



EFCOG Report

Risk Management Guidance Crosswalk

Project Delivery Working Group

Risk Management Task Team

September 2019



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Executive Summary

The Energy Facility Contractors Group (EFCOG) is a self-directed group of contractors of U.S. Department of Energy Facilities. The purpose of EFCOG is to promote excellence in all aspects of operation and management of DOE facilities in a safe, environmentally sound, secure, efficient, and cost-effective manner through the ongoing exchange of information and corresponding improvement initiatives.

The EFCOG Project Management Working Subgroup (PMWSG) established a Risk Management Task Team to promote, coordinate, and facilitate the active exchange of successful Risk Management programs, practices, procedures, lessons learned, and other pertinent information of common interest that have been effectively utilized by DOE contractors and can be adapted to enhance operational excellence and cost effectiveness for continual performance improvement by other DOE contractors.

As part of the EFCOG Risk Management Task Team activities initiatives are identified, prioritized and planned. The planned activities are established in advance of the fiscal year start as part of an EFCOG Project Delivery Working Group (PDWG) Annual Work Plan.

One such initiative is the investigation and review of existing high -level guidance documents and identification of gaps where additional guidance/best practices would be beneficial. These additional guidance/best practice documents will be scheduled for development by EFCOG in future Work Plans.

This Report presents the roadmap for investigations and reviews which lead to Risk Management Task Team recommendations. This report, when issued as final, will be Deliverable 2.6 of the EFCOG PWDG FY2019 Annual Work Plan.



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1.0 Purpose

DOE O 413.3B (Reference 6) provides high-level Risk Management requirements, invokes DOE standards as required methods and invokes DOE guides, not as requirements, but “as suggestions or potential guidelines for content and purpose of documents.”

Where guidance to implement requirements or invoked Standards relating to Risk Management is not provided in sufficient detail, a gap can be considered to exist. These gaps may result in differing methodologies being used to implement a requirement, inefficiencies in meeting requirements, and in some cases, requirements not being fully or correctly implemented.

The purpose of this report is to establish a process to:

1. Identify where implementation guidance is lacking (gaps),
2. Bridge the identified gaps by cross-walking to existing documented best practices and methodologies
3. Identify where bridging documents are needed to be developed
4. Perform re-evaluation and update of the cross-walk as new requirements are issued and new best practices and methodologies documented
5. Provide DOE with an indexed pool of best practices/methodologies which may be referenced or incorporated into future updates to DOE guidance documents

The EFCOG FY 19 Work Plan item 2.6 is shown in Table 1-1:

Table 1-1 EFCOG FY19 Work Plan (Extract) Item 2.6

<p>2.6 Review DOE Risk Management requirements/guidance and identify gaps where supplemental guidance would be of benefit. Where it is not provided elsewhere, identify the need to develop guidance/best practices and schedule their development as Risk Task Team initiatives. These supplemental guidance documents may, if deemed appropriate, be incorporated into future revisions to DOE guides</p>	<p>DOE Risk Management requirements/guidance documents do not always reach down to provide specific guidance at the implementation level. Identifying guidance gaps where supplemental guidance would be of benefit and providing that guidance benefits both contractors and DOE. Contractors will be consistent and more effective in their execution of risk management and DOE will be able to select specific guidance for inclusion in future revisions of Risk Management guides.</p>	<p>2.6.1 Issue a listing of gaps where additional guidance can be of benefit 2.6.2 Update list to identify where guidance is available in other industry-wide documents and identify where guidance needs to be developed 2.6.3 Select from the list, those guidance documents that can be developed and issued in FY19 and complete their development, approval and issuance. 2.6.4 Upload the listing at the end of FY19 onto the EFCOG Risk Management task team document library for use and also use as a planning tool for FY20 Work Plan</p>
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This report, satisfies the FY19 Work plan deliverable for 2.6.

2.0 Methodology

A roadmap was developed and utilized to plan the path forward of this initiative.

The roadmap is presented in Attachment 1. Each Roadmap activity is described below.

