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RISK MANAGEMENT PLAN

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APPROVAL PAGE

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ACRONYMS

CAM	Control Account Manager
DOE	U.S. Department of Energy
DUF6	Depleted Uranium Hexafluoride
EM	Environmental Management
ES&H	Environment, Safety, & Health
IPT	Integrated Project Team
MCS	Mid-America Conversion Services, LLC
MR	Management Reserve
PRMT	Plant Risk Management Team
P/C	Probability/Consequence
QA	Quality Assurance
RAR	Risk Assessment Report
RF	Risk Form
RM	Risk Management
RMP	Risk Management Plan
RMT	Risk Management Team
WBS	Work Breakdown Structure

EXECUTIVE SUMMARY

The risk management process follows the process described in DOE Guide 413.3-7A, Change 1, "Risk Management Guide," and its associated guidance. The general process has been tailored to complement the size, complexity, and unique attributes of the DUF6 Conversion Project.

An essential part of project planning is ensuring that project risks and uncertainties are identified, analyzed, managed, or determined to have been eliminated or mitigated. A Risk Management Plan provides the structured, formal, and disciplined approach to determine and control discrete risk events and general uncertainties at an acceptable level.

The Risk Management Plan (RMP) describes the overall process, methodology, roles, and responsibilities necessary to fulfill the requirements of the contract and to execute the work. The RMP requires the individuals responsible for the work to identify and plan for associated risks. If unacceptable risks are identified, the responsible individual shall formulate alternative plans to eliminate, avoid, or mitigate those risks. Together, the RMP, the Risk Management procedure and its associated form and guide, and the computing software comprise the risk-management process.

Risk management is an ongoing and iterative process where identified risks, existing and newly identified, are monitored and managed. Implementation of a risk-management process enhances the probability of project success by improving project performance and decreasing the likelihood of unanticipated cost overruns, schedule delays, and compromises in quality and safety.

1 PURPOSE

Department of Energy (DOE) "Risk Management Guide" defines risk as "a measure of the potential inability to achieve overall project objectives within defined scope, cost, schedule, and technical constraints." The two components of risk include the likelihood of failing to achieve a particular outcome, and the consequences of failing to achieve that outcome." The "Risk Management Guide" recommends the preparation of a RMP for all major system acquisitions.

This RMP describes the process for identifying, preventing, reducing or managing risks associated with completing the DUF6 Project under Environmental Management (EM) oversight. This RMP was developed under DOE Order 430.1, "Life Cycle Asset Management," and DOE Order 413.3b, "Program and Project Management for the Acquisition of Capital Assets."

2 SCOPE

This plan applies to the Mid-America Conversion Services, LLC, (MCS) risks for the DUF6 Project. The workflow process described within this document will identify and manage project risks throughout their respective life cycles to minimize adverse impacts to success.

This plan was developed based on the October 2015 release of the "Risk Management Guide" (DOE-G 413.3-7A, Change 1), The Office of Environmental Management's Operations Programs Protocol issued April 21, 2010, and our tailored approach for following 413.3 principles. Updates from the process originally proposed in the MCS proposal have been incorporated to ensure consistency with the new guidance.

- Under this contract, the DUF6 Project effort is an operational, ongoing process-based effort. Operational Phase – strong safety and production focus, risk characterized by:
 - risks that could impact safe operations
 - items that could delay/impact production capability
 - stronger plant ownership and management

3 ESTABLISHING/MAINTAINING A RISK MANAGEMENT CULTURE

3.1 Overview

Both DUF6 Project and DOE understand that risk management must be incorporated as a part of their daily project management culture, and will take action to make identification and mitigation a priority in all project meetings. Establishing this approach to risk management will enhance the probability of safely meeting cost and schedule objectives by increasing the likelihood of improved project performance.

Tracking and mitigating project risks are critically important to Project managers, control engineers, Control Account Managers (CAMs) and other personnel, who must routinely

identify solutions to risk management issues. Understanding project cost, schedule and scope and the impact a risk event may have on an activity is crucial. The RMP defines the scope and processes used to identify, assess and manage risks that could impact the implementation of DUF6 Project and associated tasks at Portsmouth and Paducah. To accomplish this goal, specific responsibilities are identified below, and within each section that follows.

3.2 Organizational Construct and General Responsibilities

The DUF6 Project, Risk Management Team (RMT) consists of DUF6 personnel supplemented as necessary with subject matter experts and outside consultants. DUF6 has chosen to align responsibility for risk management with each plant manager for that facility, and an additional risk manager for support systems in Lexington (business manager). Risk management is supported departmentally. The team composition will change as the project moves forward, with more responsibility for monitoring and managing risk moving to the plants.

