementation.

The survey responses also provided insight into what the DOE Federal Staff and DOE Contractors view as the top ten interpretation issues. Each of these issues should be in existing training materials; however, a complete scrub is recommended to ensure coverage. As one contractor stated in the survey response, "I do not believe any of these items are interpretation issues as there is now current guidance for each of these items through the "Snippets" and the PMOA Standard Operating Procedures."

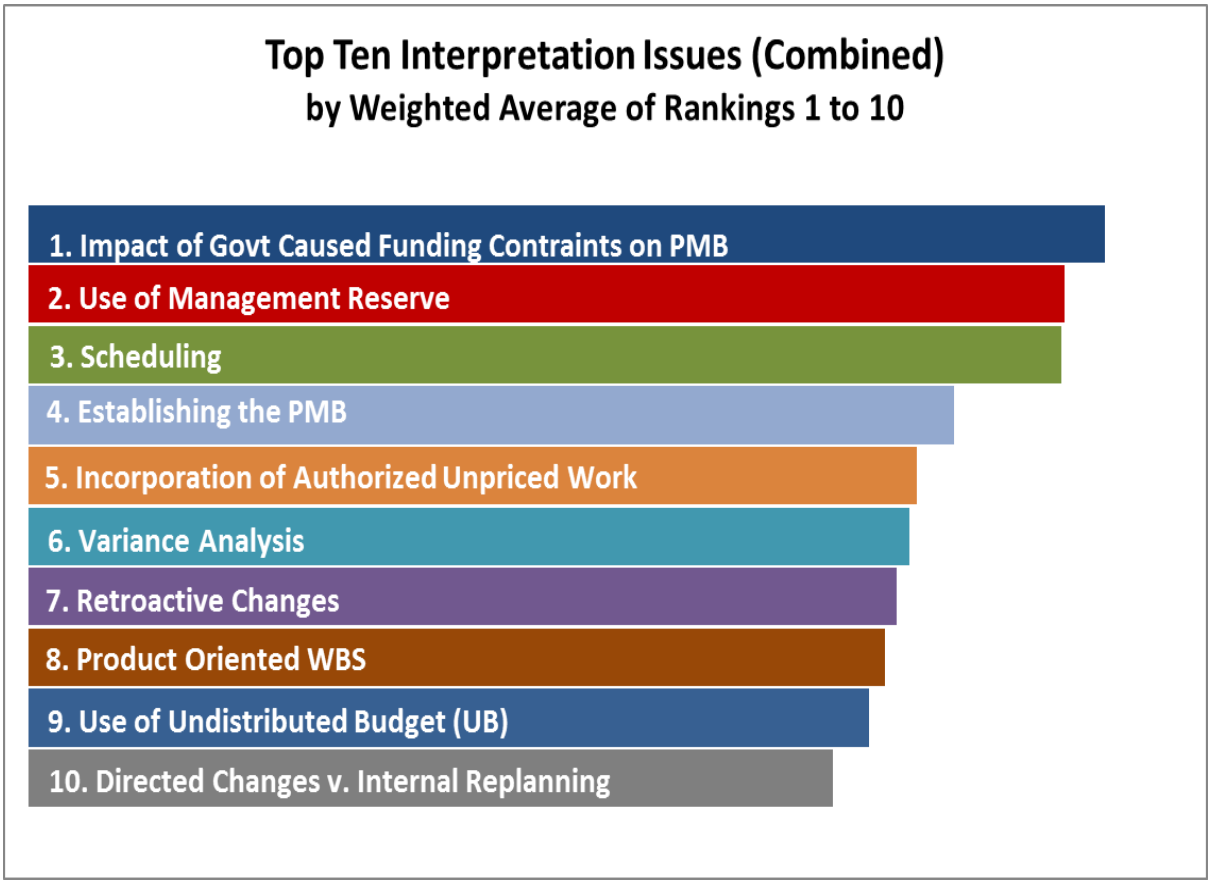

Figure 7: Top Ten Interpretation Issues. Source: Humphreys & Associates, Inc., *DOE EVMS Survey Results*, June 16, 2015.

The following is a list of training materials recommended for development or update (online or classroom courses, Snippets, etc.):

- Develop EVMS Guideline Interpretation training based on use of the DOE EVMSIH: Classroom course recommended supported by online snippets for reference purposes.
- Update current Basic EVM 24/7, Advanced Earned Value Management Techniques, and Snippets as necessary as DOE Order 413.3 updates occur, and as processes change.
- Develop 'EVMS for Contracting Officers' training, combining all applicable responsibilities into one course, and provide cross-reference to specific responsibilities currently contained within the topical Snippets.
- Develop 'EVMS Reporting and Management during Re-baselining Efforts' Training Snippet.
- Add the existing Planning and Scheduling Profession (PSP) and Earned Value Professional (EVP) Courses to the EVMS catalog of training courses.

Additional Training Recommended by Survey Responders:

- (F) Establishing an accurate project schedule that includes mandated consent decree milestone(s).
- (C) Provide examples of good and bad variance analysis, root cause analysis, and corrective actions (Note: Also addressed in Recommendations #10 and #18).
- (F) Additional snippets about conducting Contractor PMs, Control Account Managers, Functional Managers, etc. Review Interviews.
- (C) Establishing a realistic Performance Measurement Baseline (PMB) when DOE directs a full project estimate at Critical Decision (CD) 1 for activities to CD4 when the work is not all authorized because this is what the customer wants to see.
    - H&A Note: This is a good topic for internal training and process review.
- (C) Create a "How To" for DOE HQ, DOE Local Office, and Contractor relative to establishing a Capital Asset Project.
- (C) Handling Work for Others (WFO) when customers do not allow the use of MR.

- (F) Most of the major DOE project performance surprises senior leadership complaints about are attributed to contractor practices that intentionally keep performance problems from becoming visible to the customer until late in the project. A few examples include: 1) Front loading the baseline to achieve and maintain early positive cost and/or schedule variances, 2) rescheduling activities into the future to avoid schedule variances, 3) aggressive/inappropriate uses of MR, 4) not reflecting realized cost/schedule trends in the EAC and/or forecast schedule, 5) changing dependencies/durations to avoid moving completion date out or creating negative float, 6) making retroactive changes to S and/or P in the cumulative rather than current period to avoid notice of changes, 7) movement of resources from future planning packages to near-term work packages to eliminate cumulative variances (rubber baseline), etc. Many of the above can be discovered using aggressive analysis methods that are often not found using standard analysis techniques and indices and are not taught in basic EVM training.
- (F) For projects with a lengthy (over a year) re-baseline effort, some guidance would be appreciated on how to manage EVMS processes during these times.

Provides a Solution to the Problem:

- (F) There is no consistent training program within DOE. Different levels of the organization sometimes contract for their own EVM training without using the courses available through the PMCDP.
    - H&A Root Cause Analysis: Sites and Project Management Offices are using multiple sources for EV training outside those that were DOE tailored and approved by PMOA. This leads to misunderstandings as the courses outside the PMCDP may not be conducted by instructors familiar with DOE while the PMCDP courses are endorsed by PMOA and tailored to incorporate DOE EVM processes.

Addresses Survey Responder Suggestions:

- (F) PMOA needs to be constantly in the teaching mode vice the audit mode.
- (F) Training to consistently apply the standardized practices across all DOE projects.

- (F) Recommend a higher level of training in use of PARS II, contractor's monthly reports, and EVM in quarterly reports to accurately spot/pinpoint initial negative trends.
- (F) I am in contracting. Would appreciate a tailored course for my career field.

Recommendation #9: Staff Assessment Teams, e.g. Project Peer Reviews and EVMS Compliance/ Surveillance Reviews from the DOE EVM SME Community

Build a cadre of knowledgeable DOE Federal EVMS Specialists from across the enterprise to assist in conducting all types of EVMS compliances reviews. In terms of PMOA staffing, PMOA is dependent upon contract support staff to conduct EVMS compliance reviews. The expertise available does not always understand the DOE differences and have varying degrees of experience for a risk based, data driven review. PMOA should strive to become fully staffed and less dependent upon outside support. This recommendation supports knowledge transfer and the need to improve consistency.

An excellent source for staffing assessment teams would be to use EVM SMEs participating in the EVM SME Development/Certification Program (Recommendation #7). Those people who are in the entry level should be paired with a journey level or higher person, and those from the expert level should be in leadership and mentoring roles. That way everyone participates in the final product, increasing the efficiency and effectiveness of the team.

Provides a Solution to DOE Concerns:

- Lack of skilled resources attributable to internal subject matter experience shortfalls, i.e. lack of confidence in review team member knowledge.

Addresses Survey Responder Suggestions:

- (C) (F) DOE EVMS review participants should have initially completed EVMS-related training and successfully passed a certification exam.
- (C) When conducting an EVMS review, the Program Secretarial Officer (PSO) and site qualified EVM SMEs should be involved. It would be of great value for DOE to

have SC members on an EM review or EM on an NNSA. That is how the Department will get better and stronger in EV, i.e. developing SMEs across the complex.

- (F) There should be an EVMS 'Community of Practice'. It should be mandatory for anyone certified to lead an EVMS review that they participate in this process (sharing of lessons learned, opportunities for improvement, notable practices).
- (C) Consistency in the reviews would be helpful so that everyone could best prepare and be reviewed equally.
- (F) In addition, teams should be comprised of personnel across the complex and mission, so DOE has common expectations across offices.

Recommendation #10: Offer On-Site Training at Project Kick-Off

As suggested by survey responders and as evidenced in other Agencies, there is benefit in providing real time training, on site, to both Federal and Contractor, as part of a new project kick-off. The focus is on roles and responsibilities, means to ensure an effective baseline, and how to handle common issues during the execution of the project.

Benchmarking: This type of clarification, communication, and training was done as part of the Post-Award Orientation Conference in DCMA. It helps to ensure everyone is on the same page in all areas, including discussion of the EVMS clauses, reporting, and system compliance expectations.

Addresses Survey Responder Suggestions:

- (C) Suggest putting boots on the ground up front with more focus on the basics. Emphasize root cause analysis, variance analysis, estimate to complete, problem solving and corrective actions. Fixing the EVMS execution problems will make the surveillances go much better and take less time.
- (F) Recommend training project team & HQ liaisons on EVM techniques scaled to appropriate project complexity, value, and risk.
- (F) EVM training should be personal, scaled to project and involve all project participants from HQ, field (contractor & fed) - both contract and project team; initial training should occur following contract true-up.

