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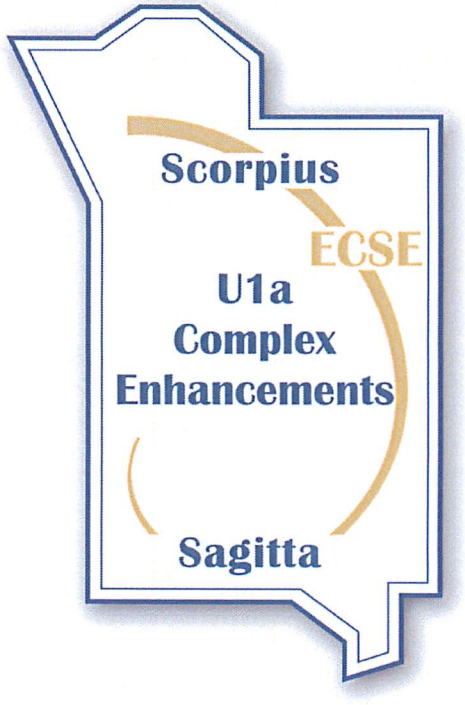
Enhanced Capabilities for Subcritical Experiments (ECSE) Risk Management Plan



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1.0 Introduction

Risk is a factor, element, constraint, or course of action that introduces an uncertainty of outcome that could impact project objectives. Risk is an inherent part of all activities, whether the activity is simple and small, or large and complex.

Risk management is a process that identifies, evaluates, handles, and monitors risks that have the potential to affect project success. The risk management process spans the entire project, from its initiation to its successful completion and closeout, including both technical and programmatic (non-technical) risks.

1.1 Purpose and Scope

This Risk Management Plan (RMP) defines the process to be used for identifying, evaluating, handling, and monitoring risks as part of the overall management of the Enhanced Capabilities for Subcritical Experiments (ECSE) 'Project'.

Given the changing nature of the project environment, risk management is essentially an ongoing and iterative process, which applies the best efforts of a knowledgeable project staff to a suite of focused and prioritized concerns. The risk management process itself must be continually applied throughout the project life cycle.

This document was prepared in accordance with DOE O 413.3B, Program and Project Management for the Acquisition of Capital Assets, its associated guide for risk management DOE G 413.3-7, Risk Management Guide, and LANL ADPM AP-350-204, Risk and Opportunity Management.

1.2 Objective

The primary objective of this RMP is to provide a systematic process for the effective management of cost, schedule, technical, and programmatic project risks to minimize adverse impacts to the successful completion of the project throughout the project life cycle.

This RMP:

- Identifies the scope of the risk management program;
- Defines organizational responsibilities regarding the management of risk; and
- Delineates the methodology to execute the risk management workflow process.

2.0 Project Summary

2.1 Background

ECSE is a combination of enhanced pulsed X-radiography capability (the "Scorpius" R&D and Major Item of Equipment (MIE) Component) and associated infrastructure upgrades to the U1a Complex (U1a Complex Enhancements Project or 'UCEP' Line Item Component). UCEP also enables deployment of Neutron Diagnosed Subcritical Experiments under R&D development by Defense Programs (the 'Sagitta' R&D Interface Component). ECSE will fill an extant gap in capability to conduct subcritical experiments (SCEs) using plutonium in integral implosion configurations.

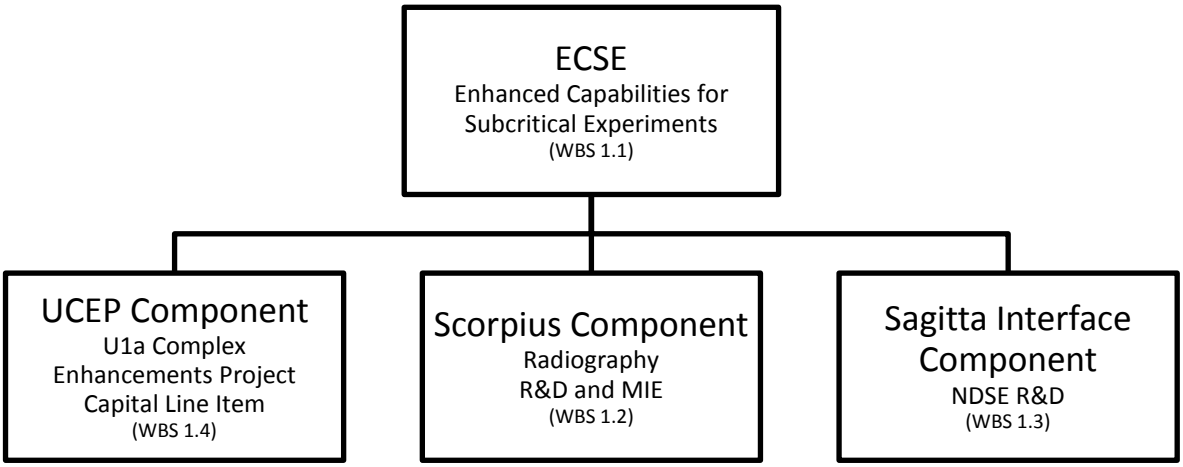


Figure 1 - ECSE Project Structure

Descriptions of project scope, work elements, and project phases and baselines will be included in the following documents:

- Program Requirements Document (PRD);
- Project Execution Plan (PEP); and
- Work Breakdown Structure (WBS) Index/Dictionary.