The project team for the development portion of the effort is comprised of the following:

- Project Manager
- Risk Management Team, consists of the following members:
 - Plant Management
 - Business Manager
 - Operations
 - ESH&QA Manager
 - Chief Engineer
 - Project Controls
 - Other representatives as deemed appropriate by the Team

The team needed for the production portion of the effort will be plant based. Each plant will have its own team consisting of the following members:

- Plant Manager
- Plant Risk Management Team (PRMT), consists of the following members:
 - Operations/Facility Manager
 - Business Manager
 - ES-HQ Manager
 - Plant/Site Engineer
 - Project Controls
 - Other representatives as deemed appropriate by the Team

This structure ensures that Risk Management is integrated with of all project functions and is not an isolated, compartmentalized activity.

- President/Project Manager
 - Reviews and approves the Risk Management Plan.
 - Sets initial Management Reserve (MR) levels, and approves the use of MR.
 - Has overall responsibility for RMP. The activities required to implement the following responsibilities may be delegated to the Project Controls risk focal point; however, the responsibility remains with the identified function.
 - Provides resources for RMP execution for those cases where implementation activities require efforts beyond that already established and budgeted for the staff.
 - Participates in the DUF6 Project conduct of RM, in remedial actions, such as:
 - Mitigation of programmatic risks, when the project's scope, budget, or schedule are impacted,
 - Mitigation of interfacing risks when other organizations (outside DUF6) are involved.
 - Assists and/or leads discussion on the identification of risks
- PRMT/RMT Members
 - Perform risk screening to identify risks.
 - Assess and grade identified risks.
 - Develop risk handling and mitigation strategies along with identifying the resources and providing justification to support the recommended strategies.
 - Conduct cost and schedule risk analyses.
 - Serve as subject matter experts.
- Risk Managers (supported by Project Controls) are responsible for:
 - Coordination of the development and maintenance of the Risk Management Plan and Risk Register.
 - Chairing and scheduling risk meetings with Risk Managers as required.
 - Coordinating the identification, assessment, and rating of risks and assuring the risk analysis results are documented and risk mitigation plans are implemented.
 - Interfacing with outside organizations when risks outside DUF6 Project and DOE are involved.

- Maintaining/tracking applicable risk data and preparing/presenting a summary status of risk mitigation activities and status of RMP implementation to the President/Project Manager.
- Coordinating the development and maintenance of the risk management infrastructure (plans, procedures, training, etc.).

The Risk Owner for each individual risk item is listed on each Risk Form (RF) and on the Risk Register under "Owner". This individual is directly responsible for monitoring, implementing mitigation plans, assessing status, and reporting status. This individual shall be at a sufficient functional level in the organization to provide the highest level of monitoring.

3.3 Risk Management Communications

Within RMP, roles and responsibilities for managing and communicating risks are assigned at each step. Project Controls has the key responsibility to promote the forward looking thinking leading to the identification and management of project risks. The production phase will shift the leadership for risk identification and management to each plant manager with project controls providing overall reporting and coordination support.

4 RISK MANAGEMENT PROCESS

4.1 Risk Management (RM) Process Overview

Risk sources fall into two broad categories - Estimate Uncertainty and Event Risk.

Events Risks are possible occurrences that can be specifically identified as having the potential to impact project scope, increase project cost and/or schedule, reduce safety margins, or reduce the quality of the final product. Event Risks can be both internal and external, and, in many cases, can be foreseen within some reasonable planning horizon. Event Risks include the following categories:

- Technical
- Safety
- Environment
- Support
- Procurement
- Programmatic
- Legal and regulatory issues
- Labor issues

Estimate Uncertainty is the result of variability of the estimating data used to create the project baseline cost and schedule estimates. This primarily covers uncertainties in project cost and schedule estimates that result from:

- Material/facility uncertainty

- Errors and omissions
- Inflation
- Adverse weather
- Pricing variances
- Quantity variances
- Complexity
- Facility access

Estimate Uncertainty is typically handled separately during risk modeling based on historical trend information and is not explicitly addressed by the risk team. Event Risk is typically the focus for the risk team, and more specifically, the technical and programmatic areas. A format for documenting these risks has been developed and is shown in Attachment D. *DUF6 Risk Form*. Risks are prioritized based on a qualitative analysis of each risk event's probability of occurrence and the consequences of that risk event.