VI. Processes

This section covers the following elements related to processes:

- External Policies, Procedures, Regulations, Guidance, Best Practices;
- DOE-wide Policies and Guides; and
- PMOA Standard Operating Procedures and Handbooks.

The 'what' and the 'how' of DOE policies, guides, handbooks, and PMOA Standard Operating Procedures (SOPs) is essential to understanding and consistency in application. The research conducted by H&A related to the adequacy of existing documents and suggestions for improvements to provide clear and concise direction, and benchmarking against other organizations. All of these recommendations support a formal knowledge transfer practice through documentation of knowledge based on experience, requirements, and best practices.

Recommendation #11: Update 0rder 413.3 with Respect to EVMS

The following update is recommended to Order 413.3 based on discussions with PMOA, research, and benchmarking with DoD:

EVMS required for any prime contract with:

- A value greater than $100M.
- A minimum performance period of 18 months.
- With development or other discrete, schedulable, and measurable work scope (excludes LOE, T&M, and Operations Type effort under the contract).
- Requires PMOA Certification and Surveillance to EIA-748 and DOE's EVMSIH.
- Reporting via DOE IPMR Formats 1 - 7 (includes UN/CEFACT).

EVMS required for any prime contract with:

- A value between $20M and $100M.
- A minimum performance period of 18 months.
- With development or other discrete, schedulable, and measurable work scope.
- Contractor Self-Compliance and Surveillance to EIA-748 and DOE's EVMSIH.
- Joint Surveillance teaming with local Federal site office EVM SME is recommended.

- Compliance activities only done on an exception basis when normal project operations identify data integrity issues and/or EVM surveillance results.
- Reporting via IPMR Formats, tailoring optional.
    - For example, DOE could consider tailoring the IPMR to Format 1 (Work Breakdown Structure), Format 5 (Explanations and Problem Analysis), and Format 6 (Integrated Master Schedule) via UN/CEFACT and input into PARS II.

Subcontractors within the same thresholds as above follow the same rules except:

- Regardless of dollar value, reporting to the prime via IPMR is not required; however the subcontractor must provide verifiable EVMS information to the prime in a sufficient manner and detail to support the prime's needs for incorporation.
- If between $20M and $100M, Subcontractor must use an EVMS compliant to EIA-748 standard and EVMS compliance activities would only be done on an exception basis.
- Identification of Fee Determination Criteria (see Recommendation #2).

Recommendation #12: Established Processes for Project Peer Reviews (EV Roles), EVMS Compliance, and Surveillance

To ensure consistency of reviews, documented processes for conducting each type of review is essential. For those survey responders who did not consider the participation in Peer, EVMS Certification, or EVMS Surveillance Reviews a worthwhile experience, the reasons given included:

- Lack of a formal review process,
- Lack of consistent direction,
- Team was unprepared, and
- Too many observers; limit the Review Team to fully qualified people who can contribute to the mission.

These procedures would then form the basis for the Review training referenced in Recommendation #7.

Recommendation #13: Require Internal Compliance to DOE PMOA Sponsored Policy Supporting Procedures and Training Materials

Incorporate a statement into the DOE Order 413.3 stating that PMOA policy supporting procedures such as Guides and Handbooks as well as training materials are to be followed unless an alternative approach has been approved. This will reduce confusion and inconsistency, essential to moving DOE forward in EVM and project management integration.

A majority of 67% of survey responders selected 'yes', SOPs should be mandatory, while 33% stated 'no'. Of the majority, 36% were CAP Contractors and 31% were Federal Staff. Of that 33%, 14% were CAP Contractors and 19% were Federal Staff.

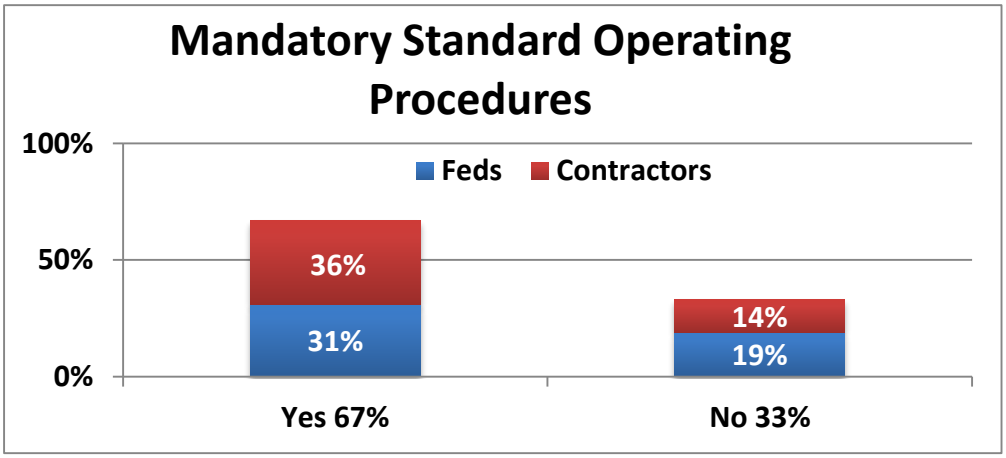

Figure 8: Should SOPs be Mandatory? Source: Humphreys & Associates, Inc., *DOE EVMS Survey Results*, June 16, 2015.

Although PMOA has taken great measures in recent years to provide accessible training materials and guidance supporting DOE Order 413.3B, these EVM-related materials are not considered as mandatory and have largely been ignored outside of PMOA. The Training Snippets are a perfect example. They were created to provide quick and easily accessible, detailed answers to specific topics pertaining to DOE. Yet survey comments show that the Federal employees believe training and policy-supporting procedures are not mandatory, thus are completely optional unless incorporated specifically into DOE Orders. For

example, on Federal responder stated "You don't put guidance in DOE PMOA Training Snippets. Guidance goes in Orders."

Some of the EVM implementation issues stem from direction by the FPD or Contracting Officers who may not fully understand the adverse impact to performance measurement. These types of lessons learned and clarification have been incorporated into the Training Snippets.

Addresses Survey Responder Concerns:

- (F) A non-mandatory guide is useless.
- (F) Current perception by DOE programs and contractors is that Guides are best practices that are not mandatory. This precludes standardization across the complex in the implementation of EVMS uniformly.
- (F) It is always helpful to know the "mandatory" requirements to ensure consistency where intended, but that doesn't mean everything should be mandatory since all projects are not the same.
- (F) The PMOA SOPs have not gone through the DOE Directives Process (RevCom). Making the PMOA SOPs mandatory "how to" procedures bypasses the directives process, essential creating "rogue" directives. The PMOA SOPs should go through RevCom and become formal DOE directives. Then we should make these directives mandatory for our contractors by including them in the List B of our contracts.
    - H&A Note: The SOPs are internal procedures that currently apply only to PMOA; however, the recommendation is to apply them to all of DOE. Internal SOPs are not appropriate for contractor directives.
- (C) A standardized interpretation / expectation from DOE-HQ of the EVMS guidelines and 413.3B guides would be very helpful to all contractors as well as DOE.
- (C) PMOA procedures and "how to" instructions are mandatory for contractors only if they are included in the contractor's contract with DOE. PMOA appears to not recognize their reviews should be constrained to contract requirements. If they disagree with the requirements in a contractor's contract and/or the DOE local site

offices expectation for EVM implementation, they need to resolve it with the DOE site office, not take it out on the contractor.

- H&A Notes:
  - EVMSIH is the means to assess compliance and does not specifically have to be on contract. However, incorporating it into the Order update is highly recommended.
  - Agree that there are internal issues with EVM compliance that need to be addressed separately from the contractor issues. This point also relates to Recommendation #1 regarding accountability.

Recommendation #14: Address the Concept of EVMS Tailoring

PMOA on behalf of the Department needs to address the concept of EVMS tailoring and define what exactly is tailorable, and under what circumstances. There is a prevalent misperception that EVMS must be flexible and tailored in order to be effective because of the different types of DOE projects. Yet those same responders wanted consistency of interpretation of requirements from review teams with procedures to communicate those requirements without being too prescriptive. When pressed for examples, interviews with survey responders indicated that by using the term 'tailoring', what they desire is an allowance for FPD 'creativity' to adjust the budget, scope, or schedule to avoid a 'red' project. This unacceptable practice was covered in Recommendation #1.

Based on research, experience, and benchmarking, there is seldom a need for flexibility in interpretation and application of EVMS guidelines on the basis of type of project other than for high rate production and agile software development. Tailoring is sometimes considered for a contractor with a small project that requires EVM; however, if a contractor has both large and small projects, its EVMS application should be consistently applied to avoid having to maintain two different systems, establish separate procedures, and provide separate training. The standard EIA-748 is not tailored as it is required by OMB and FAR. What may be tailored by each Department is the dollar threshold for when it may be required, or the reporting formats that make up the IPMR. For low dollar projects that fall below the minimum threshold established by each Department, the contractors may choose to apply EVMS yet adjust the rigor of compliance. This may include using

percentages vice dollar value for reporting variances, elimination of signatures on work authorizations while using email instead, etc.

Prevalent Misperceptions from Survey Responders:

- (C) A "one size fits all approach to EVMS" provides some significant challenges to the projects. Not all capital asset projects are construction of new facilities and thus should not be measured against those standards and requirements set forth as the criteria for a successful EVMS implementation. The type of capital asset, the total project cost, and scope of the project all must be taken into consideration when determining the level of EVMS implementation that is required to produce accurate and meaningful data for a contractor to successfully manage the work.

Addresses Survey Responder Suggestions:

- (F) I have been involved in spirited conversations/debates about how the "one size – fits all" approach does not work in our deactivation, decommissioning, dismantlement, and demolition environment within EM as compared to what is believed to be the driving force behind requirements that are perceived to pertain to Construction–as the case of Office of Science and Department of Defense. That argument somehow leads a significant portion of people to be able to discount the importance of those requirements (as in case of Orders, Guides, etc.) and simply believe that we cannot utilize those requirements as envisioned and allows the "tailoring" understanding to deviate. **Perhaps what should be considered are specific set of requirements for the conditions within EM for the D4 efforts and considering the constraints placed upon the environments, such as stakeholder involvement, discovering waste sites previously unknown, tribal concerns, and collective bargaining agreements.** I understand there are differences between construction and demolition, including the mindset of employees and contractors, but to allow the continued discounting by federal and contractor workforces on the importance of a prescribed set of EVMS or Reporting requirements should be discontinued.