2.1 Develop Roadmap and Cross-Walk Matrix Format

This initial step is to develop the roadmap which will map out the future activities of this initiative. The roadmap is a living document and can be revised during the execution of this task. The Cross-Walk Matrix is the document that will be used to show where gaps exist in current guidance and where guidance documents exist or are needed. This too will be a living document and will be updated as new requirements are issued and additional guidance documents are published.

2.2 Top Tier Documents in Cross-Walk Matrix

The top tier documents driving the Risk Management Process will be entered into the crosswalk matrix. These documents are the applicable DOE Order(s) and invoked Standards, DoD Guidance and third-party generated documents that can and are referenced by those providing oversight throughout the DOE complex.



2.3 Review and Populate with Cross-Walk to Existing Guidance Documents

In this step, each requirement set will be reviewed to identify existing guidance documents, e.g. DOE Guides, industry consensus guides, best practices and EFCOG guidance documents. Where a DOE detailed guide is cited by a requirement document (e.g. DOE G 413.3B [Reference 6] cites DOE G 413.3-7A [Reference 6]), populate the Knowledge Areas of the matrix using the guide structure (this enables a DOE guide author to easily locate a section of the DOE guide that should be considered for expansion). Supplemental guidance documents outside of the DOE Guide(s) are placed in the crosswalk matrix.

2.4 Identify Knowledge Gaps Within Cross-Walk

In this step, the Knowledge Areas where additional guidance is recommended are identified within the crosswalk matrix. Knowledge Areas with substantial guidance are good candidates for guidance consolidation while, conversely, Knowledge Areas where substantial guidance is lacking are prospects for additional guidance generation.

2.5 Team Review and Finalize Cross-Walk

This step entails a review of the crosswalk matrix by the Risk Management Task Team.

2.6 Finalize and Issue Guidance Cross-Walk Report

Comments from the Risk Management Task Team will be incorporated and the final report issued.

2.7 Select Items for Next FY Work Plan Initiatives

Where gaps have been identified and additional guidance recommended, the Risk Management Task Team will select these to be proposed as initiatives in the following year's FY Work Plan.

2.8 Complete FY Work Plan Initiatives

Approved initiatives will be executed in accordance with the appropriate FY Work Plan

2.9 Review and Update Guidance Cross-Walk, Add Completed Initiatives

After completion of initiatives or issuance of an applicable new requirement or DOE guide the crosswalk will be updated.

2.10 Finalize and Issue Guidance Cross-Walk Report

After updating the crosswalk will be issued as a revision.

3.0 Discussion of Results

The Crosswalk Matrix is presented in Attachment 2. The following sections describe the process used to develop and populate the Crosswalk matrix, and to identify gaps.

3.1 Development of Crosswalk Matrix

The goal of the crosswalk matrix review was to identify and ordinally rank the value and depth of input within the Knowledge Areas that currently exist in DOE and non-DOE oversight documentation.

The Knowledge Areas that were chosen were identified directly from DOE G 413.3-7A, Risk Management Guide [Reference 6]. This document was chosen as it is cited by DOE O 413.3B, contains a comprehensive list of Risk Management Knowledge Areas (Process Steps) within its Index and by virtue of linking the indexed Risk Management Knowledge Areas to guidance documents, when using the manual, supplemental guidance can be quickly found. A final consideration in selecting this approach was that by linking Knowledge Areas to documents, future revisions to DOE G 413.3-7A would be able to consider including the additional guidance from the cross-walked material.