4.2 Risk Management (RM) Process Details

DOE G 413.3.7A defines the risk management processes to be used for managing risk during the project life cycle. Our proposal processes have been amended to reflect this guidance. There are four major processes, with the assessment process having two major subcomponents:

1. Planning
2. Assessment
 - a. Identification
 - b. Analysis
3. Handling and Response,
4. Monitoring (Track, Report, and Closeout)

This Risk Management Plan (RMP) (and updates) covers the first item above Planning, and documents the process to be used to identify and communicate project risks. The remaining three processes are covered in specific guidance detailed below (Section 4.2.1 thru 4.2.3). Assessment results and actions are provided in a separate document which is utilized in daily management activities. Risk Management is an ongoing and iterative process, which applies the best management practices of a knowledgeable project staff to a suite of focused and prioritized issues. The RM process itself will be continually applied throughout the project life cycle.

DOE and DUF6 will communicate their individual risk analyses and mitigation plans to one another, for the purpose of teaming on risk reduction and elimination, through Integrated

Project Team (IPT) meetings or Risk Management Team (RMT) meetings. A broad overview of the action steps within the Risk Management process is depicted in Attachment C. *Risk Management Process Summary*.

4.2.1 **Risk Assessment**

4.2.1.1 *Risk Identification*

The objective of risk identification is to identify all possible risks, not to assess the probability or impact of the risk or to mitigate the risk. DUF6 risk identification is accomplished via daily activities, assessments, technical reviews, review of lesson learned, monthly and quarterly project reviews, and review of other sites' RMP, annual RMP updates, or by an organized approach for determining and selecting which events are likely to affect the project and documenting the characteristics of the events that may occur, with a basis as to why identified events are considered risks. DUF6 may choose to periodically conduct a Risk-Threat/Opportunity Summit, where a comprehensive project review is held with the sole purpose of reviewing and identifying new project opportunities and risks.

Key sources of input to aid the risk identification process include:

1. **Activity or Task Descriptions (Scope Statements, etc.).** The nature of an activity will impact its effect. For example, a project involving proven technology may have significantly less risk when compared to a project involving new technology, which may require extensive development and thus have a higher risk.
2. **Other Activity or Project Planning Documents.** The Work Breakdown Structure (WBS), statements of work (SOW), cost and/or time estimates, etc. may provide greater risks when developed from early or incomplete information. Procurement may identify unusual market conditions such as regional sluggishness or lack of multiple suppliers. Other sources include experience with similar projects, lessons learned, etc.
3. **Historical Information.** This information can be extracted from project files and databases (occurrences reports, etc.).
4. **Project Assumptions.** Assumptions and clarifications can lead to events as a project progresses and evolves. They should be reviewed for accuracy.

The entire identification process will be revisited at regular intervals. Cost, schedule, technical, and programmatic risks elements will be re-evaluated upon the following events in the project life cycle:

1. **Technical and Programmatic** – The following occurrences will prompt re-evaluation of project risks as appropriate:
 - Upon significant changes to project scope, including the addition of major scope

- Upon the reduction or addition of available resources or changes to the funding profile
 - Upon changes to key personnel assigned
 - Upon a delay or acceleration of the project schedule
 - Upon the realization that project baseline changes are imminent
 - Upon changes to major procurement cycles
 - As directed by senior management
2. **Cost and Schedule** – A qualitative analysis to assess the level of management confidence with project scope, cost, and schedule will be done during major changes to the project baseline such as a new contract modification, a rebase line event or additional contract year additions.

Annually Risk management is integrated with Accident Prevention, System Safety, Emergency Response, and Occupational Health to help assist with the identification and assessment of potential risks

Responsibilities in the risk assessment process are contained in the following table.

Table 1. Risk Assessment Process

RESPONSIBILITY	ACTIVITY
<u>PRMT OR RMT</u>	<ul style="list-style-type: none"> • Identify potential project risk. • If any items have a risk potential, document the identified candidate risks in the <i>DUF6 Risk Form</i>. • Assign Responsibility. • Forward all forms to Project Controls.
<u>PROJECT CONTROLS</u>	<ul style="list-style-type: none"> • Review the <i>DUF6 Risk Form</i> and assign a Risk Identification Number to each form. • Record the <i>DUF6 Risk Form</i> in Risk Register Database. • Distribute applicable DOE Risks to the Federal Project Director.