Recommendation #15: Address Applying EVMS on Operations Activities

The practice of applying EVMS to Operations Activities should be procedurally defined. According to Order 413.3B and OMB, EVMS is only required on capital asset funded scope. The Office of Environmental Management has been extending the requirement to Operations funded activities. This has caused confusion when the EVM data is commingled in PARSII and in performance reports. While OMB does not prohibit the application to efforts other than capital assets, EVM stakeholders need to be clear on how EVM process applies.

The key aspects that need to be addressed when requiring EVMS on Operations activities include:

1. **Application:** Application should be limited to those Operations activities where EVMS is of value, i.e. activities that have discrete scope, with defined start and end dates, and can be set up as projects with discrete milestones.
2. **Consistency:** The contractor must apply their same EVMS processes, interpretation, etc., as is used on capital asset projects. The DOE PMSO and Site Offices must apply the same EVMS data and predictive analyses procedures as PMOA uses on capital asset activities.
3. **Performance reporting:** Operations activities and reporting must be segregated from the capital asset project reporting structure. This is to ensure that performance data used to manage the capital asset activities is not commingled with Operations activities.
4. **Tailoring:** Tailoring of reporting requirements may be done, as addressed in Recommendation #14. Tailoring beyond that point drives inconsistency and confusion.

Addresses Survey Responder Concerns:

- (F) EVM on EM Operations Activities: While some EVM practices should be used because they are best practices, I think some EIA-748 required EVM practices are unnecessary (Critical path on Operations activities). I think more should be done in the Department to discern when strict EIA-748 adherence EVM is useful and/or when tailored EVM systems are more useful.

- H&A Note: This comment has been addressed in Recommendation #14 and #15 as unallowable.

Addresses Survey Responder Suggestions:

- (C) There needs to be discussion on this topic as the Operations Activities is the overwhelming majority of all DOE Funded scope throughout the complex.

Recommendation #16: Address Funding Impacts in EVM Terms

PMOA should provide specific guidance in how to properly incorporate changes to the PMB caused by funding changes. In DOE, more so than in other Departments, the impact of funding causes interruptions in the project progress and performance reporting and baseline alignment issues to scope, schedule, and cost. It seems nearly all capital asset projects are disrupted, with little understanding or consistency in how to incorporate resulting impacts into the PMB.

Funding concerns were noted by nearly every survey responder. Overall it was number 1 on the Top 10 Interpretation Issues (Combined) chart as "Impact of Government Caused Funding Constraints on the PMB" (refer to Figure 7 in Recommendation #8) and it was number 3 on the Top 10 Barriers for Successful EVMS (Combined) (see below).

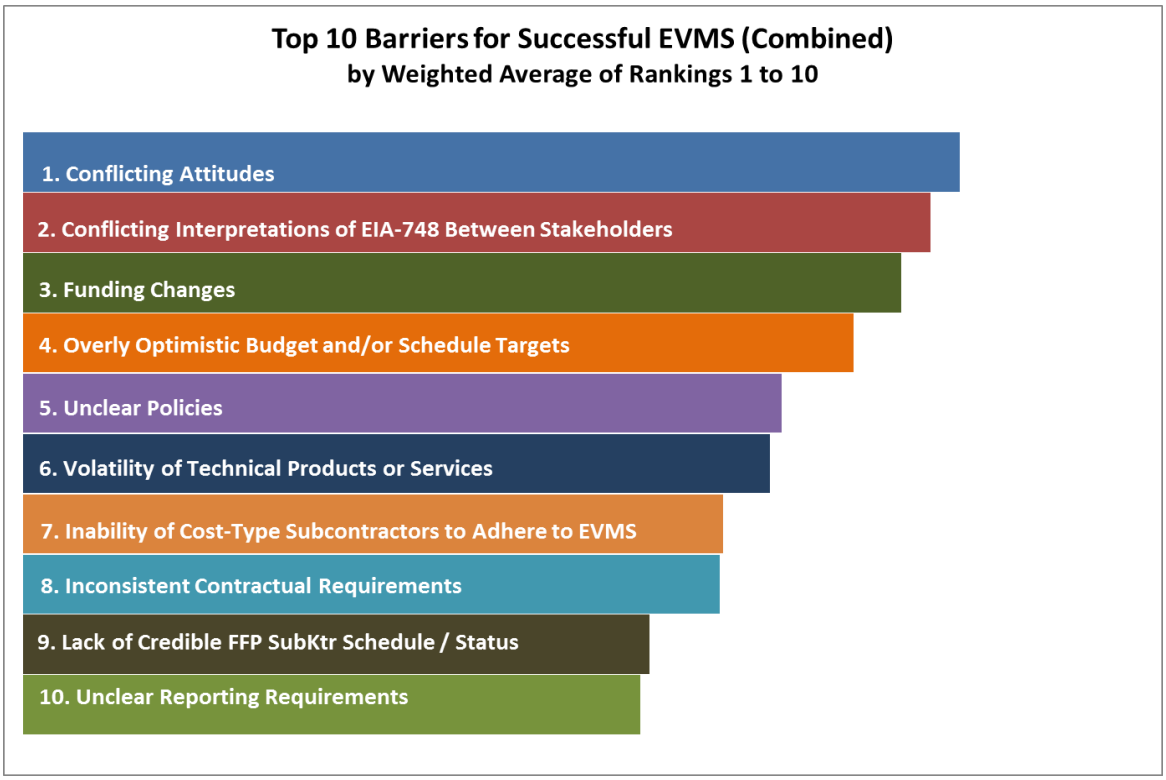

Figure 9: Top 10 Barriers for Successful EVMS. Source: Humphreys & Associates, Inc., *DOE EVMS Survey Results*, June 16, 2015.

Initial allocated and subsequent changes to funding on DOE projects cause frequent re-baselining activities that often take months on large multi-year projects. It drives up costs and diverts contractor employees from managing the project scope to developing a new performance measurement baseline (PMB). Responders recommend allowing contractors to detail plan the near term work and hold remaining effort in planning packages vice the common DOE practice of detail planning the entire project too early or too far in advance of funding received to date.

Responders state it is difficult to comply with EVM as they receive conflicting interpretations on how to maintain their baseline when funding limitations cause almost annual re-planning exercises.

Provides a Solution to the Problem:

- (C) Back-fitting project scope and cost to pre-conceived funding ceilings.
- (C) Funding changes invalidates the ability to measure performance against a changing baseline --- and any other situations that can create an unrealistic baseline.

- (C) Funding availability, slow movement of funds, authorization too slow, funding approvals sit on DOE's desk.
- (C) Funding limitations (as projects are not fully funded) prevent contractors from being truly able to manage the entire project scope to take advantage of opportunities or to address emergent risks.
- (C) Implementation of contractual changes including added/deleted scope (delays in contractual processing), FY focus, and funding driven breaks in logic.
- (C) Our current contract adds new scope through authorized unpriced work (AUW), but does it as chunks of funding. Therefore each new chunk requires us to add a new work package because the work package is in progress. This increases the number of work packages and charge codes required. It is like we are buying part of the work package a piece at a time. It sometimes makes it hard to distinguish the scope associated with each chunk of funding. Being able to add to in-progress work packages would make the process a lot more straight forward.
- (C) Funding is the key in government contracting. Bad news slows or stops funding. There are a myriad of reasons bad news is hidden, delayed, or minimized.
- (C) Volatility in changes on projects that is much more frequent than our ability to officially process changes or address impacts, all leading to baseline that doesn't reflect reality. Because of this, we need other ways, in addition to EVM, to understand status of project and to make credible forecasts.
- (C) Processing of project's management of changes for both internal and directed changes is too slow.
- (C) Establishing baselines too early prompts numerous changes to the baseline.
- (C) Operations protocol project scope versus Capital Line Item projects: There is a concern with the annual "Fiscal year Work plans" for Operations Activities, and the Funding of Capital Asset projects with annual funding limitations as well. These funding constraints have added complexities that appear to make EVMS non-compliances by design. For Contracts that have both Operations Activities and Capital Assets, as well as Contract completion dates – or completion contracts – true lifecycle baselines, forecasts and EACs are not possible for EVMS reporting. Additionally, Contractors are expecting that they should have one set of EVMS

procedures and guidance processes, e.g. that there is no "graded approach" for Operations Activities.

Addresses Survey Responder Suggestions:

- (C) One issue does pop up often, however, that always seems to raise eyebrows relative to approval of changes that defer work – funding limitations. Project managers, operating in an environment where funding is provided by the drip, must make prioritization decisions when funding limitations prevent planned work from being performed. Control Account managers need flexibility to re-plan work (albeit to avoid schedule performance variances) when funding limitations, outside of their control, prevent planned worked from being performed.
- (C) Additional emphasis and attention must be focused in the areas of Acquisition strategy (annual funding, completion contract dates versus lifecycle, Project EVMS reporting expectations) Scheduling (formalization of IBRs, Integrated Master Plans (IMP) and Integrated Master Schedule (IMS) review and concurrence, Project Schedule Architecture, Process and Products and schedule health metric and assessments) and Risk & Opportunity Management throughout the complex, as the Field office and the Contractors have adopted tailored approaches that may be difficult to demonstrate for compliance.

Recommendation #17: Involve PMOA EVM SMEs Prior to Contract Award or Project Start to Review EVMS-related Requirements

Involving PMOA EVM SMEs prior to contract award can be very helpful in identifying potential concerns relative to EVMS contract clauses, reporting requirements, and award fee criteria.

Benchmarking: DCMA has an internal process for contract receipt and review which involves each functional area, including EVMS. EVM SMEs are responsible to notify the Procurement Contracting Officer if a contractual discrepancy or omission exists.

Addresses Survey Responder Suggestions:

- (C) Involve a HQ EVMS review of contract requirements and Capital Asset development prior to issue of contracts or starting a project. Clearly scoping a project can have more influence on successful completion than tracking a poorly scoped / conceived project.