2.2 ECSE Project Risk Management Team

The project risk management team (PRMT) consists of a core team supplemented as necessary with subject matter experts (SMEs). The core team is comprised of the following:

- Project Director;
- Site Deputy Project Directors;
- ECSE Risk Manager;

- ECSE Project Controls Manager;
- Project Component Leads
  - Radiography Lead ("Scorpius" project);
  - UCEP Lead;
  - NDSE Lead ("Sagitta" interface);
- Other Functional Management Leads to be determined.

This structure ensures that risk management is an integral part of project management functions and is not an isolated, compartmentalized activity.

3.0 Roles and Responsibilities

The Project Director has overall responsibility for project risk management, as well as the content and implementation of this RMP. The activities required to implement the following responsibilities may be delegated, however, the responsibility remains with the Project Director.

Project Director	• Lead and be responsible for the risk management process including the development and approval of the RMP. • Chair the ECSE PRMT meetings. • Designate an ECSE Project Risk Manager. • Ensure a tailored approach to risk management. • Verify evaluation and closure of key project risks. • Provide budget for risk management program execution. • Actively participate in the ECSE PRMT, particularly in development and execution of Risk Response Plans for project risks that meet threshold requirements for management at the ECSE Project level.

Project Risk Manager

- Report to the Project Director.
- Maintain the RMP.
- Provide coordination and guidance on applying the risk management process.
- Facilitate effective implementation of the risk management program and ensure that risks are identified, analyzed, documented, and managed.
- Oversee and maintain the ECSE Project Risk Register, monitor the execution of risk response plans, and track risks to closure.
- Facilitate ECSE Project Risk Management Team meetings.
- Ensure planning, integration, and coordination of risk information and prepare ECSE Project Level Risk reports for review at PRMT meetings.
- Coordinate the performance of Monte Carlo analysis when required.
- Develop and maintain the risk management infrastructure (plans, procedures, database, training, etc.).

Project Component Leads

- Apply a routine, iterative risk management process.
- Perform risk screening to identify risks as they arise or as changes occur.
- Select Risk Handling Strategies and develop Risk Response Plans with input from project staff, along with identifying the resources required and provide justification for cost and schedule impacts for the recommended action(s).
- Ensure risk assessment documentation, within respective assigned area, is complete and current, and facilitate reviews.
- Facilitate effective implementation of the risk management program within respective project component including providing training as required for Risk Owners, Risk Response Plan Action Owners, and subject matter experts.
- Prepare project component risk reports and provide input to the Risk Manager for risk reporting at the ECSE Project level.
- Keep the Risk Manager informed of risk activities within Project Component.

Project Controls Manager

- Represent the Project Controls Group as their cognizant individual.
- Conduct cost and schedule estimate uncertainty & contingency analyses.
- Manage the development of project baseline estimates for appropriate activities, resources and costs for risk management activities, including Risk Response Plan actions, over the remaining project life cycle. Ensure Risk Response Plans are included in WBS.

Project Risk Management Team	• Review, evaluate, and advise the Project Director on matters that come before the PRMT. • Identify risks to successful project completion at the ECSE Project level and work with the Risk Manager to draft risks for consideration by the PRMT. • Review the ECSE Project-level risk register and progress for open risks. • Review and concur with approach for selection of ECSE Project-level risk handling strategies. • Review risk information and metrics. • Perform independent review of ECSE Project-level risks to ensure proper closure when recommended by the Risk Owner. • Review the overall risk assessment process and suggest enhancements as required. • Function as liaisons and promote communications between their organization and the PRMT.
Project Staff	• Identify risks to successful project completion and work with the Project Component Leads to draft risks for consideration by the PRMT. • Provide timely updates on Risk Response Plan status and progress to the Project Leads if a designated Risk Owner of a HIGH or MEDIUM risk, as determined by Figure 4 – Risk Level Determination Matrix. • Reassess the risk to confirm it has not changed or become a more significant risk to the project if a designated Risk Owner of a LOW risk, as determined by Figure 4 – Risk Level Determination Matrix. • Actively work action items assigned to them and report on their progress at project action item status meetings if a designated owner of a Risk Response Plan action item. When an action item is closed, provide justification of closure to the Project Lead.