Table 3-1 shows the Guidance Areas Used

Table 3-1 Knowledge Areas

Cited Guidance Document from: DOE G 413.3-7A https://www.directives.doe.gov/directives-documents/400-series/0413.3-EGuide-07a-admchg1/@images/file	
3.0	Risk Management Organizational Breakdown Structure, Concept and Responsibilities
3.1	Risk Management Organizational Breakdown Structure
3.2	Risk Management Organizational Concept
3.3	Risk Management Organizational Responsibilities
3.3.1	Federal Project Director
3.3.2	Integrated Project Team
3.3.3	Contractor Project Manager
4.0	Risk Management Process Within the Project Life Cycle
4.1	Project Phase integration
4.2	Risk Planning
4.3	Risk Assessment
4.3.1	Risk Identification
4.3.2	Assignment of Risk Owners
4.3.3	Assignment of Probability and Consequence
4.3.4	Assignment of Risk Trigger Metrics
4.3.5	Risk Register
4.3.6	Risk Analysis
4.3.6.1	Qualitative risk Analysis
4.3.6.2	Quantitative Risk Analysis
4.3.6.3	Project Learning Analysis



4.3.6.4 Error and Variance Analysis
4.3.6.5 Contingency Adequacy Evaluation
4.4.1 Acceptance
4.4.2 Avoidance/Exploit
4.4.3 Mitigation/Enhance
4.4.4 Transfer/Share
4.6.1 Risk Monitoring Process Considerations
4.6.2 Risk Monitoring Methods
5.0 Risk Documentation and Communication
5.1 Risk Documentation and Communication

The next step in developing the crosswalk matrix was to identify the top tier guidance documents. The initial selection of top tier documentation was reviewed by the Risk Management Team resulting in additional documents, updates and improved revisions being incorporated in the final 18 documents. The final set of top tier documents is presented in Table 3-1.

Table 3-1 Top Tier Documents for Cross-Walk Matrix Comparison

Top Tier Documents in Cross-Walk Matrix
DOE O 413.3B
DOE G 413.3-7A
EIR SOP
Office of PM EVMS Compliance Review SOP (ECRSOP)
ECRSOP - Compliance Assessment Guidance (CAG)
EIR SOP
PASEG
Project Peer Review Process SOP
GAO Best Practices: GAO-16-89G
GAO-09-3SP GAO Cost Estimating and Assessment guide: Best Practices
EM Protocol for Application of Contingency and Management Reserve for the Acquisition of Capital Asset Projects
DoD Integrated Program Management Report (IPMR) Implementation Guide
FAR Acquisition Letter No. AL 2009-01
Department of Defense Risk, Issue, and Opportunity Management Guide for Defense Acquisition Programs, Jan.-2017
NDIA ANSI/EIA-748-D Intent Guide
DOE G 413.3-21 Cost Estimating Guide
AACEI RP No. 57-09
AACEI RP No. 18R-97

3.2 Populating the Crosswalk Matrix

Each identified document was then reviewed for the existence, breadth and depth of guidance that it contained for each of the Knowledge Areas. This ‘crosswalked’ comparison resulted in identification of Knowledge Areas that do not currently have substantial guidance provided, cases where some guidance is provided and other cases where substantial (although rarely comprehensive) guidance existed in each DOE or non-DOE source.

The amount of guidance present in each document was rated on an ordinal scale. The ordinal scale’s criterion was the level of near-comprehensive direction provided by each document for each of the documents. This standard should not be misunderstood as fully comprehensive or all-inclusive feedback, but instead a standard which provides a facet of each of the Knowledge Areas. The value assigned to each of the Knowledge Areas was the highest score/rating that any document received for the given area. Said another way, if any one of the guidance documents provided thorough guidance, then ranking (green) was assigned to the Knowledge Area. The assumption here being that this document’s input could be used by the RM Professional or Project Team to ascertain the appropriate steps in the Risk Management Process. The Ordinal values scale used is:

	Gap Status	
Guidance Not Provided	○	
Guidance Provided	●	
Some Guidance Provided	±	

A “usefulness” value was also assigned to each of the guidance documents. This methodology, although not directly impacting the Gap Analysis in terms of identifying shortfalls in clarity and direction, provides some additional knowledge to the general utility of each of the 18 guidance documents. The same ordinal values were utilized for each of the documents but in this case the assessment pertains to the general usefulness of each document in total, not as it applies to the specific Knowledge Area. A ‘Median Ranking’ was used as a rough guide.