Recommendation #18: Proceed with Issuance of the EVMS Corrective Action Standard Operating Procedure (ECASOP)

With the analysis of the survey results and the CAR database, the recommendation is to proceed with issuing this important instructional Federal procedure. PMOA has drafted an SOP for the purpose of establishing internal instructions for the issuance of CARs and Continuous Improvement Opportunities (CIOs), as well as the assessment of contractor procedures and implementation associated with Variance Analysis Reports (VARs) and CAPs in accordance with EIA-748. The SOP is based on regulatory guidance and standardized processes based upon a common understanding of EVMS Industry and Government best practices for use by the Department of Energy (DOE). It has been coordinated with EFCOG but has been on hold pending the completion of the EVMSIH.

While the intent of this SOP is to instruct Federal staff on how to complete a CAR or CIO format, it also addresses the process for review and closeout of contractor activities in responding with CAPs, including process flow. The SOP also addresses expected VAR content as completed by the Contractor. While the VAR content ultimately is addressed in the EVMSIH, the content of this ECASOP may be adjusted.

When survey participants were asked how root causes and corrective actions are developed during the CAR response and VAR process, 70% did not use root cause analysis techniques but relied on discussions and experience. Of those using recognized root cause analysis processes, 15% used the 5 Whys, 4% Cause/Effect diagrams, 2% Fishbone diagrams, and 2% Six Sigma. Of the 7% who chose 'Other', they mentioned using schedule and CPRs, group fact finding, analysis of baseline data to progressed data, and company established corrective action management processes.

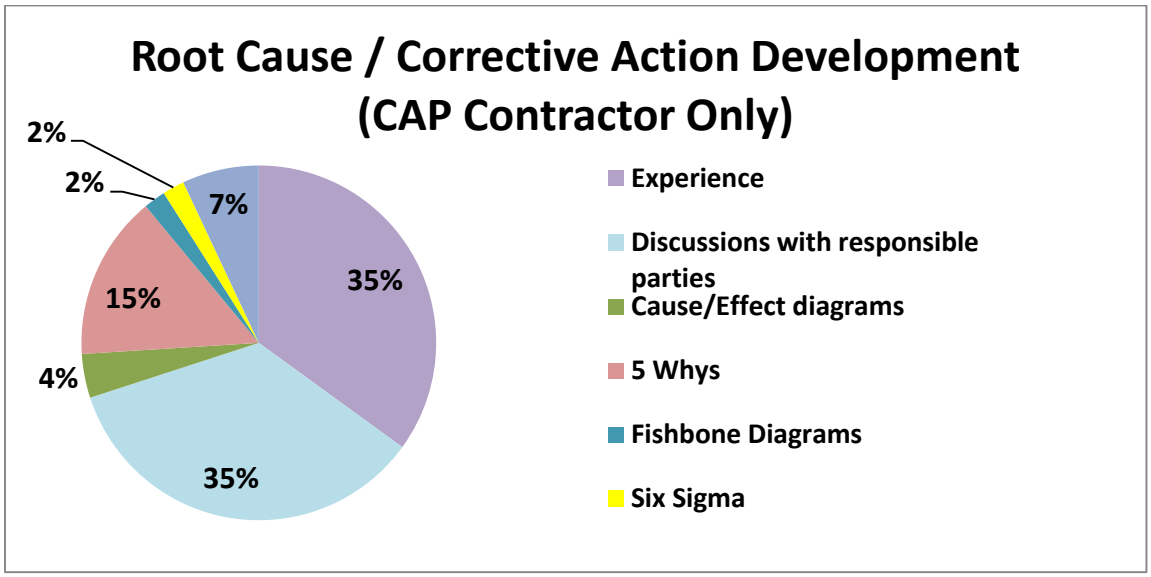

Figure 10: Root Cause/Corrective Action Development. Source: Humphreys & Associates, Inc., *DOE EVMS Survey Results*, June 16, 2015.

While many contractors have not been performing variance analysis (root cause, impact and corrective action) at the analytical level necessary to determine true root cause, the DOE Field office personnel have not been requesting or requiring accountability of root cause or corrective action tracking. This lack of focus makes it more difficult for the Contractor Project Controls and PMOA EVMS teams to convey the role root cause plays in ensuring the cause of the variance is controlled and will not continue. Project management decisions must be based on assurance that the contractor has identified the root causes of significant variances in order to a) adequately assess the risk of reoccurrence, and b) the risk of corrective action failure.

This recommendation addresses the root cause and variance analysis issues from a procedural standpoint, while Recommendation #8 addresses this as one of many areas for improved training. Recommendation #10 refers to this in the survey responders' requests for On-Site Project Kick Off training. It also relates to the common theme of providing consistent guidance internally for the PMOA compliance review teams, Recommendation #3.

Provides a Solution to the Problem:

When the survey responses were compiled to who the top ten interpretation issues, Root Cause Analysis was number 8, and Variance Analysis was number 9 (refer to Figure 7 in Recommendation #8).

Survey responses like the three listed below indicate a lack of understanding in how the EVM system is supposed to work, the value of conducting root cause analysis for performance variances, and how variance analysis reports are used by management.

- (C) Root cause has typically not been performed in the EV arena.
- (C) The best tool used in reporting and correcting variances is having an experienced CAM, functional manager in place that understands the issues and take immediate action to resolve the issue.
- (C) Writing monthly VARs and reports are to provide people, (senior company managers, local DOE, and HQs) the information needed for them to analyze the contractor's performance. The contractor uses working schedules, staffing performance reports, subcontractor's reports, and plan of the day meetings, etc. to address what is happening. If a CAM or front line managers waits for the monthly report to take action, they are too late. Monthly reporting is for outsiders to gain an understanding of where the project is.

Addresses Survey Responder Suggestions:

- (C) Provide examples of good and bad variance analysis, root cause analysis, and corrective actions.
- (C) Define VARs (components, SPI/CPI/TCPI tolerance thresholds).

Recommendation #19: Institute a Requirement for an Integrated Master Plan (IMP)

DOE should consider adding the requirement to Order 413.3 for an Integrated Master Plan. The IMP is an important element of Project Management. It is an event-based plan consisting of a hierarchy of project events with each event being supported by specific accomplishments, and each accomplishment associated with specific criteria to be satisfied for its completion. The IMP is normally prepared as part of a proposal response and it

becomes a part of the contract and thus contractually binding. The Integrated Master Schedule (IMS) is traceable to the IMP.

Benchmarking: The IMP is used in conjunction with the IMS as explained in DoD's Integrated Master Plan and Integrated Master Schedule Preparation and Use Guide, Ver. 9, October 21, 2005. This document describes the benefits and value to the project manager when an IMP is used.

According to David Bachman, a former instructor at the Defense Acquisition University (DAU), the integrated master plan (IMP) provides a better structure than either the work breakdown structure (WBS) or organizational breakdown structure for measuring actual integrated master schedule (IMS) progress. (Bachman, David C. (October 2011). *"Better Schedule Performance Assessments Derived From Integrated Master Plan-Referenced Schedule Metrics"* (PDF).

In the DoD's recently released Risk, Issues, and Opportunities Risk Management Guide for Defense Acquisition Programs, June 2015, Sec. 4.2, the IMP plays a prominent role.

"Effective risk management requires a stable and recognized baseline from which to identify program risks. The IMP and IMS help establish and maintain that baseline and facilitate effective planning and forecasting that are critical to project success. The IMP is an overarching event-based plan that displays each milestone and supporting accomplishments needed for program completion. Programs should include risk management tasks and handling activities, as appropriate. A well-constructed IMS includes distinct tasks that are summarized by WBS identifiers so the program can track progress and measure schedule performance. Risk activities should be included in the program IMP and IMS and resourced appropriately in the IMS. The IMP and IMS should be traceable to the program and contractor WBS and Statement of Work. The IMP narratives can be a good source to identify risks as they may contain risk-related information. The program should include risk handling activities and associated resources in the IMS to establish an accurate performance measurement baseline and critical path analysis."

Recommendation #20: Conduct a Review of all EVMS-related Policies and Procedures to Assess Currency and Relevance

Recommendations incorporated from this report will have an impact to many of the existing policies, procedures, and training snippets. While some have been identified in the discussion of a particular recommendation, a review of the complete list should be conducted to add, edit, delete, or improve. The EVMSIH, once released, will also have an impact. Already on PMOA's agenda, but mentioned here to ensure coverage, are the aspects of the Integrated Baseline Review process that need to be covered in existing processes, such as the External Independent Review (EIR). Also a part of this recommendation is to address those topics that are not currently covered in some form of documentation that should be covered, such as EVMS Analysis and Data Traces, EVMS Certification Process, Schedule Health Assessment, and Schedule Risk Assessment (SRA). This list represents those Orders, Guides, Handbooks, and SOPs that relate to EVM.

Directive Type	Directive Number	Policy/Guidance Title and Link	Date Published
Order	DOE O 413.3B	Program and Project Management for the Acquisition of Capital Assets	Nov 2010
Guide	DOE G 413.3-4A	Technology Readiness Assessment	Sep 2011
Guide	DOE G 413.3-5A	Performance Baseline	Sep 2011
Guide	DOE G 413.3-7A	Risk Management	Jan 2011
Guide	DOE G 413.3-9	Project Review Guide for Capital Asset Projects	Sep 2008
Guide	DOE G 413.3-10A	Earned Value Management System (EVMS)	Mar 2012
Guide	DOE G 413.3-13	Acquisition Strategy for Capital Asset Projects	Jul 2008
Guide	DOE G 413.3-15	Project Execution Plans	Sep 2008
Guide	DOE G 413.3-16A	Project Transition/Closeout (CD-4)	Oct 2011
Guide	DOE G 413.3-19, Chg. 1	Staffing Guide for Project Management (Staffing Model Spreadsheet)	Oct 2011
Guide	DOE G 413.3-20	Change Control Management	Jul 2011
Guide	DOE G 413.3-21	Cost Estimating Guide	May 2011

Standard Operating Procedures (SOP) and Handbooks

Guidance Type	Guidance Title and Link	Date Published
Handbook	Statement of Work and Key Performance Parameters Handbook	Sep 2014
Handbook	Acquisition and Project Management Glossary of Terms Handbook	Sep 2014
SOP	Earned Value Management System (EVMS) and Project Analysis Standard Operating Procedure (EPASOP)	Mar 2014
SOP	External Independent Review (EIR) SOP	Feb 2014
SOP	Independent Cost Review (ICR) and Independent Cost Estimate (ICE) SOP	Sep 2013
SOP	Earned Value Management System (EVMS) Surveillance SOP	Sep 2013
Handbook	Work Breakdown Structure (WBS) Handbook	Aug 2012

Other documents requiring review and possible update include PARSII Analysis Reports, the EVMS Snippet Training Library, PMOA templates, the EVMS Cross Reference Checklist, the EVMS Risk Assessment Matrix, and the DOE Gold Card.

