

PROJECT RISK MANAGEMENT WHITE PAPER 2006

Background

The Project Management Working Group (PMWG) was requested to assess the current status of risk mitigation planning and use in the management of DOE projects, identify best practices, and consider techniques for using risk management as a tool and for reporting of progress versus project risk mitigation. Toward that end, the PMWG assembled a Risk Management Focus Group, with the objective of collecting and evaluating existing practices and making recommendations to DOE for best practices in risk management.

Introduction

The management of project risk is a fundamental expectation for successful project management. When project risk is defined as the exposure to potential undesirable project outcomes (scope, cost, schedule, or technical performance), the recommended managerial approach is to break down total project risk into identifiable components, analyze the risk components, and take steps to eliminate, avoid, reduce, mitigate, or otherwise manage the project risks until the remaining risk is acceptable. Any remaining acceptable project risks can be considered in evaluation of total project budgets, with contractor-controlled management reserve or customer-controlled project contingency included as appropriate.

For clarity, the Risk Management Focus Group encourages a clear distinction between the risks of potential undesirable project outcomes which are project management concerns, and potential environmental, safety, health, and quality risks which are recommended for separate treatment. Some of the nomenclature and tools for treatment of these risks may be similar, especially for qualitative assessments. However, the levels of acceptable project risk will not correlate with DOE objectives for protection of the environment, public safety, and worker safety. Throughout the remainder of this paper, the term “risk” is used exclusively in the context of potential undesirable project outcomes for scope, schedule, cost, and/or technical performance.

Current Risk Management Requirements

Chapter 14 of DOE M 413.3-1, approved 3-28-03, includes significant discussion on the topic of project risk management, and the discussion is generally more directly and specifically focused on acquisition risk and mitigation versus project execution risk and handling. Projects with complexity, concurrency, and risk are encouraged to develop a Risk Management Plan, including a description of the methodology to identify and quantify or assess risks, and the methodology for risk tracking and closeout. Potential risk identification is recommended from both the top down and from the bottom up for scope, cost, schedule, and technological risks. Risk analysis is generally described for weighing the likelihood of a specific risk occurring with the impact or consequence of that occurrence. Common methods of risk handling techniques for schedule, cost, and technical risks are also described. The costs for risk handling approaches are encouraged to be included in the project as active work packages, while the residual risk for each project variable is treated as uncertainty to be addressed by management reserve and/or

contingency. Risk reporting, tracking, and closeout is generally described, but with an emphasis on the project acquisition risk assessment.

Risk Management Weaknesses

Risk management has always played a significant role in project management, but the discipline and available tools for risk management have evolved considerably. Current guidance allows significant flexibility in application of risk management principles, with a focus on recognizing and appropriately addressing risks. Many of the DOE capital and operational projects are exceptionally complex and are often one-of-a-kind or first-of-a-kind projects, where project risks have higher likelihoods of occurrence than in traditional fields. Similarly, many DOE projects invoke strict requirements and higher levels of investments for environmental protection and safety, resulting in more severe cost and schedule consequences for potential undesirable project outcomes. The combination of these trends results in a disproportionate level of high likelihood and high consequence risks for DOE projects. With current DOE objectives for improvements in project management, the role of risk management in project execution should be strengthened.

Priority for Risk Elimination or Avoidance

Current guidance does not highlight a key element of risk management, especially for high likelihood and high consequence risks, that of risk elimination or avoidance. In particular, the bulk of the current Section 14.4.4 of DOE M 413.3-1 is devoted to risk handling by including budget for the tailored mitigation strategy. Consideration should be given to guidance that high likelihood and high consequence risks should be eliminated or avoided first as a priority.

Risk-Informed Decisions

Current guidance addresses risk management for the project as a whole, but does not consider risk management as a tool to support effective project decision-making. Some projects implement risk-informed decisions, where the potential risk portfolio and the potential impacts of alternates to project risk mitigation requirements and residual risks are included as significant elements of the decision process along with the technical, cost, and schedule impacts.

Preferred Methods for Risk Reporting

Current guidance identifies risk tracking and reporting as an important project management tool. Risk tracking includes monitoring risk handling actions, identifying and evaluating new risks, and re-evaluating previous risks as a result of changes or project evolution. Risk reporting includes documenting the risk management process and status through risk closeout. As a project matures, the residual risks should be systematically reduced. Current guidance is not provided concerning preferred methodology for risk tracking and reporting.

Compliment Risks with Opportunities

Some projects and risk management practices have advocated identifying potential opportunities as the compliment to potential risks, and managing these opportunities similarly to risks. Potential opportunities could be identified and evaluated as to likelihood of occurrence and consequences, along with any necessary project investment to implement or enhance the opportunity. The authorized cost of implementation could be included in an active work package, and the opportunity could be tracked and reported through completion.

Recommendations

Recommendation 1: DOE should encourage the use of a standard Risk Level Matrix for major system projects, and should require that high likelihood and high consequence risks be eliminated or avoided as a priority.

Although specific guidance is not provided, the current Figure 14-2 in DOE M 413.3-1 implies a balanced approach between low level risk and high level risk occurrences. As used by some projects, we recommend that DOE adopt a standard configuration for the risk matrix similar to the following table.

Risk Consequence					
Risk Likelihood	Negligible	Marginal	Significant	Critical	Crisis
Very Likely	Low	Medium	Medium	High	High
Likely	Low	Low	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Very Unlikely	Low	Low	Low	Medium	Medium
Risk Level					

With this or a similar configuration for Risk Levels, risks with negligible or marginal consequences warrant a low level of attention, while higher consequence risks warrant higher levels of attention.

Current guidance does not emphasize specific requirements for events with High Risk Levels. We recommend that DOE adopt guidance with a strong preference for elimination or avoidance of any event with a High Risk Level. Where events with High Risk Levels cannot be eliminated or avoided, then we further recommend that Critical Decision documentation include specific review of the risk mitigation strategy. These recommendations will help projects focus on events with High Risk Levels, and ensure that senior DOE management understand and accept residual High Risk Levels.

Recommendation 2: DOE should require that CD-0, CD-1, and any Level 0 or Level 1 Changes include an evaluation of the potential risk profile and the potential impact of alternates to project risk mitigation and residual risks.

Risks should be an important aspect of project decisions, along with technical, cost, and schedule aspects. Project decisions that consider the impact on the potential risk profile are better informed, and typically result in more acceptable outcomes. The weighting of risk as a part of the decision will depend on the individual project application, as with the other aspects of the decision.

Recommendation 3: DOE should adopt standard methods for risk reporting.

Current guidance does not provide any specific requirements for risk tracking and reporting, and does not define frequency and distribution for reports and trends. Recommended methods include tracking the status of individual risks with “green”, “yellow”, and “red” status based on routine and periodic assessment of project risks, tracking the overall project contingency versus time as project risks are realized, and use of a “Risk Performance Index (RPI)”, defined as the ratio of remaining project contingency to remaining project risk. Any or all of these methods could be used for standardized risk status reporting. Reports should be routinely provided and reviewed with the appropriate levels of DOE management.

Recommendation 4: DOE should include guidance to consider project opportunities in a complimentary way to project risks.

Opportunities represent potential desirable project outcomes, and sometimes require project actions or investments to implement or enhance the opportunity. DOE should encourage that projects identify potential opportunities, with evaluation of the likelihood of occurrence and consequences, and any necessary project investment to implement or enhance the opportunity.

Recommended Examples

Examples of recommended project risk management tools and techniques will be included on the EFCOG web site. A particular recommended example is the Risk Management Plan for the Depleted Uranium Hexafluoride (DUF₆) Conversion Project.