3.3 Identified Gaps

While many of the Knowledge Areas contained an overview, some cursory explanation of terms, or touched lightly on many of the Knowledge Areas, there were several Knowledge Areas that could benefit from an additional level of instruction and clarification in order to successfully steer a DOE project team through the risk lifecycle. The Knowledge Areas from DOE G 413.3-7A provided an excellent overview of an effective risk process. Gaps (inadequacies), however, in detailed guidance were identified during the Gap Analysis effort in the following Knowledge Areas:



- 4.3.6.3 Project Learning Analysis
- 4.4.1 Acceptance
- 4.4.4 Transfer/Share

Other Knowledge areas were identified during this analysis that would benefit from additional enhanced guidance. The fully populated crosswalk matrix is shown in Attachment 2

4.0 Conclusions

With the goal of the Cross-Walk Report being to identify a clear path forward, priority should be placed largest Knowledge Area gaps (inadequate guidance) where guidance is needed and secondly on the areas where Knowledge areas would benefit from additional, more detailed guidance (guidance can be enhanced).

Additional and enhanced guidance will provide Federal and Project Management an improved toolset to implement the Risk Management process. Guidance would recognize the interdependency and interplay between the contractual and risk spheres of influence, reserve sufficiency, and leverage the use of existing best practice knowledge that currently exists.

This approach fosters consistency and ease locating of key best practices currently existing within both DOE and non-DOE guidance.

5.0 Recommendations

The Team made the following recommendations:

5.1 EFCOG Work Planning

The Knowledge Areas that would benefit from the discussion of and production of additional and enhanced guidance are put forward as candidate initiatives for future EFCOG Work Plans within Table 5-1:

Table 5-1 Future Work Plan(s) Activities

Activity(s)	Benefit(s)	Gap/Deliverable Solution	
Project Delivery Working Group			
1. Investigate and develop guidance for items found to have inadequate guidance.	Identified Guidance Gaps filled	4.3.6.3 Project Learning Analysis	Inadequate: Lacking description of best method of utilizing historical data to drive future duration and cost variance. Establish a centralized EFCOG Risk Management “Body of Knowledge” with lessons learned and a housing a searchable historical database of assessment data collected from throughout the DOE complex.



Activity(s)	Benefit(s)	Gap/Deliverable Solution	
		4.4.1 Acceptance	<p>Inadequate: Overview of terms was sufficient but lacked discussion on impact of this approach on mitigation efficacy on mitigation selection and quantification.</p> <p>Develop best practice guidance on evaluating the projected effectiveness of a risk/opportunity handling strategy and the methodology to guide project team through the decision process to implement or not to implement.</p>
		4.4.4 Transfer/Share	<p>Inadequate: Specific guidance for the level of complexity necessary during each CD step (specifically for Risk Register and QA/Risk Analyses) would be helpful.</p> <p>Generate clear guidance which calls out responsibility and tasks list for proper integration of probabilistic output into the Contract Performance Reporting process.</p>
2. Investigate and develop additional guidance for items found to have opportunities for guidance enhancement.	Identified Guidance Opportunities Optimized	4.4.3 Mitigation/Enhance	<p>Enhance. More discussion regarding which type of threats/opportunities should remain with the Federal Risk Management Plan and which threats should be held at the Contractor level. More discussion of DOE/Contractor sharing could be included, including responsibility thresholds.</p> <p>Identify, document and communicate complex-wide norms for threat assignment by generating an EFCOG Best Practice Document outlining the topic.</p>
		4.3.6.4 Error and Variance Analysis	<p>Enhance. More objective/quantified guidance (per type of scope/design maturity) for historical temporal variance analyses throughout the complex.</p> <p>Task Team discussion of Risk Management Working Group to discuss existing variance analysis approaches at the multiple DOE sites. The resulting findings can be incorporated into an EFCOG White Paper about the different methodologies and their applications in Risk Analyses.</p>
		4.2 Risk Planning	<p>Enhance. No input on acquisitions and award process.</p> <p>Include output from FY19 Risk Management Task Team ‘FAR-Based Contract MR Management’ initiative into EFCOG Best Practices upon completion.</p>
		3.3.2 Integrated Project Team	<p>Enhance. This could be more organization-focused Client (DOE) v. Contractor</p> <p>Include enhancement language into an EFCOG Best Practices document designed to act as a checklist for identifying Risk Roles & Responsibilities during Project Execution Plan generation.</p>
		4.4.2 Avoidance/Exploit	<p>Enhance: Discussion about avoiding Threats via vertical transfer was not discussed.</p>