VII. Systems

Reporting Systems

The reporting system used by DOE is PARSII. Based on discussions with PMOA and review of their plans to improve PARSII user interface, functionality, and ability to receive data via UN/CEFACT XLM Schema, there are no further recommendations in this area. The key is to improve the oversight controls to ensure the data received from the contractors reflect the data they use, i.e. one set of books.

Analysis Tools

Information gathered during the survey relative to current tools being used by Federal staff and DOE Contractors revealed:

- Schedule Analysis Tools: The most common tool being used for schedule analysis was Deltek Acumen Fuse® at 62%. Ten percent chose Oracle® Primavera®. Ten percent chose 'Other' which included Pertmaster™, 14 point analysis, Technical Expertise, Clipper, and 'ad hoc'. Six percent use self-developed or 'homegrown' tools, 6% use Encore Analytics Empower™, 3% use SAP®, 3% use Steelray™, and 1% use STAT™.
- EVM Data Analysis Tools: Twenty-eight percent of the survey responders use Other Tools, such as HANDI, SAP®, Deltek-MPM™, PARSII, Cost Manager, and Technical Expertise. Twenty-five percent of the survey responders use Self-Developed tools including use of Microsoft Excel®, 25% use Deltek wInsight Analytics®, 13% use Encore Analytics Empower™, and 9% use Deltek Cobra™.
- Risk Analysis Tools: The majority at 52% of survey responders chose Pertmaster / Oracle® Primavera™ Risk Analysis, 11% @Risk™, 11% Deltek Acumen Risk™, and 10% Oracle® Crystal Ball. Six percent chose 'Other', 4% chose P6 Risk Manager®, 3% chose Risk Plus, while 3% said they use self-developed tools for risk assessment.

PARSII Analysis Reports: When asked if responders used PARSII as a data analysis tool, 80% stated they have used PARSII for that purpose while 20% have not. However, when asked specifically if they use PARSII Analysis Reports, only a slight majority of 53%

answered 'yes' to this question, 47% stated they do not. Those survey responders who do not use the Analysis Reports section of PARSII were asked why they did not use the reports. Some said they had access issues.

There were some alarming responses where contractors mentioned they didn't use PARSII because it was not the 'source data'. The PARSII requirement is that the contractor's source data be uploaded without change.

Some responders recommended that DOE consider standardizing the EVMS cost and analysis tools to Cobra™ and Empower™, for example. Responders felt that standardization would gain exponential benefit for the Government and the Contractors, complex-wide, as improvements and innovation synergy could be shared, much like the benefits of using P6™ as the cornerstone application for scheduling. This idea supports other opinions about Peer Review and site wide communication. It should be mentioned here that DCMA was informed by its Legal Counsel that they could not impose a particular project management tool upon a Contractor. EIA-748 requires that they conduct cost, schedule, and technical analysis but the means by which they do that is not mandated.

One DOE Contractor responder reported that P6™ is a DOE field office standard (per contract requirement) and DOE owns the licenses. The update cycles are also to DOE's discretion. Because version 8.3 is still in testing at this particular location, the Contractor must wait until DOE releases the new version. Once the new version is implemented, data will be easily retrievable and available for schedule detail. Until then, the local DOE controls the version of P6™ being used. If this scenario is accurate as the contractor stated, it should be investigated for legality as it could cause unintended consequences such as relieving the contractor from liability for data issues attributable to the tool.

There are no concerns with DOE's plans to incorporate a contractual requirement for contractors to submit data in a UN/CEFACT XML Schema format since that requirement ties to the reporting means for deliverable data.

Recommendation #21: Identify an Internal Cost, Schedule, and Risk Analysis Tool Suite for Internal Use DOE-Wide to Supplement Current PARSII

Consistency while conducting data analysis for both project performance predictions and EVMS compliance is best achieved by using one set of tools within DOE so the FPD's staff, PMSO, and PMOA can all talk the same language and teach to specific outputs of that analysis tool. While it is inappropriate to require Contractors to use those same tools, they should be aware of what tools DOE is using and how acceptance thresholds are established.

The threshold establishment for compliance should be included in the EVMSIH but should also be provided for any specific parameters internal to the analysis tool. For example, if the decision is to use Acumen Fuse ®, the settings used by DOE should be made available to any contractor who wishes to use the same tool. In speaking with the Deltek representative, Mr. David Barnhardt, while he was conducting a tutorial for PMOA staff recently, he stated that he could easily incorporate whatever master set of DOE Schedule Health Assessment metrics are decided into their next release to all users. Deltek said the DOE metrics would be available as a selection along with the DCMA 14 point and GAO metrics that currently show. Therefore, the DOE Contractors who use Acumen Fuse ® or Steelray ® could also have the set of metrics at their disposal. That would eliminate hours spent trying to determine the settings each user used and get everyone on the same page. This would solve the problem where multiple survey responders pointed out issues with the PMOA-provided Acumen Fuse® template (sometime prior to the issuance of this survey in February 2015). The template had numerous errors in the syntax causing the selection and trip-wire criteria in the template to not work, or return inaccurate results.

Provides a Solution to the Problem:

PARSII was originally thought to serve this purpose; however, nuances were found in the programming that do not allow it to work effectively in isolating discrete activities from level of effort activities, which skews the results.

- (F) In general, there were so many reports, with so many exceptions that I find the reports developed by the EV SME in our project office to be much more useful.

- (F) For HQ level analysis the PARSII Analysis reports are fine. However, PARSII is not a useful tool for the field. It is not user-friendly or at a sufficient level of detail to support the field.

Recommendation #22: Improve PARSII

PARSII serves an important purpose in DOE yet needs improvement to be widely embraced by the Federal and Contractor community. Recommended improvements for user interface include a more stable platform, streamlined access, ease of navigation, displays, report purposes and uses, and menus. Functionality improvements include: project level reporting that shows combined multi-contractor levels that can also be segregated by contractor for performance evaluation, programming solutions to current issues associated with metric calculations caused by the inability to segregate discrete activities from LOE; and shift from current extraction tools to UN/CEFACT data extraction to improve timeliness of data and allow for lower level visibility of data reporting (below the Control Account Level).

PARSII contains an Analysis Reports folder that was developed for both DOE and Contractor use since it uses the contractor's data. Strengths of this process include:

- The PMOA-developed EPASOP provides clear instructions for use of these reports.
- Accessible by DOE and Contractor based on Project access approvals.
- Provide basic and some advanced assessment information.

Some current weaknesses with the report data that are being corrected in the future include:

- Inability to distinguish LOE tasks from discrete tasks,
- Calendar in native system may not transfer exactly to PARSII, and
- Accuracy limited by accuracy of data uploaded into PARSII.

The survey responses indicated that several people, representing both the Federal staff and Contractor, were unaware of the PARSII Analysis Reports. Many responders stated they want to use a tool that is consistent with what both the local Federal Site Office staff and Contractors are using, yet they choose to use reports generated from the contractor's system because either they do not like the PARSII report format, do not like the PARSII

login requirements, or the most concerning response was they do not like PARSII reports because they differ from contractor's reports.

Provides a Solution to the Problem:

- (C) Access to PARSII would be the main 'con' when compared to our internal system.
- (F) It is arcane to fumble through the various reports trying to find one that gives a historical and current track of CPI, SPI, TPC and EAC for examples. Then the system crashes. If you move from your computer for a few minutes e.g. for coffee, you are locked out and have to start all over. If you miss select a place to click, you may be locked out or have to start over. The data is slow to load so you have to wait.
- (F) Difficult to use.
- (F) In general, there were so many reports, with so many exceptions that I find the reports developed by the EV SME in our project office to be much more useful.
- (F) For HQ level analysis the PARSII Analysis reports are fine. However, PARSII is not a useful tool for the field. It is not user-friendly or at a sufficient level of detail to support the field.

Addresses Survey Responder Suggestions:

- (C) Better graphics; better drill down capabilities for more of the reports; better funding status reporting; more 6-month performance comparisons to see developing trends at the WBS level.
- (C) Create customizable validation reports to ensure the data in PARSII matches source systems.
- (F) Get a proper table of content for the reports. Get a proper searchable index for the items in the reports. Use smart links to other aspects of reports that are commonly used.
- (F) Roll over prior month's FPD narrative into current reporting period.
- (F) Retire PARS II and work with the field and industry experts to create a better and more useful system.
- (F) Include information on how to interpret the report and the calculations. Some of the reports have this but not all of them.

- (C) Schedule related metrics would be nice: Float metrics by project/WBS/Control Account.
- (C) Enhanced upload tools and the ability to support more than 1 contractor per Project. Don't break a project into multiple contracts if your system doesn't allow multiple contractors.
- (C) It would be helpful if they could be more current. Most of the time PARS II data is 2 months out from reporting data.

VIII. Communication

There were kudos, complaints, and suggestions for improvements in communication within DOE and with DOE Contractors and Federal contracted staff support. As one survey responder pointed out, "the training snippets, newsletters, and web based forums are all good ideas to improve communications and should help to keep everyone working more consistently."

Based on as 'As Is' analysis conducted, the following weaknesses were identified:

- No direct line of communication from EVM policy makers (PMOA) to EVM practitioners, and
- Efforts to communicate are not ideal and information is not widely transmitted and received. For example, survey results showed that many users were unaware of the EVMS Training Snippets, how to get EV-related questions answered, and how to get basic EVMS training (which is available on-line 24/7 through DOE's Corporate Human Resource Information System (CHRIS).