4.0 Risk Process

The overall risk management process that will be employed for the ECSE Project is illustrated in Figure 2 - Risk Management Overview. Risk management consists of four major processes:

- Identification;
- Evaluation;
- Handling; and

- Monitoring.

Risks will be identified for the

- ECSE Project Level (including Project Component Interfaces) managed by the Project Director; and
- Project Component Level (including system/sub-system level as appropriate) managed by the Project Component Leads.

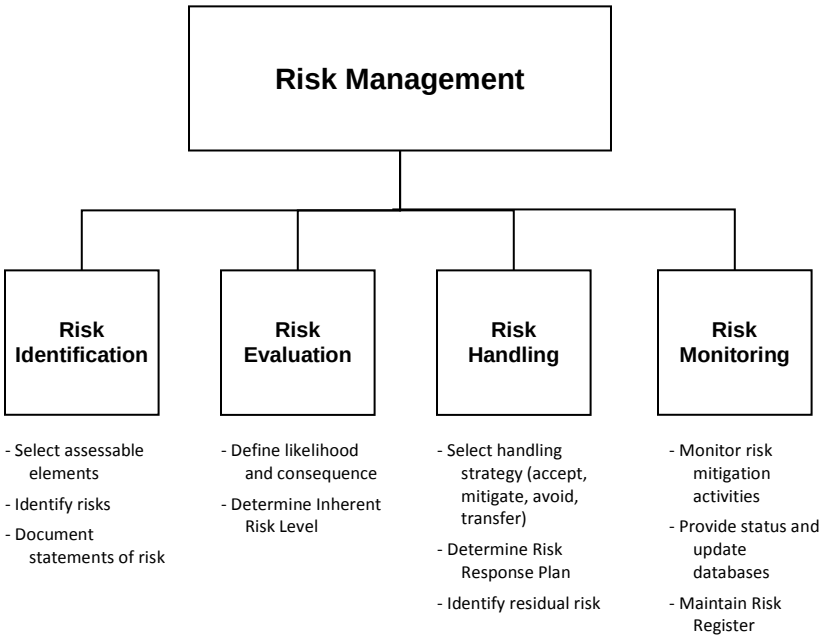


Figure 2 - Risk Management Overview

4.1 Risk Identification

Risk identification is an organized approach for:

- determining and selecting which events are likely to affect the project; and
- documenting characteristics of the events showing why identified events are considered risks.

Risk identification for the project will rely upon the skill, experience, and insight of project/functional personnel. Risks that are both internal (under project control) and external (beyond project control) will be identified.

Identification will be initiated by considering key areas in which risks may be encountered. Key sources of information or data to aid the risk identification process include, but are not limited to:

- *Activity (or Project) Descriptions* (scope statements, etc.). The complexity of an activity will have a major effect. For example, a project involving proven technology may have significantly less risk when compared to a project involving new technology. New technology may require extensive development and thus have a higher risk.
- *Other Activity (or Project) Planning Documents*. The WBS may provide visibility into new innovations not readily extracted from scope statements, statements of work, etc. Cost and/or schedule estimates, as they develop and evolve, may provide greater insight into risks. Procurement plans may identify unusual market conditions, such as regional sluggishness or lack of multiple suppliers or material cost fluctuations. Quality Assurance Programs, Operability and Maintainability Assessments, and Safety, Security and Environmental Assessments will all identify potential areas of risk to the project. Other sources include experience with similar projects, lessons learned, etc. Outputs from trend meetings, where variances in cost and schedule are discussed can be invaluable in uncovering negative trends in project activities.
- *Historical Information*. This information can be extracted from previous project files, lessons learned, personal remembrances, and commercial databases.

Use of a risk categories list, or risk breakdown structure, can be useful as a device to generate ideas and discussion regarding project risk (see Figure 3 – Sample Risk Categories List).

4.1.1 Project Component Level Risks

Risks will be identified independently for each project component. These risks are those that will be managed by the Project Component Leads within their own budget.

4.1.2 ECSE Project Level Risks

ECSE Project Level Risks will consist of cross-cutting, high-level programmatic risks that cannot be effectively managed at the project component level. In addition, risks identified as interface

risks between the project components or interactions between the DOE Complex sites involved in ECSE or with DOE/NNSA will be managed at the ECSE Project level.

Risk identification proceeds by clearly documenting the risks foreseen in each area. The results of the identification phase are clear statements of risks that include the following key elements:

- A **Risk ID**.
- The **WBS Element** impacted by the risk.
- A **Risk Title** that succinctly describes the event.
- A **Risk Statement** to include:

  Baseline - The normal situation for the element containing the risk or opportunity (e.g., assumptions, design basis).