4.2.1.2 Risk Analysis

Risk analysis involves determining the probability of the occurrence of a risk, assessing the consequences of this risk, and combining the two to identify a probability/consequence (P/C) correlation score. This P/C score represents a judgment as to the relative risk level to the project as a whole. The probability assessment involves qualitative assessment and the consequence assessment involves quantitative analysis. This assessment is made by:

- Understanding the nature of the risk.
- Determining the conditions that would or could cause the risk to be realized.
- Considering the likelihood that these conditions will occur.

Attachment E. *Risk Probability Occurrence* and Attachment F. *Risk Consequences of Occurrence* show the criteria for defining probability and consequence of occurrences on the project. These are based on DOE criteria. Project Controls, along with the RMT/PRMT shall evaluate each *DUF6 Risk Form* and assign a probability and consequence score based on Attachments E and F. A consensus shall be reached within the team for each score. Care shall be taken to ensure that all participants are free to and encouraged to contribute. The assessment of each risk in terms of probability allows the binning of risks in the categories shown in Attachment E. The quantitative assessment evaluates how the risk will affect the project's cost and schedule as the consequence. This quantitative assessment allows the risks to be categorized in the levels of consequence shown in Attachment F. *Risk Consequence of Occurrence*. This assessment is made by:

- Determining what impact would occur to the plant if the risk was realized.
- Establishing a rough estimate of the cost to correct or address the realized risk.
- Determining the schedule impact to the overall mission of the project that the realized risk would have and estimating the resulting cost impact.

Each event shall be analyzed as an independent event (i.e., that the probability of the event occurring is independent of any other event occurring). Although interdependencies are expected among events, these interdependencies will be addressed later in the process. If interdependencies can be identified, this information shall be captured on the *DUF6 Risk Form* for further analysis.

Because risk events are "known or unknowns," it is unlikely that the probability or consequence of an Event occurring can be quantified precisely. Therefore, these assessments most likely will be a judgment. Accordingly, the Team's rationale for assessing the probability and consequence of an Event occurring should be documented on the *DUF6 Risk Form* to facilitate further analysis. Further information can be added to the Additional Comments section or added as attachments.

In addition to using the *DUF6 Risk Form*, all risk data shall be entered and tracked in the Risk Register by Project Controls. This database shall be a centralized repository for risk information established and maintained by Project Controls.

The *Risk Probability Occurrence* and *Risk Consequence of Occurrence* shall then be analyzed together to determine the P/C score. This score, obtained by cross referencing the probability rating and highest consequence rating from Attachment G. *Probability/Consequence Correlation Score* shall be utilized as input in determining the appropriate risk handling strategy described in the next section.

Scheduled meetings of the RMT/PRMT will be the platform for identifying and assessing identified risk events. The meeting frequency, attendance, and conduct shall be the

responsibility of Project Controls. These meetings give DOE the opportunity to provide input, guidance and feedback on risk assessments.

Responsibilities in the risk analysis process are contained in the following table.

Table 2. Risk Analysis Process

RESPONSIBILITY	ACTIVITY
<u>PRMT OR RMT</u>	<ul style="list-style-type: none"> • Refer to the criteria set forth in Attachment E, <i>Risk Probability Occurrence</i> score and base each identified risk on the <i>DUF6 Risk Form</i>. • Refer to the criteria set forth in Attachment F, <i>Risk Consequence Occurrence</i> score and base each identified risks on the <i>DUF6 Risk Form</i>. • Develop a qualitative rough Order of Magnitude estimate as to potential worst-case cost and schedule impacts for each identified risk assuming the risk actualizes. Record these values to the respective Risk Register. • The probability/consequence correlation score is determined from the matrix in Attachment G, <i>Risk Probability/Consequence Correction Score</i> by obtaining the score from bullet 1, <i>Risk Probability Occurrence</i> and the score from bullet 2, <i>Risk Consequences Occurrence</i> in this table. • Forward the <i>DUF6 Risk Form</i> to Project Controls for review and comment prior to risk handling meetings.

4.2.1.3 *Impact Determination*

Risk impact determination is the process of evaluating and quantifying the effect of risk(s) on the Project. Risk can impact a project in a variety of ways – cost, schedule, technical scope, and quality being the more common. In most situations, technical scope and quality are a given, and must be achieved, therefore cost and schedule become the main emphasis areas for measuring risk impact. Impacts of risks on cost and schedule in the project estimates can be addressed by the following:

1. **Handling strategy implementation.** The first impact is the handling strategy implementation. If the risk is reduced using a risk reduction or mitigation strategy, there may be a cost and schedule impact associated with the implementation of that strategy. The “implementation” cost and schedule impacts of the risk mitigation strategy shall be included in the baseline project cost and schedule.
2. **Residual risk.** Even after risk-handling strategies have been implemented, there may be remaining risk impacts. The cost and schedule impacts of residual risks

should be included in the management reserve. There are a number of methods available to the project for determining the impact of residual risks.