Activity(s)	Benefit(s)	Gap/Deliverable Solution
		Specific guidance about the criteria for in/exclusion of given Threats within a project’s Risk Register v. when to transfer these catastrophic project-cancelling Threats to the HQ level could be generated and communicated via an EFCOG White Paper.
	4.3.4 Assignment of Risk Trigger Metrics	Enhance: Could benefit from further discussion of goals, thresholds, tracking, examples and integration into IPT etc. A Best Practice Document which outlines the integration of Risk Trigger Metrics within the different Phases of Projects could be developed. This Best Practice would focus on the Pros/Cons of the different approaches.
	4.1 Project Phase integration	Enhance: Could focus more on the use and integration of risk analysis output on baseline and forecast generation. A Best Practice document could be generated which outlines when, during the different project phases, to compare risk analysis output with current funding requirements, established MR values and Project Contingency.
	4.3.6.2 Quantitative Risk Analysis	Enhance: Could use more discussion on the benefits of different Quantitative Risk Analyses methods. Generate and submit Pros/Cons of the various quantitative analysis methods into a Best Practices document.
	4.3.3 Assignment of Probability and Consequence	Enhance: Could benefit from an augmented discussion about weather calendar importance and use. Establish Best Practice Document outlining the optimal approaches, build and impact of weather threats/probabilistic calendars.
	5.1 Risk Documentation and Communication	Enhance: Could include additional guidance on best practices for IPT and Field<-> HQ Communication. Include additional guidance for IPT and Field<-> HQ Communication within a Best Practices document.
	3.3.1 Federal Project Director	Enhance: Could benefit from more guidance about specific probabilistic date and value submissions to HQ. Cross-reference the current CD process timeline within a Best Practice Document in order to outline specific probabilistic input (e.g. p50, p80 \$/dates), and subsequent ranges, into Capital and Operational budget submissions.
	4.3 Risk Assessment	Enhance: Could use more weather/resource impact on the Integrated Cost-Schedule Risk Analysis. Establish Best Practice Document outlining the optimal approaches, build and impact of weather consequences.

Activity(s)	Benefit(s)	Gap/Deliverable Solution	
		4.6.1 Risk Monitoring Process Considerations	<p>Enhance: Lacking discussion on integration of Risk Monitoring Methods as they pertain to BCP/Configuration Control.</p> <p>Produce Best Practice language about the optimal method for integrating Risk Monitoring Processes/Methods into established PM methodology throughout the DOE complex.</p>
		4.6.2 Risk Monitoring Methods	<p>Enhance: Needs further details of macro-project level monitoring.</p> <p>Produce Best Practice language about the optimal method for integrating Risk Monitoring Processes/Methods into established PM methodology throughout the DOE complex.</p>
		3.3 Risk Management Organizational Responsibilities	<p>Enhance: This could be organizationally focused Client (DOE) v. Contractor</p> <p>Include a White Paper outlining Complex-Wide norms in an effort to standardize Contractor/Federal roles at the various DOE sites.</p>

5.2 Future Activities

The Crosswalk Matrix should be:

- Re-evaluated and updated periodically
- Updated when DOE G 413.3-7A is revised
- Provided to DOE authors of DOE G 413.3-7A as an input to future revisions