  Event - Some incident, occurrence, circumstance, etc., that may happen that is different from the normal situation.

  Impact - A statement of what affect or result the event will or could have on the normal situation (including performance, cost, and schedule impacts).

  The risk statement is often phrased in the form of an "if… then" statement. "IF a certain event occurs, THEN the impact could be …"
- A **Risk Category**, e.g., Design, Procurement, Regulatory, Safety, Startup, Construction, External Interfaces. The project can create other categories deemed useful.
- A **Risk Owner** that reflects the person who will most actively manage the risk. Avoid assignment of multiple owners.

Design
- Undefined, Incomplete, Unclear Functions or Requirements
- Complex Design Features
- Numerous or Unclear Assumptions or Bases
- Reliability
- Inspectability
- Maintainability
- Safety Class
- Availability
- Errors and Omissions in Design

Regulatory & Environmental
- Environmental Impact Statement (EIS) Required.
- Additional Releases
- Undefined Disposal Methods
- Permitting
- State Inspections
- Order Compliance
- Regulatory Oversight

Resource/Conditions
- Material/Equipment Availability
- Specialty Resources Required
- Existing Utilities Above and Underground
- Support Services Availability
- Geological Conditions
- Temporary Resources (Power, Lights, Water, etc.)
- Resources Not Available
- Construction Complexities
  - Transportation
  - Critical Lifts
  - Population Density
- Escorts
- Personnel Training & Qualifications
- Tools, Equipment Controls & Availability
- Experience with System/Component (Design, Operations, Maintenance)
- Work Force Logistics
- OPC Resources
  - Operations Support
  - Health Physics
  - Facility Support
  - Facility Maintenance Centralized Maintenance
  - Construction Support Post Modifications
- Training
- Research and Development Support
- Multiple Project/Facility Interface
- Facility Work Control Priorities
- Lockout Support

Safeguards & Security
- Category I nuclear materials
- Classified process / information

Technology
- New Technology
- Existing Technology Modified
- New Application of Existing Technology
- Unknown or Unclear Technology

Procurement
- Procurement Strategy
- First-use Subcontractor/Vendor
- Vendor Support

Construction Strategy
- Turnover/Start-up Strategy
- Direct Hire/Subcontract
- Construction/Maintenance Testing
- Design Change Package Issues

Testing
- Construction
- Maintenance
- Operability
- Facility Startup
- System Startup (Subcontractor or In-house)

Safety
- Criticality Potential
- Fire Watch
- Exposure Contamination Potential
- Authorization Basis Impact
- Hazardous Material Involved
- Emergency Preparedness
- Safeguards & Security
- Confinement Strategies

Interfaces
- Multiple Agencies, Contractors
- Special Work Control/Work Authorization Procedures
- Operating SSCs Including Testing
- Multiple Customers
- Co-Occupancy
- Outage Requirements
- Multiple systems
- Radiological Conditions (Current and Future)
  - Contamination
  - Radiation
- Multiple Projects
- Proximity to Safety Class Systems

Management
- Funding uncertainties
- Stakeholders Program Strategy Changes
- Errors and Omissions in Estimates
- Fast track/critical need
- Infrastructure influence

Figure 3 – Sample Risk Categories List

Risk identification is an ongoing process. The identification process should be revisited at project team meetings. Cost, schedule, technical, and programmatic risks elements should be re-evaluated upon the following events in the project life cycle:

- significant changes to project scope, including the addition of major scope;
- reduction or addition of available resources or changes to the funding profile;
- delay or acceleration of the project schedule;
- significant changes to field conditions;
- realization that project baseline changes are imminent;
- changes to major procurement cycles; or
- as directed by senior management.

4.2 Risk Evaluation

Risk Evaluation is the process of evaluating the likelihood that a risk event will occur and assessing the range of possible consequences of that risk to the program. The quantification of risks as High, Medium, or Low will be accomplished by plotting a Risk Level for each identified risk. These risk levels will be determined based on five levels of likelihood that an event will occur (Table 1 - Likelihood Determination) and five levels of consequences (Table 2 - Consequence Determination) to the project if that event does occur. Whatever levels of likelihood and consequence are selected, the basis for those selections should be documented.

4.2.1 Establish Likelihood Levels

The likelihood of the risk occurring should be assessed in the absence of any risk handling actions; this requires judgement about the state that presently exists. Reviewers should read the definition corresponding to each level of likelihood on the appropriate charts and then select the level that most closely reflects their judgment.