- a. **Flat rate reserve.** This method assigns a standard, flat percent reserve for the cost estimate, as determined by the President/Project Manager. The flat-rate calculation is applied individually to each function or activity (such as engineering or construction) instead of applying to the overall project cost. The sum of the individual components becomes the project reserve. This method is generally useful for activities where estimating uncertainty is known, based on historical data and experience and may be used in coordination with other methods.
- b. **Monte Carlo simulation (or equivalent).** This is accomplished by determining a cost impact probability distribution for each residual risk or on various WBS elements for the project as a whole.
- c. **DOE Contingency.** A contingency is a response to inherent uncertainty that an event will transpire within the scope of the project, which cannot be planned, estimated or controlled with any certainty by DUF6. DUF6 will recommend actions to DOE for these items.
- d. **Other methods.** As determined by the RMT.

Responsibilities in the risk impact determination process are contained in the following table.

Table 3. Risk Impact Determination Process

RESPONSIBILITY	ACTIVITY
PRMT OR RMT	<ul style="list-style-type: none"> • Determine the cost and schedule impact of each risk's handling strategy implementation to be included in the project baseline. Consult with the President/Project Manager as necessary. • Develop a contingency recommendation for residual risks (those remaining after risk-handling strategies have been implemented) and a management reserve determination. • Advise the President/Project Manager of the risk impact revision. The President/Project Manager adds and approves risk impact revisions to project baseline and management reserve or contingency, as appropriate. • Monitor impacts to the project's successful completion.

4.2.2 Risk Handling & Response

Risk handling is the identification of the course of action or inaction selected for the purpose of effectively managing or mitigating a given risk. Handling strategies are selected that identify the optimum set of steps to balance risk with other factors, such as cost and timeliness. Risks include both threats and opportunities.

1. **Threat: Acceptance/Opportunity: Share.** For threats, accepting the risk is essentially a “no action” strategy, but it does not mean that the risk is ignored. It will be continually monitored as all open risks are. Selection of this strategy is based upon the decision that it is more cost effective to continue the project as planned with no resources specifically dedicated to addressing the risk possibly because available risk mitigation strategies are cost prohibitive. However, the “no action” strategy may be managed by monitoring and developing a contingency plan in case the risk event occurs and then tracking the risk to assure that it does not increase during project execution.

If the risk is accepted without additional actions, then the cost and duration of implementation is zero, which should be documented on the *DUF6 Risk Form*. For opportunities the strategy is to share in the cost reduction to the extent allowable.

2. **Threat: Mitigate/Opportunity: Enhance.** For threats, the mitigation strategy should identify specific steps or actions that will mitigate the consequence of a risk should it occur. The cost of the implementing the mitigation should be recorded in the risk register and added to the performance measurement baseline if it is not already included. In using the Mitigate strategy, the risk is either reduced or

eliminated after the mitigation is conducted. This reduced risk, if any, is called the residual risk. This residual risk will be statistically combined later with other residual risks to provide magnitude guidance for establishing Management Reserve levels. For opportunities the strategy is to enhance the phenomenon causing the cost reduction.

3. **Threat: Transfer/Opportunity: Exploit.** For threats, this strategy involves contractually transferring risk to a subcontractor or to the DOE. An example is establishing a fixed-priced subcontract for the delivery of good and/or services. Typically this transfer of risk will result in increased cost over not transferring the risk; however, if the risk is realized the final cost to the project may be less under this approach. Transferring risk can also be accomplished by purchasing insurance, performance bonds, or payment bonds. For opportunities the strategy is to exploit the opportunity in such a way that other parties involved in the transitions do not take all the savings to the extent allowable.
4. **Threat: Avoidance/Opportunity: Share.** For threats, this strategy focuses on completely eliminating the specific threat or risk-driving event usually by eliminating the potential that the risk event can occur. This can be accomplished through total structure, system, or component redesign, or by selecting an alternate design approach that does not include the particular risk. Of course, the project will not be able to eliminate all risks, but specific risk events can often be eliminated with this strategy.