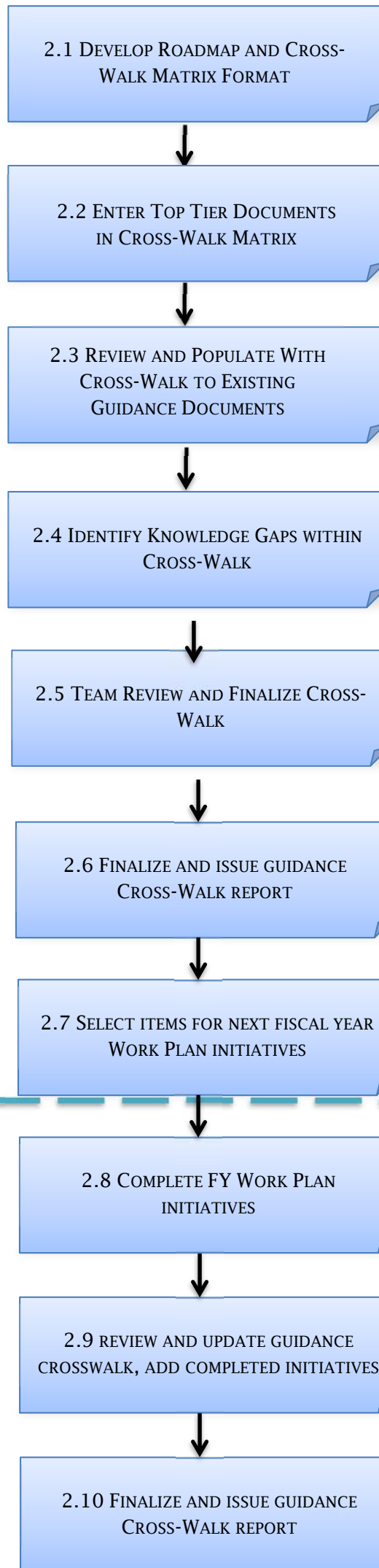
6.0 References

- 6.1 DOE O 413.3B, Program and project management for the Acquisition of Capital Asset Projects, Chg. 5; 12-Apr-2018.
- 6.2 DOE G 413.3-7A, Risk Management Guide, Chg. 1; 22-Oct-2015
- 6.3 US DOE (EERE) Standard Operation Procedure (SOP) Peer Review Best Practice and Procedures; AUG-2004
- 6.5 Office of PM EVMS Compliance Review SOP (ECRSOP); Apr-2018
- 6.6 ECRSOP – Appendix A: Compliance Assessment Guidance (CAG); 28-Nov-2018
- 6.7 EIR SOP, Department of Energy (DOE); Dec-2011



- 6.8 National Defense Industrial Association Integrated Program Management division (NDIA) Planning & Scheduling Excellence Guide (PASEG), Version 3.0; 9-Mar-2016
- 6.9 US DOE 2019 Project Peer Review Process SOP, Bioenergy Technologies Office; Mar-2019
- 6.10 GAO Best Practices: GAO-16-89G; Dec. 2015
- 6.11 GAO-09-3SP GAO Cost Estimating and Assessment guide: Best Practices; Mar-2009
- 6.12 EM Protocol for Application of Contingency and Management Reserve for the Acquisition of Capital Asset Projects; 14-May-2010
- 6.13 DoD Integrated Program Management Report (IPMR) Implementation Guide; 05-Feb-16
- 6.14 FAR Acquisition Letter No. AL 2009-01; 06-Oct-2008
- 6.15 Department of Defense Risk, Issue, and Opportunity Management Guide for Defense Acquisition Programs, Jan.-2017
- 6.16 NDIA ANSI/EIA-748-D Intent Guide; 28-Aug-2018
- 6.17 DOE G 413.3-21 Cost Estimating Guide; 9-May-2011
- 6.18 Association for Advancement of Cost Engineering International (AACEI), RP No. 18R-97; 2-Feb-2005
- 6.19 Association for Advancement of Cost Engineering International (AACEI), RP No. 57R-09; Rev. 9-Jul-2019