Table 1 - Likelihood Determination

Likelihood (L)	Level	Definition
Nearly Certain	5	The event is expected to occur in most circumstances as there is a history of regular occurrence for similar projects/programs/facilities. Complex process or new technology and/or facilities that may exceed the state of the art. Impacting factors outside the control of organization. **>90% chance of occurrence.**
Highly Likely	4	There is a strong possibility the event will occur as there is a history of frequent occurrence for similar projects/programs/facilities. Will probably occur in most circumstances. Major facility and/or equipment development. Impacting factors outside the control of organization. **75% - 90% chance of occurrence.**
Likely	3	The risk might occur at some time as there is a history of casual occurrence for similar projects/programs/facilities. Modification of a technology or process at a site; new technology with moderate facility and/or equipment modifications. **The "broad middle group" 25% - 75% chance of occurrence.**
Unlikely	2	Not expected, but there is a slight possibility of occurrence. Routine process, suitable facilities exist with minor equipment modifications. **10% - 25% chance of occurrence**.
Very Unlikely	1	The risk may occur in exceptional circumstances. It could happen but probably never will. Routine process with existing technologies. No previous incidence of occurrence. **<10% chance of occurrence**.

4.2.2 Establish Consequence Levels

Following determination of the Likelihood Level, the risk will be assessed for the potential consequence or impact(s) expected as a result of the risk occurring in the absence of any risk handling action. Consequence impacts are described in terms of expected deviations from cost, schedule, and/or performance as a result of occurrence of the risk. If, for example, a risk has the potential to represent a significant impact to the schedule, but only a moderate impact to cost, the higher of the two consequences should be chosen. The risk can also be split and tracked as separate risks. This may be helpful if consequences are substantially different for cost, schedule, or performance. As with determining the Likelihood, many of the required judgements are subjective and the exact impact may not be provided in the guidelines.

Table 2 - Consequence Determination

Consequence (C)	Level	Definition
Severe	5	• Major additional funding required – *greater than $5M*. • Schedules cannot be adjusted within subsystem or system schedule to accommodate changes. Impact to milestones is expected and impact to project deliverable schedule may be expected, *greater than 6 months*. • *Unacceptable* performance will exist. Cannot meet or demonstrate performance to specifications. One or more key performance requirements cannot be met. Major system redesign is required. Will jeopardize program/ mission success.
Significant	4	• Additional funding required – *less than $5M*. • Schedules cannot be adjusted within subsystem or system schedule to accommodate changes. Impact to milestones is expected and impact to project deliverable schedule may be expected, but *less than 6 months*. • *Significant* degradation in technical performance will exist. Major subsystem or moderate system redesign is required. May jeopardize program/mission success.
Moderate	3	• Cost impact is handled within project component budget – *less than $1.5M*. • Schedule can be adjusted within subsystem or system schedule to accommodate changes with *less than a 3-month* reduction in float but with no impact to the overall project critical path. • *Moderate* degradation in performance will exist. One or more important performance requirements cannot be met. Moderate subsystem or minor system redesign is required.
Minor	2	• Cost impact is handled within project component budget – *less than $500k*. • Schedule can be adjusted within subsystem or system schedule with *less than a 1-month* reduction in float. • *Minor* degradation in performance will exist. All key and major performance requirements can be met. Minor redesign is required.
Minimal	1	• No cost impact, may involve a transfer of funds within the component or below, but budget estimates are not exceeded. • *No immediate schedule impact* on internal (subsystem, system, or component) schedule or float. • Performance requirements can be met. Redesign is not required.

4.2.3 Establish Risk Level

Once likelihood and consequence levels have been determined using Table 1 - Likelihood Determination and Table 2 - Consequence Determination above, the risk level can then be determined graphically using the risk chart shown in Figure 4 – Risk Level Determination Matrix. Each combination of likelihood and consequence will have a unique risk level ranging from 1 (lowest) to 25 (highest); levels are weighted toward higher consequence. Risk levels from 1 to 9 are "LOW" risks, risk levels from 10 to 16 are "MEDIUM" risks, and risk levels from 17 to 25 are "HIGH" risks. This risk level should be recorded in the risk register. Residual risk levels can be determined using the same method.

		Risk Consequence (C)				
	L / C	Minimal (1)	Minor (2)	Moderate (3)	Significant (4)	Severe (5)
Risk Likelihood (L)	Nearly Certain >90% (5)	5	13	18	23	25
	Highly Likely 75% to 90% (4)	4	11	17	21	24
	Likely 25% to 75% (3)	3	9	15	20	22
	Unlikely 10% to 25% (2)	2	7	12	16	19
	Very Unlikely <10% (1)	1	6	8	10	14

Figure 4 – Risk Level Determination Matrix

4.2.4 Quantitative Risk Analysis

Quantitative risk analysis determines the likelihood and quantifies the impact of cost or schedule overrun and performance nonconformance. Quantitative risk analysis is the process of doing the following:

1. Describing the project by its detailed parts (e.g., WBS-level costs, Critical Path Method, schedule tasks);

2. Making a model of the project by logically combining the individual detailed project parts (e.g., summation of costs, schedule logic for time, fault tree for reliability);
3. Interviewing or otherwise describing the uncertainty in the project parts (e.g., by specifying distributions of possible cost by element, duration by task, or reliability by component part); and
4. Using the model to derive the uncertainty of delivering the total project objective.

