CA001.1 Identify and Manage Risks and Opportunities

Purpose

Provides instructions on identifying and managing risks and opportunities to establish a structured, consistent, and systematic way of making informed decisions using risk and opportunity-related information to minimize negative effects and maximize benefits.
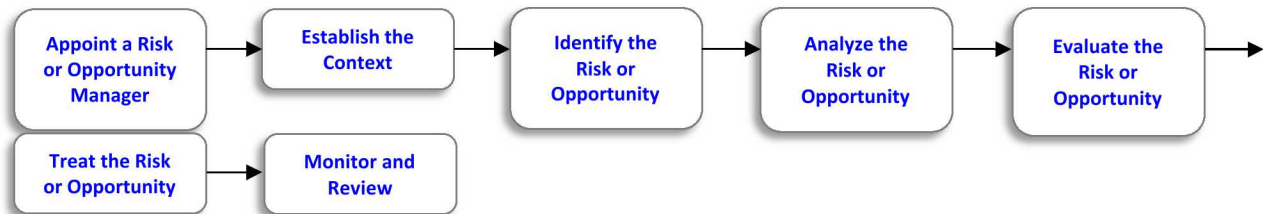
Applicability

This process applies to all Sandia National Laboratories (SNL) organizations, projects, all management elements, all SNL sites, and all Members of the Workforce.

Process Tables

Q1: What risk or opportunity management related task do you need to perform?

A1. Identify and Manage a Risk

A2. Identify and Manage an Opportunity

A3. Establish Cost and Schedule Contingency to Cover Impacts if a Residual Risk is Realized (As Applicable)

A4. Monitor, Review, and Close a Risk or Opportunity

Q1.A1: Identify and Manage a Risk

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┌─────────────┐   ┌─────────────┐   ┌─────────────┐   ┌─────────────┐   ┌─────────────┐
│ Appoint a Risk│→ │ Establish the │→ │ Identify the │→ │ Analyze the │→ │ Evaluate the │→
│ or Opportunity│   │   Context    │   │   Risk or   │   │   Risk or   │   │   Risk or   │
│   Manager    │   │              │   │ Opportunity  │   │ Opportunity  │   │ Opportunity  │
└─────────────┘   └─────────────┘   └─────────────┘   └─────────────┘   └─────────────┘

┌─────────────┐   ┌─────────────┐
│ Treat the Risk│→ │ Monitor and │→
│ or Opportunity│   │   Review    │
└─────────────┘   └─────────────┘
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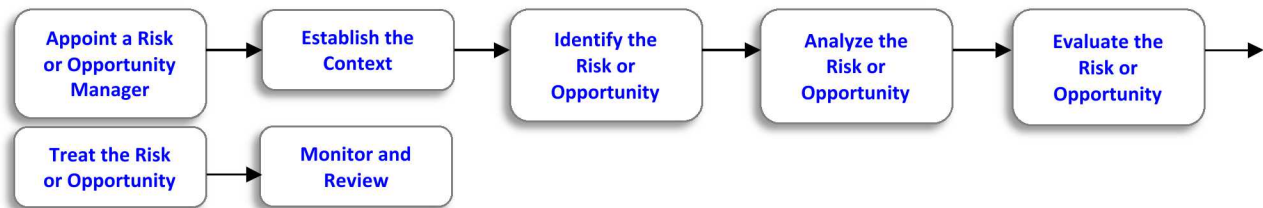| Sequence IDs	Responsible Party	Required Actions
Q1.A1.S1 Q1.A2.S1	**Appoint a Risk or Opportunity Manager**	

Q1.A1.S1.1
Q1.A2.S1.1
	Organization or Project Manager	• Appoint a Risk or Opportunity Manager who will serve as the subject matter expert (SME) and facilitator for risk and opportunity management for the organization or project.
		
		• An organization may be any organizational body at Sandia listed in the Sandia Organizational Directory. This entity may be an organization under a Manager, Senior Manager, Center Director, Associate Laboratories Director, Senior Directors, Deputy Laboratories Director, or Laboratories Director.
		
		• For some organizations and projects, as appropriate, the Risk or Opportunity Manager may be the Project Manager.
		
		• Do the following for communication and consultation:
		
		    o Identify stakeholders.
		    o Ensure that stakeholder interests are understood and considered.
		    o Solicit and consider differing views.
		    o Secure support and endorsement of stakeholders.
		    o Continue communication and consultation through the life of each risk.

Q1.A1.S2 Q1.A2.S2	**Establish the Context**	
Q1.A1.S2.1 Q1.A2.S2.1	Risk or Opportunity Manager (with assistance from members of the organization or project and the	Identify the external context of the risk or opportunity. This can include but is not limited to: • Legal and regulatory requirements. • Contractual requirements. • Stakeholders and their perceptions, values, and requirements.