Attachment 1 – Risk Management Guidance Cross-Walk Roadmap



FY19

FY20 and Each Successive year



Attachment 2 – Risk Guidance Cross-Walk Matrix

PRIMARY REQUIREMENT DOE Order 413.3B	Cited Guidance Document																				Ordinal Gap ranking & recommendations for best practice maturation
	Gap Status (Overall Usefulness of Document)	DOE G 413.3-7A	413.3B - rev.5	EIR SOP	Office of PM E/MS Compliance Review SOP (ECRSOP)	ECRSOP - Compliance Assessment Guidance (CAG)	EIR SOP - DOE	PASEG	Project Peer Review Process SOP	GAO Best Practices: GAO-16-89G, Dec. 2016	GAO-09-55P GAO Cost Estimating and Assessment guide: Best Practices	EM Protocol for Application of Contingency and Management Reserve for the Acquisition of Capital Asset Projects	DoD Integrated Program Management Report (IPMR) Implementation Guide: 05-Feb-16 200901	FAR Acquisition Letter No. AL	Department of Defense Risk Issue and Opportunity Management Guide for Defense Acquisition Programs: Jan-2017	NDIA ANSIEIA-74B-D Inert Guide	DOE G 413.3-21 Cost Estimating Guide	AACE RP: 57R-09	AACE RP No. 18R-97		
Guidance Not Provided	○																				
Guidance Provided	●																				
Some Guidance Provided	±																				
Median Ranking of each cited/ evoked Document		●	○	±	○	○	±	●	○	±	±	±	○	○	±	○	○	●	○		
Cited Guidance Document: DOE G 413.3-7A https://www.directives.doe.gov/directives-documents/400-series/0413.3-EGuide-07a-admchg1/@/images/file																					
1.0 Purpose																					
2.0 Scope																					
3.0 Risk Management Organizational breakdown Structure, Concept and Responsibilities																					
3.1 Risk Management Organizational Breakdown Structure	●	●	○	○	±	○	○	±	○	±	±	±	○	○	±	○	○	○	○	Adequate	
3.2 Risk Management Organizational Concept	●	●	±	○	○	○	±	±	○	○	○	○	○	○	±	±	±	○	○	Adequate	
3.3 Risk Management Organizational Responsibilities	●	●	±	±	○	○	±	±	○	○	○	±	○	○	±	○	○	±	○	Enhance: This could be organizationally focused Client (DOE) v. Contractor	
3.3.1 Federal Project Director	●	●	±	○	○	○	±	±	○	±	±	○	○	○	±	○	○	○	○	Enhance: Could this benefit from more guidance about specific date submissions to HQ?	
3.3.2 Integrated Project Team	●	●	±	±	○	○	±	±	○	±	±	○	○	○	±	○	○	±	○	Enhance: This could be more organization-focused Client (DOE) v. Contractor	
3.3.3 Contractor Project Manager	●	±	±	○	○	○	±	±	○	○	○	○	○	±	±	○	○	±	○	Adequate: Appears to be a catch all (as appropriate)	
4.0 Risk Management Process Within the Project Life Cycle																					
4.1 Project Phase integration	●	●	●	±	○	±	±	○	○	○	○	○	○	±	○	○	○	○	○	Enhance: Could focus more on the use and integration of risk analysis on baseline and forecast	
4.2 Risk Planning	●	●	±	±	○	±	±	±	○	±	±	○	○	○	○	○	○	○	○	Enhance: No input on acquisitions and award process.	
4.3 Risk Assessment	●	±	±	±	○	○	±	○	○	○	○	○	○	○	○	○	○	○	○	Enhance: Could use more weather/resource impact on the Integrated Cost-Schedule Risk Analysis.	
4.3.1 Risk Identification	●	●	±	±	○	±	±	±	○	±	±	±	○	○	○	○	○	○	○	Adequate. A true DOE portion for Best Practices should include top complex wide T/Os	