Quantitative risk analysis will (1) quantify the risk exposure for the project and determine the size of cost and schedule reserves that may be needed; (2) identify risks requiring the most attention by quantifying their relative contribution to project risk; and (3) identify realistic and achievable cost, schedule, or scope targets for the overall project. The risk rating and analysis results will be revisited during the project in order to detect changes and update the project risks.

The distinctions between quantitative and qualitative methods include the following: Quantitative analysis (1) quantifies the risks by specifying three-point estimates or other distributions of possible outcomes at the detailed level and (2) derives the total project risk implied by **all** the identified and quantified risks and the structure of the project plan (cost element, schedule, technical performance). Qualitative analysis (1) does not quantify the possible alternative results at the detailed level and (2) only derives the consequences for the project one risk at a time.

To support quantitative analysis, each risk needs to provide three-point estimates for cost and schedule. A three-point estimate is the best case (optimistic), most likely, and worst case (pessimistic) estimate for either cost or schedule if the risk is realized.

There are a number of methods available to the project for quantitatively determining the impact of risks. One method commonly employed is the Monte Carlo Simulation. This method is accomplished by determining a cost impact probability distribution for each risk. One of the most commonly used distributions is the “triangular” distribution consisting of three-point estimates for cost and schedule impacts. A three-point estimate is the best case (optimistic), most likely, and worst case (pessimistic) estimate for either cost or schedule if the risk is realized. The probability distributions are then combined statistically through a Monte Carlo process to produce the reserve estimate. The result of the simulation will be an overall project risk cost profile versus the probability of project success.

4.3 Risk Handling

Risk handling is the identification of the course of action (or inaction) that can be taken to effectively manage a given risk. Following the assessment of the likelihood of occurrence (L) and the potential impact of occurrence (C), a risk handling strategy and risk response plan can then be developed. When selecting a risk handling strategy, a determination must be made on how much influence handling actions can have on the Probability of Occurrence and the Consequence Impact. The objective of the risk handling strategy is to select the appropriate approach for the risk response plan - Avoid, Transfer, Mitigate, or Accept.

4.3.1 Risk Handling Strategy

The handling of risks is the process that will either ensure that a risk is acceptable to the project or make an unacceptable risk acceptable. The primary objective is to establish priorities and the level of effort required for handling of the individual risks. The following four strategies are the means to handle risks (see Figure 5 - Risk Handling Strategies). They are:

- **Avoid** – This strategy eliminates the source of the uncertainty. This is generally accomplished through a fundamental change in requirements, specifications, or design approach. An example would be to eliminate the requirement for an item to be able to withstand a specific severe environmental condition or move the item to a less severe environment. Avoidance actions should be taken only after a thorough evaluation of the potential effects on mission and/or functional capabilities has been made;
- **Transfer** - Transfer strategies involve the reallocation of risk from one party to another. Occasionally, this strategy is acceptable when a project scope with identified risks can be transferred to another project, especially when this same risk can be more easily handled within the receiving project. Transfer strategies are generally financial arrangements that require the payment of a risk premium to accomplish the transfer. Examples include fixed-price contracts and insurance arrangements such as performance bonds. The individual or organization receiving the risk must accept ownership of the risk transfer;
- **Mitigate** - Mitigation is a risk handling strategy taken to reduce the likelihood of occurrence of an identified risk, when it cannot be eliminated, and/or minimization of the impact of a risk should it occur.
- **Accept** - Acceptance indicates that the project has decided not to implement another handling strategy either because they cannot identify a suitable risk response plan or that the risk response plan would not be cost effective – particularly for low-level risks. The most universally used risk acceptance strategy involves the establishment of reserves or contingencies for time, funds, or other resources.

The selected handling strategy should be recorded in the risk register.