When survey responders were asked about ways that communication has been improved, responses included the sharing of internal PMOA SOPs, the PMOA Road Show, the EVMS Training Snippets, Guide updates, and PMOA Articles in the PMCDP Newsletters. Other improvements provided by CAP Contractors include PMOA EFCOG EVM subgroup interface and collaboration on EVM initiatives, participation in EFCOG Project Management Working Group, PMOA EV assistance visits, participation in Critical Decision Reviews at other Laboratories, and the Office of Science's Operations Improvement Committee (OIC) Conferences that allow brainstorming between individuals between different laboratories.

The recommendations supporting improvements in communication methods follow. They are based on concerns from the survey responders stating that communication seems to have degraded in part because the PMOA office, EVMS in particular, have had many retirements and employee turnover. Establishing documented procedures as in this case methods of formal communication help ensure that processes are repeated and completed in a consistent and predictable manner despite staffing changes.

Recommendation #23: Improve EVM-Related Communication

PMOA should establish various communication methods to share and exchange EVM-related to improve communications between all EVM stakeholders. The benefits derived include:

- Builds knowledge among users,
- Improves consistency of EVM interpretation and approach,
- Serves as a forum for exchange of ideas, questions, and lessons learned, and
- Build teamwork within the DOE structure.

As shown in the Figure below, survey responders were asked the question "What suggestions do you have for improvements in EVMS-related communications from HQ to functional EVMS experts?"

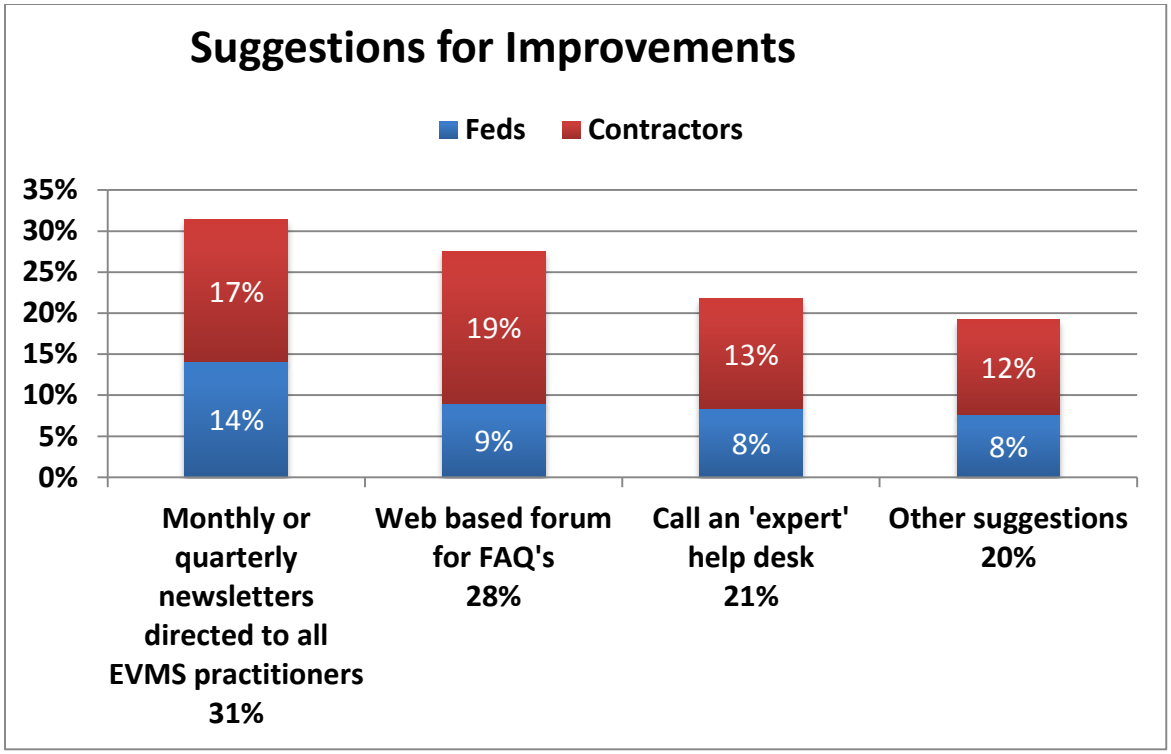

Figure 11: Suggestions for Improvements in Communication. Source: Humphreys & Associates, Inc., *DOE EVMS Survey Results*, June 16, 2015.

Based on survey responses and benchmarking, recommendations to improve methods of communication follow. There are several communication methods available. Selecting the

right methods depends on the type of information to be shared and urgency. Each of these will be discussed in more detail below.

1. Focal Points: Determine the audience
2. Email: Time-sensitive announcements or requests for feedback.
3. Newsletter: Sharing of non-time sensitive information such as calendar of events, articles, and status of EVM policy and training development.
4. Web Accessible 'Ask the Expert' Feature: Users to submit questions as they arise.
5. Webinars: Best suited for presentations and immediate feedback.
6. Workshops: Provide opportunities for involvement, networking, and recognition.

1. **Establish a list of EVM Government and Contractor Focal Points:** The first step in improving communications is to determine the audience. Developing the list of survey recipients was quite difficult as there was no clear way to identify who the targeted audience was beyond FPDs, Contracting Officers, and Contractor PMs. Based on those who responded to the survey, the list of interested parties has begun to take shape. Next step would be to work with EFCOG to identify contractor EVM Focal Points, and then to contact contractors who did not respond to the survey and are not members of EFCOG and ask them to identify an EVM Focal Point. The list must be maintained by a responsible organization and PMOA is the logical choice.

   Addresses Survey Responder Suggestions:

   - (C) DOE seems to rely of the EFCOG as the means to communicate EVMS expectations. Not all sites fully participate in the EFCOG EVMS sub-group meetings and activities, so other means of communications to EVMS practitioners is advised.
   - (F) Develop an EVM Focal Point Working Group, comprised of each organizational EVM Focal Point to share latest policy, guidance, initiatives, and best practices. This group can help ensure that their organizations have the latest information to assist their projects. Integrated teams to discuss a common approach to EVM throughout the Department to foster consistent approaches to

the tool and to determine where/when EVM is (1) applicable (2) useful and (3) best value to government for performance measurement.

- (C) Form an EVMS users group including contractor EVMS leads across the complex to discuss EVMS execution challenges and solutions with peers on their projects without retribution. This would promote compliance, consistency and training. To be able to meet quarterly would be great. This could be done by net meeting.
- (C) Establish and maintain a DOE and contractor EVM point-of-contact (POC) for each DOE Site.

2. **Email:** PMSO should use the EVM Focal Points listing to communicate time-sensitive information such as request for review of a draft procedure with a suspense date, short turn around training offerings, urgent information, etc.

3. **PMOA Sponsored Newsletters:** PMOA should sponsor Newsletters to disseminate information such as updates to the website, advertise upcoming training, and provide articles submitted by internal DOE practitioners, EFCOG white papers, and links to EVM topics from appropriate external sources, such as the H&A EVM Blog (http://blog.humphreys-assoc.com/).

   Recommended frequency is bi-monthly or quarterly, i.e. often enough to maintain interest yet not overload the recipient's inbox. The newsletter would also be posted on the EVM Website. Participation from the sites, Business Centers, and PMSOs should be encouraged, as well as the enrollees in the EVM SME Development / Certification Program. Involvement outside PMOA will encourage a sense of teaming to Facilitate knowledge transfer.

   Addresses Survey Responder Suggestions:

   - 31% of responders thought monthly or quarterly newsletters directed to all EVMS practitioners would improve EVMS-related Communications.
   - (C) There is no good method of making sure we have all been informed by a new rule. Need a way to get the word out to the users without having to be told. Can we sign up for News Releases?

- (C) Any communication must include DOE as well as contractors. The key is consistency throughout the agency. When so many players play with their own set of rules it becomes non-productive in trying to implement an EVMS.
- (C) It is not easy to get relevant EVMS related information from DOE other than what is posted officially in 413. Most of the information we get is from word of mouth from other contractors via personal networks.
- (C) I can honestly state that the information provided by PMOA a) has not been communicated broadly, so contractors don't know what is out there (e.g. the Planning and Scheduling Excellence Guide (PASEG), ESSOP, EPASOP), b) has not been provided in any timely manner to facilitate compliance beforehand, and c) does not lend itself to interpretation by reviewers (which creates confusion and frustration when CARs are generated based on personal preference).
- (C) PMOA uses references that are not-well known in the EM complex (e.g. the PASEG). Communication of these references is not well orchestrated.
    - H&A Response: The PASEG, ESSOP, and EPASOP have been posted on the PMOA EVM website for a few years now; however, the point is well taken that the website updates could be published in a Newsletter as well.
- (F) The Humphreys Blog is an example of something that would be beneficial. Even references to the Humphreys monthly blog would be beneficial to DOE project analysts and contractor project controls personnel. As is, I am not sure DOE analysts/contractors are aware of or read the blogs.
- (C) When new data analytical tools are developed and utilized by reviewers, communications should go out from the certifying body that these tools are now being used (e.g. some of the "big data" concepts being bantered about).

4. **'Ask the Expert':** A common concern is who to ask for guidance on interpretation and mechanics of EVM implementation. Twenty-eight percent of survey responders, mostly CAP Contractors, thought Web based forums for FAQs would improve EVMS-related Communications. Twenty-one percent of survey responders thought a 'Call an Expert' help desk would improve EVMS-related Communications.

Benchmarking: DoD's Performance Assessments and Root Cause Analyses (PARCA) organization established a similar process a few years ago. The PARCA EVM Interpretation and Issue Resolution (IIR) Process provides both Industry and Government a vehicle for formally submitting requests to PARCA regarding existing DoD EVM policy and guidance. The process is intended to be used when a particular question or concern cannot be answered within the requestor's natural organization's chain of command. Where appropriate, IIR responses are made available to the public via Lessons Learned or a FAQ section on the PARCA EVM website. (http://www.acq.osd.mil/evm/faqs.shtml). FAQs reflect guidance on the interpretation of DoD EVM policy and guidance to promote a common understanding and consistent implementation of DoD EVM Policy throughout the EVM community. Any information, guidance, or recommended resolutions provided by PARCA EVM through the IIR process do not replace any contractual documents, requirements, or any Contracting Officer's direction on a given contract. **(**http://www.acq.osd.mil/evm/issueRes.shtml).