4.3.2 Assignment of Risk Owners	●	●	○	○	○	○	○	±	○	±	±	○	○	○	±	○	○	○	○	Adequate	
4.3.3 Assignment of Probability and Consequence	●	±	○	○	○	○	○	○	○	○	○	±	○	○	±	○	○	○	○	Enhance: Could benefit from further discussion about calendar importance/optimization	
4.3.4 Assignment of Risk Trigger Metrics	●	●	○	○	±	○	○	±	○	±	±	±	○	○	±	○	○	±	○	Enhance: Could benefit from further discussion of goals, thresholds, tracking, examples and integration into IPT etc.	
4.3.5 Risk Register	●	●	○	±	○	○	±	±	○	±	±	○	○	±	±	±	±	○	○	Adequate	
4.3.6 Risk Analysis	●	±	○	○	○	○	○	○	○	○	○	○	○	±	○	○	○	○	○	Adequate	
4.3.6.1 Qualitative risk Analysis	●	○	○	○	○	○	±	±	○	±	±	±	○	○	±	○	○	○	○	Adequate	
4.3.6.2 Quantitative Risk Analysis	●	○	○	○	○	○	±	○	○	○	○	±	○	○	±	○	○	○	○	Enhance: Could use more discussion on importance of network path convergence risk in Quantitative Risk Analyses.	
4.3.6.3 Project Learning Analysis	±	±	○	○	○	○	±	±	○	±	±	○	○	○	±	○	○	±	○	Inadequate: Lacking description of best method of utilizing historical data to drive future duration and cost variance. Best practices or centralized EFCOG uncertainty database for uncertainty could be collected for reference throughout complex.	
4.3.6.4 Error and Variance Analysis	●	±	○	○	○	○	○	○	○	○	○	±	±	○	±	○	○	○	○	Enhance: More objective/quantified guidance per type of scope and per design maturity throughout complex.	
4.3.6.5 Contingency Adequacy Evaluation	●	○	○	○	○	○	○	±	○	±	○	±	±	○	±	○	○	○	○	Adequate.	
4.4.1 Acceptance	±	±	○	○	○	○	○	±	○	±	±	±	○	○	±	○	○	○	○	Inadequate: Overview of terms was sufficient, but lacked discussion on impact of this approach on mitigation efficacy on mitigation selection and quantification.	
4.4.2 Avoidance/Exploit	●	●	○	○	○	○	○	±	○	±	±	±	○	○	±	○	○	○	○	Enhance: Additional reconciliation of mitigating actions and current status schedule (time/logic/\$) was not included. Needs to be incorporated.	
4.4.3 Mitigation/Enhance	●	○	○	±	○	○	○	○	○	±	±	±	○	○	±	○	○	○	○	Enhance: More discussion regarding which type of threats/opportunities should remain with the Federal Risk Management Plan and which threats should be held at the Contractor level. More discussion of DOE/Contractor sharing could be included, including responsibility thresholds.	
4.4.4 Transfer/Share	±	±	○	○	○	○	○	±	○	±	±	○	○	○	±	○	○	○	○	Inadequate: Specific guidance for level of complexity necessary during each CD step (specifically for Risk Register and QA/SRA) would be helpful. Clear guidance for integration of probabilistic output into IMPR CPR process would help.	
4.6.1 Risk Monitoring Process Considerations	●	±	○	±	○	±	±	○	○	○	○	±	○	○	±	○	○	○	○	Enhance: Lacking discussion on integration of Risk Monitoring Methods as they pertain to BCP/Configuration Control.	
4.6.2 Risk Monitoring Methods	●	±	○	±	○	○	○	○	○	○	○	±	○	○	±	○	○	○	○	Enhance: Needs further details of macro-project level monitoring lacking.	
5.0 Risk Documentation and Communication																					
5.1 - 5.3 Risk Documentation and Communication	●	○	○	○	○	○	○	○	○	○	○	±	±	±	±	±	±	±	○	Enhance: Could include additional guidance on best practices for IPT and Field<-> HQ Communication.	