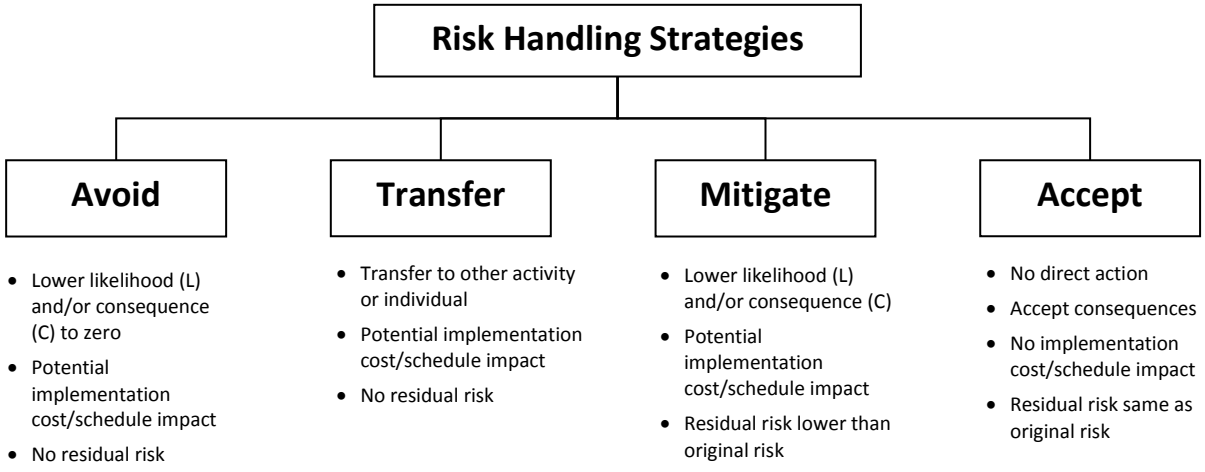


Figure 5 - Risk Handling Strategies

4.3.2 Risk Response Plans

A risk response plan is developed to implement risk handling actions and to document both the choice of strategy and the choice of action. Development of the risk response plan includes the following actions:

- Establish actions based on the risk handling strategy objective, including responsibility assignments for each Risk Actions Owner and schedule dates.
- Identify a trigger for event-based risks; this is an early warning sign that a risk is about to occur.
- Define risk response plan completion requirements.
- Identify and process any required trends/baseline change proposals to execute the risk response plan.

The risk response plan for each individual risk will be analyzed to ensure that it is feasible and that resources are available for its implementation. It will also be assessed for the potential of introducing additional risk by its implementation. Costs related to the implementation of risk response plans will be evaluated and added, if necessary, to the project baseline cost and incorporated in project action items. The risk response plan will be recorded in the risk register.

4.3.3 Residual Risk Evaluation

Once a risk handling strategy and a risk response plan are developed, it is important to determine any potential residual impact to project objectives resulting from the residual risk. The post-handling results are forecast as remaining residual risk. This is accomplished qualitatively using the same method as defined in Section 4.2.3 Establish Risk Level. The residual risk level should be recorded in the risk register.

Quantitative residual risk analysis is accomplished using the same method as defined in Section 4.2.4 Quantitative Risk Analysis, by determining a cost impact probability distribution for each residual risk. These probability distributions are then combined statistically through a Monte Carlo process to produce the reserve estimate. The result of the simulation will be an overall project risk cost profile versus the probability of project success that will be included in the Management Reserve calculations. A key component of the residual forecast also includes determining the appropriate time-phasing or distribution, by fiscal year, of the residual impacts and associated Management Reserve values. This allows for project information/metrics to be generated. The metrics can then be used to monitor the forecasted risk-based Management Reserve requirements and the overall confidence level for completing the project within the Total Estimated Contract Cost. This is done by estimating the distribution percentage(s) for the forecasted year or range of years for when the realization value for each risk could manifest itself. The result is a planned distribution profile by area and fiscal year used to plan and manage Management Reserve distribution for the life-cycle of the project.

4.4 Risk Monitoring and Reporting

4.4.1 Project Component Risk Monitoring and Reporting

Risk monitoring is the systematic review of the on-going implementation of the Risk Response Plans. Effective risk monitoring provides valuable information that assists with making timely decisions in advance of risk materialization. Risk discussions are a necessary element of risk communication and feedback and, as much as possible, should become a routine part of standard project progress meetings.

Discussion of the status of the risk should include more than whether the risk is open or closed. It may also include:

- Monitoring trigger events,
- Determining if risk response plans have been implemented as planned,
- Assessing if risk response plan actions are effective;
- Identification/emergence of new risks and/or risks that are being realized; and
- Reiteration of risk evaluations to current risks on a periodic basis for effecting changes to risk evaluation or response plans over time due to maturing data and events.

It could include items such as whether the trigger metric did or did not occur and the risk time has elapsed; the risk has significantly changed and is being entered as a new risk; the risk handling strategy is being modified; or other information that might highlight such items as a lessons learned or new risk item.

Risk reporting at the project component level will include:

- Status of project component risks, their risk response plan actions, and explanations of any significant changes;
- Identification of any new emerging risks; and
- Status of the remaining project cost and schedule reserve and explanations of any significant changes.

Risk reports will be submitted to the ECSE Project Director and be made available to the project team.