How It Could Work in DOE: The form would be available on the PMOA EVMS Website. Once the form is completed and submitted, it would be delivered to a staffed inbox. This process allows the sender to ask project-specific or contractor-specific questions that may not be appropriate for viewing in a FAQ forum as well as any EVM-related questions. The questions are then researched by a member of an EV Help Desk team (sponsored by PMOA, consisting of EVM SMEs). If the question cannot be readily answered based on DOE procedures or training materials, the SME would send a response.

Rules of engagement would need to be developed to provide separate processes depending on the nature of the question. For example, if the appropriate answer were already available via procedures or training materials, the EVMS SME could respond. If the question ties directly to project-specific direction, then the appropriate chain of command would be involved in the research to minimize concerns of providing conflicting direction. If the question addresses an EV interpretation or process that is not addressed in existing procedures or training materials, a committee consisting of PMOA, NNSA, EM, Office of Science, and/or EFCOG representatives may be consulted.

The automation along with the format of the template helps ensure sufficient information is obtained, ease of submittal and delivery, and allows for direct discussion if need be. If the EV Help Desk team feels the question is appropriate as a FAQ public posting, the specific details are edited out to ensure the general nature of the question is captured along with the appropriate response.

Addresses Survey Responder Suggestions:

- (C) Create a process that allows questions to be submitted to an PMOA Subject Matter Expert (SME) regarding 'vague ideas' and ensure consistency by documenting the questions and answers.
- (C) Make sure you have the right people answering the questions. Many times the answers given are so vague that it causes a loss of integrity which will put the effectiveness of the system at stake. Ensure the right people are answering the questions.
- (C) Timely response to questions. A no blame or fault response to questions. Closer working with PMOA, EVMS teams at sites, and FPDs or DOE EV SMEs to better understand needs, improvements, and team concept to assure the valuable tool is used as a tool and not boat anchor.

A Survey Responder's Concerns with This Approach:

- (F) A HQ "Ask an Expert" suggestion does not cut any ice with the contractors, who report to their respective FPD. The FPD is going to do whatever is in his best interest—i.e., looks the best, any "outside expert's" opinion notwithstanding.
    - H&A Response: The 'Ask an Expert' feature is recommended to be staffed at the PMOA level, who is the EVMS Certifying Official for DOE. This concern voice here ties more to the accountability issue of the FPD (see Recommendation #1) than it does with seeking expert guidance in EVMS.

5. **Increase Use of Webinars:** Based on the type of information to be communicated, Webinar formats are more helpful when providing briefings and to solicit feedback. Participants would include Federal EVM Focal Points and EFCOG Representatives as warranted.

Addresses Survey Responder Suggestions:

- (C) Additional EFCOG Subgroup discussions/meetings/working sessions and/or conference calls to broaden the expectations and understanding.
- (C) Periodic webinars with topics solicited from the EVMS community or from HQ to get their message across on any concern areas.
- (C) Host web workshops to further develop plans on implementing any actions resulting from this survey.
- (F) Monthly Video Teleconferences (VTCs) with smaller groups to present available tools and benefits - as well as convey any new policies or procedures.

6. **Annual EVM Workshops:** In discussions with EFCOG, Federal site, PMSO, and HQ staff, one suggestion was widely received and that was for PMOA to conduct EVM Workshops similar to the Project Management Workshops. The targeted audience would be those involved in the contractor Project Controls organization, Federal site level staff responsible for monthly EVM data analysis, and Business Center, PMSO, and PMOA staff with both project analysis and assessment responsibilities. Benefits would include improved communication, sharing of ideas and lessons learned networking, and consistency of EVM-related processes.

   As a timing consideration, this workshop is recommended to be held in the fall as opposed to the Project Management Workshop held in the spring. An excellent forum for EVM SMEs is the IPM 2015, the 27th Annual International Integrated Program Management Workshop, November 16-18, 2015, North Bethesda Marriott. Several DOE Contractors and Federal staff attend this conference so it could be cost effective to hold the 1st Annual DOE EVM Workshop the next day, Thursday, November 19, 2015.

   Addresses Survey Responder Suggestions:

   - (C) Recommend annual DOE/Contractor EVMS workshop for Project Management/Project Controls Managers. This would allow for regular sharing of knowledge, discuss re-occurring issues share lessons learned, discuss use of tools, and contract implementation to compare execution and management/oversight methodologies.

- (F) Conduct EVMS workshops on an annual basis to share lessons learned and training on new tools.
- (F) The suggested improvement to improve communications from HQ to the field is to reverse the flow; it should be from functional EVMS experts to HQ as the experts are in the field.
    - H&A Note: Similar to the Project Management workshop forum, site-level EVM SMEs would be encouraged to present briefings of EVM-related solutions and lessons learned.

Recommendation #24: Improve PMOA EVMS Website

PMOA has an EVMS Website that would benefit from a complete restructure to improve organization of policy and procedural documents, training materials, provide a space for announcements, what's new, Lessons Learned, Frequently Asked Questions (FAQ), etc. It needs to be improved for ease of use. Decisions need to be made to communicate what will be available to the public, and what is available only for DOE contractors, and lastly, what information is only for DOE Federal employees.

Addresses Survey Responder Suggestions:

- (F) Maintain the Lines of Inquiry (LOI) and/or Criteria and Review Approach Documents to be used in EV certification reviews and surveillances in a central library that is accessible to the field.
- (F) Current instructions, policies, SOPs, Snippets, etc. are difficult to find.
- (F) Recommend that PMOA maintain a library of EV certification and surveillance: 1) LOIs/CRADs 2) CARs and CIOs 3) Corrective Action Plans 4) Certification / Surveillance final reports 5) EV Lessons Learned.
- (F) Update PMOA website to include latest version of the OMB Circular A-11.
- (F) Add placeholders and status for documents under construction.
- (C) Establish and maintain an EVMS certification/surveillance/CAR/CIO Library.
- (C) Easy to access training and guidance information would be very helpful.
- (F) There are a lot of good references. The challenge is keeping them 'front and center' when a question or issue comes up. Long URLs (like the one to the Snippets) don't help. Too many places to look now - PowerPedia, Newsletters, Websites.

Benchmarking: For ideas on how to improve and structure the website, H&A recommends the NASA and DoD PARCA EVM websites as a best practice. After extensive review of other Federal agency sites, H&A found these to be clear, well organized, and easy to navigate. NASA uses a simple but effective approach, with a menu on the left-hand side to provide organization (http://evm.nasa.gov/index.html).

The DoD PARCA EVM website features a menu across the top of the page which limits organizational choices because of spacing; however, the content presentation within each choice was well done (http://www.acq.osd.mil/evm/index.html). The PARCA website is featured in another recommendation because of its Lessons Learned and FAQ feature.

Recommendation #25: Share Compliance Review Lessons Learned

In order to facilitate improvement and increased knowledge among practitioners, the sharing of lessons learned is invaluable. This suggestion came up repeatedly from survey responders. Although there may need to be controls in place to restrict access beyond DOE or among DOE Contractors, the sharing of lessons learned and issue resolutions not specifically identified in the EVMSIH would be helpful. Because of the sensitivity of sharing contractor specific CARs and CAPs among other contractors, DOE would need to exercise caution when sharing issue resolutions.

Addresses Survey Responder Suggestions:

- (C) Publish lessons learned from various compliance reviews and make available to contractors (at least annually).
- (F) Communicate noncompliant EVMS practices noticed at sites that are degrading the reliability and accuracy of EVMS performance data, e.g. tricks of the trade, call the pocket) by making EVMS performance data appear better than it actually is. Provide methods to identify these non-compliances. This would help minimize misinterpretations on both sides.
- (F) Trend EVM findings/issues concerns across multiple sites/contractors.
- (F) Recommend performing a Root Cause Analysis of why there have been EV struggles at some DOE locations (e.g. loss of certification). It could also be helpful to engage with other federal organizations that have had EV struggles and determine if they have conducted any RCAs. Also recommend that PMOA take a look at projects

where EV is working well and determine why it works well at some locations. Without understanding why EV has worked well at some locations and why EV has had struggles at other locations, we cannot be certain that the actions being taken to improve EV will address the underlying causes of recent difficulties.

Recommendation #26: Continue Teaming with EFCOG's EVMS Subgroup

PMOA's teaming relationship with EFCOG's EVMS subgroup has been a successful story in the past and continues. By working with EFCOG's EVMS subgroup, DOE has been able to improve not only communications, but receive support from the contractor community. Some examples include EFCOG's insightful involvement in the development of the EVMS surveillance process (ESSOP) in 2011 and 2013, the Earned Value Management System (EVMS) and Project Analysis Standard Operating Procedure (EPASOP) in 2013-14, the development of EVMS Snippets 2013-14, and a Corrective Action process and the EVMSIH that are currently under construction. The EFCOG forum is an effective method for contractors to have a voice in affecting DOE's EVMS policies and practices.

Benchmarking: For decades DoD and DCMA have maintained a successful working relationship the National Defense and Industry Association's (NDIA) Integrated Program Management Division (IPMD). This group is the "primary forum for maintaining strong Industry and Government working relationships to promote disciplined program performance management methodologies for planning and executing programs to optimize outcomes." (Reference: http://www.ndia.org/Divisions/Divisions/IPMD/Pages/default.aspx).

Survey Responder Concerns with This Approach: Although PMOA and EFCOG have experienced success with teaming there may be some misperceptions driven by recent cutbacks in EFCOG subgroups.

- (C) Previously, travel to EFCOG workshops, etc. was reimbursable, and actually encouraged. That seems to have changed, with DOE even having to approve/authorize travel to such events. This does not lend itself to participation.

- (C) EFCOG has never been something widely promoted or discussed where I am employed. I only recently found out it even exists. I think better information about these kinds of resources/groups would be helpful.

Addresses Survey Responder Suggestions:

- (C) I think the communication that happens between contractors and PMOA at EFCOG is invaluable. I appreciate that the PMOA folks go through such lengths to participate and speak at these meetings and to ask for support. I think that the current PMOA management really is trying to make things better and it is greatly appreciated.