If the strategy is to avoid the risk, the cost and duration of implementation of the strategies is determined and documented. Once the strategy is implemented, the risk level for the specific element will be reduced to zero. No residual risk remains with this strategy, although new risks may be introduced by the alternative. For opportunities this strategy involves accepting the lower costs as such.

The selected handling strategy, or strategies, will be documented on the *DUF6 Risk Form* and added to the Risk Register Database. Costs related to the scope of the selected risk handling strategies shall be added to the project baseline cost. Thus, risk handling implementation costs are included in the baseline cost. Wherever practical, the *DUF6 Risk Form* should capture assumptions, mitigation strategies, and designs that have been incorporated to address the risk. This information can be captured by reference or by attaching the specific information.

Responsibilities in the risk handling process are contained in the following table.

Table 4. Risk Handling Process

RESPONSIBILITY	ACTIVITY
<u>PROJECT CONTROLS</u>	<ul style="list-style-type: none"> • Convenes a meeting (or meetings, as appropriate) of the PRMT or RMT to review and prioritize completed <i>DUF6 Risk-Form</i>.
<u>PRMT OR RMT</u>	<ul style="list-style-type: none"> • Conduct a comprehensive review of strategies available to mitigate, reduce and/or avoid identified risk with a P/C score of 12 or greater. • Implement a monitoring program for identified risks with P/C scores of less than 11. • Verify that risks with a P/C score of less than 7 can be accepted as is or monitored. • Identify the cost and schedule required to implement the risk handling strategies. • Develop a mitigation plan and milestones, including expected closure dates. Assign functional responsibilities for the implementation of the project risk handling strategies. • Evaluate the selected mitigation strategy for residual risk elements. This includes documenting the Risk Probability Occurrence, Risk Consequence Occurrence, and the P/C score. • Forward the <i>DUF6 Risk Form</i> to Project controls, or DOE as applicable, for review and comment.
<u>PROJECT CONTROLS</u>	<ul style="list-style-type: none"> • Updates the Risk Register Database with proposed risk mitigation/reduction strategies, mitigation plans and milestones. • Reports Risk on a regular basis to the President/Project Manager.
<u>PROJECT MANAGER</u>	<ul style="list-style-type: none"> • Reviews and approves risk handling mitigations, use of MR to mitigate risk, and reports overall status to DOE.

4.2.3 **Risk Monitoring (Reporting, Tracking, and Closeout)**

Risk monitoring is the active reporting and tracking of mitigation items developed from risk handling strategies from commencement to successful completion. Good risk monitoring and control processes provide valuable information that assist with making timely decisions in advance of risk materialization. The RMT and PRMT shall monitor risk handling mitigations from risk identification through closure on a continuous basis. The RMT shall update (as appropriate) the individual *DUF6 Risk Form* each time they are reviewed. During these reviews, the RMT may be able to foresee risks and that the mitigation strategy needs to get implemented.

The use of Management Reserve must be justified and approved by the President/Project Manager and implemented into the baseline through the baseline change process, prior to the start of the risk mitigation in most instances. However, management reserve may be utilized without a modification to the baseline, depending on the risk situation and at the discretion of the President/Project Manager. The use of Contingency must be requested of the Federal Project Director through a Change Proposal. The RMT closes risks by documenting the closure on the *DUF6 Risk Form* and by gaining the appropriate approvals.

Responsibilities in the risk monitoring process are contained in the following table.

Table 5, Risk Monitoring Process

RESPONSIBILITY	ACTIVITY
<u>PROJECT CONTROLS</u>	<ul style="list-style-type: none"> • Initiate Reporting, Tracking and Close Out Meetings with the PRMT or RMT. • Update applicable records (e.g., Risk Register Database, <i>DUF6 Risk Form</i>, and Risk Management Matrix, as required). • Initiate closeout actions on the <i>DUF6 Risk Form(s)</i> upon completion of the mitigation strategy.
<u>PRMT OR RMT</u>	<ul style="list-style-type: none"> • Record the progress of the mitigation strategy for the Risk Assessment. • Conduct a reassessment of outstanding mitigation strategies, identify deviations or shortcomings within the mitigation strategy implementation and initiate corrective action as required. • Evaluate the effectiveness of risk mitigation plans throughout the project life cycle. • Monitor the effectiveness of outstanding mitigation strategies. • Provide oversight of risk mitigation closeout actions and recommend risk closure to Project Controls. • Periodically (as required by the President/Project Manager) issue a Risk Assessment Report (RAR) that summarizes the risk identification, assessment, handling, impact determinations, simulation, etc. documented on the RAFs.