4.4.2 ECSE Project Risk Reporting and Tracking

The ECSE Risk Manager will produce a risk report for review at project status meetings of the PRMT. It will be the primary means of communication for the risk process and will be made available to project component leads. The risk report will include:

- ECSE Project-Level Risks
  - Identification of any new emerging risks;
  - Status of risks and explanations of any significant changes;
  - Review of risk response plan actions taken or due during the previous period and their effectiveness;
  - Brief of risk response plans due during the next period, including the responsible party; and
  - Status of the remaining project cost and schedule reserve and explanations of any significant changes;
- Project Component Risks – with input from Project Component Leads
  - Status of HIGH project component risks and explanations of any significant changes;
  - A description of any action requested of the Project Leaders by Project Component Leads in the management of Project Component-level risks.

5.0 References

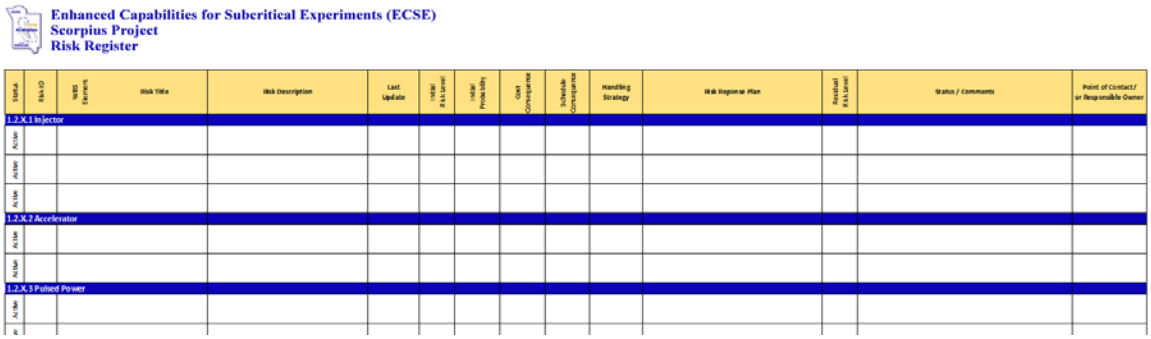
Document Number	Title
LANL AP-350-204	Risk and Opportunity Management
DOE O 413.3B	Program and Project Management for the Acquisition of Capital Assets
DOE G 413.3-7	Risk Management Guide

6.0 Attachments

Attachment	Title
1	Risk Evaluation Template
2	Instructions for Completion of Risk Evaluation Template

Attachment 1
Risk Register Template

For each risk, the risk register template shown below should be completed following the guidelines below. This template is an example and can be adapted to fit project needs.



Enhanced Capabilities for Subcritical Experiments (ECSE)
Scorpius Project
Risk Register

Status	Risk ID	WBS Element	Risk Title	Risk Description	Last Update	Initial Risk Level	Likelihood	Cost Consequence	Schedule Consequence	Handling Strategy	Risk Response Plan	Residual Risk Level	Status / Comments	Point of Contact / or Responsible Owner
1.2.X.1 Injector														
Active														
Active														
Active														
1.2.X.2 Accelerator														
Active														
Active														
1.2.X.3 Pulsed Power														
Active														

Figure 6 - Sample Risk Register

Attachment 2
Information to be tracked in Risk Registers

Below is a description of the risk information that should be entered into ECSE risk registers.

- A **Risk ID**.
- The **WBS Element** impacted by the risk.
- A **Risk Title** that succinctly describes the event.
- A **Risk Statement** to include:

  Baseline - The normal situation for the element containing the risk or opportunity (e.g., assumptions, design basis).

  Event - Some incident, occurrence, circumstance, etc., that may happen that is different from the normal situation.

  Impact - A statement of what affect or result the event will or could have on the normal situation (including performance, cost, and schedule impacts).

  The risk statement is often phrased in the form of an "if… then" statement. "IF a certain event occurs, THEN the impact could be …"
- A **Risk Category**, e.g., Design, Procurement, Regulatory, Safety, Startup, Construction, External Interfaces.
- A **Risk Owner** that reflects the person who will most actively manage the risk. Avoid assignment of multiple owners.
- An **Initial Risk Level** comprised of
  - **Initial Likelihood**
  - **Initial Consequence**
- Identify a preferred **Handling Strategy**
- A **Risk Response Plan** comprised of
  - **Risk Actions** based on the handling strategy objective, a single owner of each, and target completion dates.
  - **Risk Trigger(s)** that describe an event, occurrence, or sequence of events could provide an early warning that the risk may be about to occur
- A **Residual Risk Level**, assessed in the same manner as the Initial Risk Level, on that portion of the risk that remains after the implementation of the risk response plan. There is no residual risk for handling strategies of "Avoid" or "Transfer".
- A **Status** statement recorded whenever the risk is modified or discussed for the purpose of providing historical information on the evolution of the risk. Any details provided in this section will aid project personnel in seeing the evolution of the risk over time.