IX. Path Forward

Shifting to a trust based project management approach where project managers (FPDs, Contractor PMs) are encouraged to report accurate data without fear of reprisal will challenge the current paradigms associated with project success. The pressures in the past where project success is measured by favorable, near perfect CPI and SPI indices of 1.0, has created an environment of fear to report anything less. It is clear, however, that the paradigm shift is essential to allow the EVM systems to work as designed. When used properly, the EVMS will accurately track current and past efficiencies, provide visibility into the root causes of performance issues, allowing management to use that information to prevent reoccurrences the future.

Recommendation #1 Establish a Trust Based Project Management Environment is the most critical of the recommendations herein, and forms the setting for the other recommendations to be successful. For DOE to be successful in this endeavor, a plan based on change management principles is required. "Successful organizations do not evolve randomly, but through purposeful and dynamic strategies . . . using a disciplined approach" (PMI. *Managing Change in Organizations: A Practice Guide. PA: 2013,* p. 7).

The first step is for DOE leadership to put forth an improvement plan based on these recommendations and socialize it among all stakeholders with emphasis on the urgency for these changes and to solicit buy-in. The methods of communication listed in Recommendation #23 such an official Memorandum followed by a Webinar to kick-off and broadcast the plan. Use the opportunity as a means of exciting people about how their voices were heard via the survey and the Department is responding by making improvements in the integration of EVMS and PM with the help and support of the stakeholders.

A certain amount of distrust from the message is expected so generating short term wins is important to success. An example of recommendation that demonstrates sincerity would be to implement Recommendation #2, Remove Inappropriate Performance Incentives from all Contracts and Performance Plans. People respond to what their performance and basis for bonuses are measured against.

Another short term win that will also demonstrate long term commitment is to hold the first annual EVM Workshop in November 2015 as outlined in Recommendation #23. The Workshop would provide a perfect forum for sharing the improvement plan details and timeline and provide opportunities for participation in current or future procedural updates and training materials.

With the update of Order 413.3B in process as stated in Recommendation #3, there are two recommendations considered critical to support the improvement plan that could be incorporated into the update. Recommendation #13 explains the benefits of adding a statement into the Order 413.3 update stating that PMOA policy supporting procedures such as Guides and Handbooks as well as training materials are to be followed unless an alternative approach has been approved. Recommendation #17 supports a process where PMOA EVM SMEs are consulted prior to contract award to identify any potential concerns relative to EVMS contract clauses, reporting requirements, and award fee criteria.

Some of the recommendations require more development time than others so the improvement plan timeline needs to consider sufficient development to help ensure success when the recommendation is fully operational. A good example is Recommendation #7 Establish a DOE EVM SME Development/Certification Program (Train from Within). This recommendation was embraced by 69% of the survey responders and will pay large dividends in the future as new EVM SMEs are trained and provided experiences in EVM both from compliance and from project analysis perspectives. Based on DOE's mature workforce statistics, the knowledge transfer from current EVM SMEs is necessary to build and preserve the expertise within the Department.

As previously noted, the PMOA management team and EVMS staff met with Humphreys & Associates to discuss this report and recommendations. At that meeting PMOA developed a proposed implementation plan which is detailed in the Appendix to this report.

X. Conclusion

The goal established by the Secretary of Energy in his June 8, 2015 Memorandum on Project Management Policies and Principles was clear. DOE continues to place a priority on improving project management across the Department and removing all Departmental organizations from the GAO High-Risk List for contract and project management. Achievement of the goal requires fundamental changes primarily in promulgating a trust based project management approach and knowledge transfer within the organization. The recommendations contained in this report as the result of extensive research, benchmarking, analytical assessments, and careful review of survey responses provide the framework to achieve fundamental changes to improve the integration of EVM and project management.

Achieving the goal will require some finesse as a paradigm shift is essential for success and, unfortunately, deeply ingrained as evidenced by survey results and interviews over the course of the last six months. The survey response demographics show 84% of the responders having over 20 years of overall work experience, and 35% had over 20 years of EVM experience. Those statistics may indicate that change will be a challenge. "We cannot become what we need to be by remaining what we are." (Max DePree, *Leadership Is an Art*, New York:1989).

Therefore, engagement of leadership to put forth the plan and socialize it with emphasis on the level of participation from both the Federal Staff and CAP contractors, including a broad cross-section of locations, organizations, and levels of responsibilities, is essential.

The recommendations provided herein serve to focus DOE's efforts in correcting these concerns by providing a solid and informed path forward. The road ahead will require patience as the paradigm shift will take time. However, the value of being able to achieve EVM and project management integration will serve the Department and the taxpayers well in the future.

XI. Table of Recommendations

	FOUNDATIONAL
1	Establish Trust Based Project Management Environment
2	Remove Inappropriate Performance Incentives from all Contracts and Performance Plans
	PEOPLE (RESOURCE MAPPING, ROLES/RESPONSIBILITIES, TRAINING)
3	Re-Establish One Certifying Authority in DOE
4	Establish a Model for EVM SME Site Level Staffing
5	Ensure a Vertical Depth of EVM Competency in DOE
6	Establish an EVMS Joint-Surveillance Program at the Site Level (Contractors with Only Projects in $20M-$100M Range)
7	Establish a DOE EVM SME Development/Certification Program (Train from Within)
8	Assign PMOA responsibility for Development and Currency of EVM Training Materials Used in DOE
9	Staff Assessment Teams, e.g. Project Peer Reviews and EVMS Compliance/ Surveillance Reviews from the DOE EVM SME Community
10	Offer On-Site Training at Project Kick-Off
	PROCESSES
11	Update 0rder 413.3 with Respect to EVMS
12	Established Processes for Project Peer Reviews (EV Roles), EVMS Compliance, and Surveillance
13	Require Internal Compliance to DOE PMOA Sponsored Policy Supporting Procedures and Training Materials
14	Address the Concept of EVMS Tailoring
15	Address Applying EVMS on Operations Activities
16	Address Funding Impacts in EVM Terms
17	Involve PMOA EVM SMEs Prior to Contract Award or Project Start to Review EVMS-related Requirements
18	Proceed with Issuance of the EVMS Corrective Action Standard Operating Procedure (ECASOP)
19	Institute a Requirement for an Integrated Master Plan (IMP)
20	Conduct a Review of all EVMS-related Policies and Procedures to Assess Currency and Relevance
	SYSTEMS (REPORTING SYSTEMS AND ANALYSIS TOOLS)
21	Identify an Internal Cost, Schedule, and Risk Analysis Tool Suite for Internal Use DOE-Wide
22	Improve PARSII
	COMMUNICATION
23	Improve EVM-Related Communication
24	Improve PMOA EVMS Website
25	Share Compliance Review Lessons Learned
26	Continue Teaming with EFCOG to Grow Contractor Community Involvement

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XIII. Abbreviations and Acronyms List

AUW: Authorized Unpriced Work

BCP: Baseline Change Proposal

CAM: Control Account Manager

CAP: Capital Asset Project ; Corrective Action Plan

CAR: Corrective Action Request

CD: Critical Decision

CHRIS: Corporate Human Resource Information System

CIO: Continuous Improvement Opportunities

CPARS: Contract Performance Assessment Reporting System

CPI: Cost Performance Index

CPR: Contract Performance Report

CV: Cost Variance

D&D: Decontamination & Decommissioning

DAU: Defense Acquisition University

DCMA: Defense Contract Management Agency

DoD: Department of Defense

DOE: Department of Energy

EAC: Estimate at Completion

ECASOP: EVMS Corrective Action Standard Operating Procedure

EFCOG: Energy Facility Contractor's Group

EIA: Electronic Industries Alliance

EIR: External Independent Review

EM: Environmental Management

EPASOP: Earned Value Management Systems Project Analysis Standard Operating Procedure

ESCP: EVMS Specialist Certification Program

ESSOP: Earned Value Management Systems Surveillance Standard Operating Procedure

ETC: Estimate to Complete

EV: Earned Value

EVM: Earned Value Management

EVMS: Earned Value Management System

EVMSIH: EVMS Interpretative Handbook

EVP: Earned Value Professional

EVT: Earned Value Technique

FAR: Federal Acquisition Regulation

FPD: Federal Project Director

FY: Fiscal Year

GAO: Government Accountability Office

H&A: Humphreys & Associates, Inc.

HQ: Headquarters

IBR: Integrated Baseline Review

IMP: Integrated Master Plan

IMS: Integrated Master Schedule

IPMD: Integrated Program Management Division

IPMR: Integrated Project Management Report

IRR: Interpretation and Issue Resolution

JSR: Joint Surveillance Reviews

KSAs: Knowledge, Skills, and Abilities

LOE: Level of Effort

MPM: Micro-Frame Program Manager

MR: Management Reserve

NASA: National Aeronautics and Space Administration

NDIA: National Defense Industrial Association

NNSA: National Nuclear Security Administration

OAPM: Office of Acquisition and Project Management (now PMOA)

OIC: Operations Improvement Committee

OMB: Office of Management and Budget

OPM: Office of Personnel Management

P6™: Oracle® Primavera P6™ Professional Project Management

PARSII: Project Assessment and Reporting System

PASEG : Planning and Scheduling Excellence Guide

PD: Position Description

PEMP: Performance Evaluation and Measurement Plan

PM: Project Manager

PMB: Performance Measurement Baseline

PMCDP: Project Management Career Development Program

PMI: Project Management Institute

PMOA: Office of Project Management Oversight and Assessments

PMSO: Project Management Support Office

POC: Point of Contact

PPR: Project Peer Review

PSO: Program Secretarial Officer

PSP: Planning and Scheduling Profession

QE LOI: Qualifying Expectation Lines of Inquiry

RevCom: Review and Comments System

SAP: Systems Applications and Products Enterprise Resource Planning System

SC: Office of Science

SME: Subject Matter Expert

SOP: Standard Operating Procedures

SPI: Schedule Performance Index

STAT: Schedule Test and Assessment Tool

SV: Schedule Variance

SWOT: Strengths, Weaknesses, Opportunities, and Threats

T&M: Time & Materials

UB: Undistributed Budget

UN/CEFACT XML: United Nations Centre for Trade Facilitation and Electronic Business, Extensible Markup Language

VAR: Variance Analysis Report

VTC: Video Tele Conference

WBS: Work Breakdown Structure

WFO: Work for Others