Note: It should be noted that a risk might occur that negatively impacts cost and schedule beyond the amount of contingency assigned to it during risk impact determination. Risks may also occur that result in conditions that are different than those assumed in the DUF6 contract. If such risks materialize, the processing of a Change Order should be considered.

5

ATTACHMENTS

- Attachment A. *Definitions*
- Attachment B. *Reference*
- Attachment C. *Risk Management Process Summary*
- Attachment D. *DUF6 Risk Form*
- Attachment E. *Risk Probability Occurrence*
- Attachment F. *Risk Consequence of Occurrence*
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ATTACHMENT A. DEFINITIONS

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Consequence of Occurrence - A qualitative or quantitative representation of the potential impact of an identified risk materializing.

Contingency - Resources controlled by the Government that are required to increase confidence for project success and effectively manage the risks that are normally considered outside DUF6's control (i.e., "unknown unknowns"). Contingency is not part of the negotiated contract.

Event – A discrete occurrence that may affect scope, schedule, and/or cost of a project for better or worse.

Event Risk – Broad-based issues that can have an impact on project scope, increase project cost and/or schedule, reduce safety margins, or reduce the quality of the final product (examples: labor contract issues, inability of component suppliers to meet their delivery schedules, safety regulation changes, etc.).

Management Reserve - Resources required increasing confidence for project success and effectively managing the risks. Management Reserve is part of the budget withheld for DUF6 management control purposes. It is part of the negotiated contract and controlled by DUF6.

Monte Carlo Analysis or equivalent - An automated probabilistic risk assessment technique used to measure the effects of uncertainty within defined probability distributions.

Probability of Occurrence - A qualitative or quantitative representation of the relative probability of realizing an identified risk.

Probability/Consequence Correlation - A score that represents a judgment as to the relative risk level to the project as a whole. It is the combination of a risk's probability of the occurrence and its consequence should it occur.

Programmatic Risk - The impact associated with disruptions created by decisions, events, or actions that have the potential to affect a project's outcome. Programmatic risk is typically beyond the project manager's ability to adequately control.

Qualitative Analysis - A subjective assessment of the level of confidence within the defined scope of work.

Quantitative Analysis - An objective assessment of the level of confidence within the defined scope of work.

Residual Risk - Risk elements remaining after the implementation of selected risk handling or mitigation strategies.

ATTACHMENT A. DEFINITIONS

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Risk - A measure of the potential inability to achieve overall program/project objectives within defined cost, schedule, and technical constraints. Risk is comprised of the probability and/or likelihood of failing to achieve a particular outcome, and the consequence associated with failing to achieve the desired end-state.

Risk Factor - A quantitative representation of a technical or programmatic risk based upon the product of the probability of occurrence and the consequence of occurrence.

Risk Management - The act or practice of dealing with risk. It includes planning for risk, assessing (identifying and analyzing) risk areas, developing risk-handling options, monitoring risks to determine how risks have changed over the course of a project, and documenting the overall risk management program.

Technical Risk - The impact associated with uncertainties regarding the development of a new design or the use of existing technologies within different applications, either to provide a greater level of performance or to accommodate imposed requirements and/or constraints.

ATTACHMENT B. REFERENCES

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DOE O 413.3b, "Program and Project Management for the Acquisition of Capital Assets"

DOE O 430.1, "Life Cycle Asset Management"

DOE G 413.3-7A, Change 1, "Risk Management Guide," October 2015

ATTACHMENT C. RISK MANAGEMENT PROCESS SUMMARY

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ATTACHMENT D, DUF6 RISK FORM

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DUF6 RISK FORM

ID Number:		Revision:		Last Date Evaluated:		Status:	
Event Title:							
Risk Type:		Responsible Organization:			Program:		IPT:
Date Identified:		Owner:			Sub-Project (if applicable):		
Impacted WDS Element(s):		Title:			CAM:		
Statement of Event:							
Pre-Mitigated Probability Rating:				Probability Basis:			
Pre-Mitigated Consequence Rating:				Consequence Basis:			
Cost:							
Schedule:							
Pre-Mitigated Risk Level:							
Pre-Mitigation Cost Impact		Best (\$)	Most Likely(\$)	Worst (\$)	Pre-Mitigated Impact Basis:		
Pre-Mitigation Schedule Impact		(Work Days)	(Work Days)	(Work Days)			
Pre-Mitigation Probability		%					
Handling Strategy:				Description:			
Handling Strategy Action Item:							
Handling Strategy Implementation				Handling Strategy Cost Basis:			
Cost(\$K):							
HS Implementation							
Schedule Date:							
Other Handling Strategies (Optional):							
Statement of Residual Risk (same as Statement of Event, above, if left blank):							
Residual Probability Rating:				Probability Basis:			
Residual Consequence Rating:				Consequence Basis:			
Cost:							
Schedule:							
Residual Risk Level:							
Residual Cost Impact		Best (\$)	Most Likely(\$)	Worst (\$)	Residual Impact Basis:		
Residual Schedule Impact		(Work Days)	(Work Days)	(Work Days)			
Residual Probability%							
Notes:							
Evaluation Comments:							

ATTACHMENT E, RISK PROBABILITY OCCURRENCE

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Qualitative	Criteria	Score
Very Unlikely	Is extremely unlikely to occur anytime in the life cycle of the project or its facilities.	<5%
Unlikely	Is unlikely to occur in the life cycle of the project or its facilities (i.e., there is not much chance the event will happen).	5 to 29%
Likely	Will likely occur sometime during the life cycle of the project or its facilities (i.e., there is a moderate chance of the event happening).	≥30 to 70%
Very Likely	Will very likely occur sometime during the life cycle of the project or its facilities (i.e., there is a high chance the event will happen).	≥70- to 95%
Imminent	Will most likely occur sometime during the life cycle of the project or its facilities (i.e., everything points to the event happening).	>95%

ATTACHMENT F, RISK CONSEQUENCE OF OCCURRENCE

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<u>Qualitative</u>	<u>Cost</u>	<u>Schedule</u>
Minor	Minimal or no consequence. No impact to Project cost. < \$250K	Minimal or no consequence. Very minor impact to Project schedule. < 2 Weeks
Marginal	Small increase in meeting objectives. Marginally increases costs. \$250K and \$2M	Small increase in meeting objectives. Marginally impacts schedule. 2 weeks and 2 Months
Significant	Significant degradation in meeting objectives significantly increases cost; fee is at risk. >\$2M and \$6M	Significant degradation in meeting objectives, significantly impacts schedule. >2 months and 4 months
Critical	Goals and objectives are not achievable. Additional funding may be required; loss of fee and/or fines and penalties imposed. >\$6M and \$10M	Goals and objectives are not achievable. Additional time may need to be allocated. Missed incentivized and/or regulatory milestones. >4 months and 8 months
Crisis	Project stopped. Funding withdrawal; cure notice, withdrawal of scope, or imminent contract cancellation. >\$10M	Project stopped. Withdrawal of scope, cure notice, or imminent contract cancellation. >8 months

ATTACHMENT G, PROBABILITY/CONSEQUENCE CORRECTION SCORE

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Probability and Scoring (PID)					
<i>- Risk score is based on the Highest Impact</i>					
	Negligible	Marginal	Significant	Critical	Crisis
Imminent	5	9	18	36	72
Very Likely	4	7	14	28	56
Likely	3	5	10	20	40
Unlikely	2	3	6	12	24
Very Unlikely	1	1	2	4	8
LOW	P/C Score <7				
MEDIUM	P/C Score >=7 and <25				
HIGH	P/C Score >=25				

ATTACHMENT H, SAMPLE RISK ASSESSMENT REPORT OUTLINE AND GUIDANCE

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Introduction

Assessment of Risk

Risk Management Process Overview

Summary of RM Process Results

Risk Assessment Summary Table

Detailed Discussion of "Top" Technical Risks

One method for determining "top" risks is to sort all risks from highest P/C score (most risky) to lowest (least risky) and apply a Pareto Analysis. Pareto Analysis is based on the premise that 80% of the problems are due to 20% of the possible causes. With respect to Risk Management, 80% of the problems come from the top 20% of the risks. These 20% are the "vital few" that should be discussed and targeted for immediate action and monitoring by management during the particular critical decision phase.

This section should start with the following phrase: "There is technical risk to the project baseline if. . ." The risk should be discussed in detail including possible initiating factors, probability of occurrence, consequence of occurrence, handling strategies, cost of strategies, etc.

Detailed Discussion of "Top" Programmatic Risks

Detailed Discussion of "Top" Cost Risks

Detailed Discussion of "Top" Schedule Risks

Appendices

Monte Carlo Analyses

Crystal Ball, Pertmaster Analyses, or similar software

Other supporting data

END OF DOCUMENT