Sequence IDs	Responsible Party	Required Actions
	Organization or Project Manager)	- Cultural, political, financial, technological, economic, natural, and competitive environments (international, national, regional, and local). - Key external drivers and trends impacting the organization or project.
Q1.A1.S2.2 Q1.A2.S2.2	Risk or Opportunity Manager (with assistance from members of the organization or project and the Organization or Project Manager)	Identify the internal context of the risk or opportunity. This can include but is not limited to: - Objectives of the organization or project. - Program and project delivery requirements. - Organizational governance, policies, and processes. - Perceptions, values, and culture of internal customers. - Available resources and knowledge base, information reporting flow requirements, and decision-making processes.
Q1.A1.S3	**Identify the Risk or Opportunity**	
Q1.A1.S3.1	Risk Manager (with assistance from members of the organization or project and the Organization or Project Manager)	Identify internal and external risks in risk meetings, held at least quarterly, and document them in the organization's or project's Risk/Opportunity Register: - Identify the risks associated with new mission assignments and discuss with stakeholders. - Identify risks from previous internal and external assessments. - Identify risks from existing or previous issues captured in Sandia's Assurance Information System (AIS) or Sandia's organizational/project risk tool. - Identify risks from Sandia's Lessons Learned System. - Use other methods to identify risks. See the Examples of Risks for more information.
Q1.A1.S3.2	Organization or Project Manager	Designate a Risk Owner to lead the effort to address the risk. - For some organizations and projects, as appropriate, the Risk Owner may be the same person as the Organization/Project Manager, the Risk Manager, or both. - Risks may be assigned by a higher-level manager to a lower-level organization or project. The organization or project assigned the risk will determine the Risk Owner. If risk lifecycle documentation responsibilities are delegated, accountability for managing the risk remains with the Risk Owner.

Sequence IDs	Responsible Party	Required Actions
Q1.A1.S3.3	Risk Manager	Record the risk title, risk description, and the Risk Owner in the organization's or project's Risk/Opportunity Register.
Q1.A1.S4	**Analyze the Risk or Opportunity**	
Q1.A1.S4.1	Risk Owner	• Identify the drivers to determine the potential for the risk occurring. • Identify if risk is systemic across several organizations. • Determine the likelihood of the risk occurring. The Risk Likelihood Descriptor provides a standardized way to determine the likelihood of occurrence. • Determine the consequence of the risk if it occurs (see the Risk Consequence Descriptor), factoring in that there may be multiple consequences. • The provided Risk Consequence Descriptor has been tailored specifically for Associate Laboratories Directors (ALDs), Senior Directors, the Deputy Laboratories Director, and the Laboratories Director, but can be applied wherever appropriate. Center, department, program, project, or activity/task levels may tailor their likelihood/consequence descriptors to match their unique requirements. • Risks that are escalated to ALDs, Senior Directors, or the Laboratories Director will require reevaluation using the provided risk likelihood/consequence descriptors. • Record the likelihood/consequence level in the organization's or project's Risk/Opportunity Register.
Q1.A1.S5	**Evaluate the Risk or Opportunity**	
Q1.A1.S5.1	Risk Owner	• Use the risk matrix to compare the selected likelihood and consequence rating to determine the risk level, which may be high, moderate, or low. • Prioritize risks based on their consequence rating. Consider legal, regulatory, and other applicable requirements when rating and prioritizing risks. • Factor in the level of risk tolerance by affected organizations or projects and customers to determine which risks need treatment and in what priority. • Determine if risk ownership needs to be escalated. This may be necessary if the risk is systemic and affects other parts of the Laboratories, or if higher managerial authority is required due to the scope or the cost to address.

Sequence IDs	Responsible Party	Required Actions
		• Record the risk level in the organization's or project's Risk/Opportunity Register.
Q1.A1.S6	**Treat the Risk or Opportunity**	
Q1.A1.S6.1	Organization or Project Manager	Designate a Treatment Owner to lead effort to identify treatment and prepare the treatment plan. • Treatment Owner may be the Organization or Project Manager, Risk Manager, Risk Owner, or otherperson depending on the nature and complexity of the risk. • If the risk affects more than one organization or project, more than one Treatment Owner may be identified.

Q1.A1.S6.2	Treatment Owner(s)	• Select the best risk treatment option(s) for the specific situation:
		   o **Avoid** the risk by not starting or by ending the activity if the risks outweigh the benefits of the activity.
		   o **Mitigate** the risk by identifying ways to reduce its likelihood or consequences.
		   o **Accept** the risk without further treatment. In this instance, the risk must be monitored.
		   o **Transfer** the responsibility to another party that is in the best position to address the risk.
		• Record the selected treatment option(s) in the organization's or project's Risk/Opportunity Register.

Q1.A1.S6.3	Treatment Owner(s)	Prepare the Risk Treatment Plan: • Document in the Risk Treatment Plan the chosen treatment option(s), why they were chosen, and how they will be implemented. Consider several treatment options that can be applied individually or in combination. • If the risk is systemic across several organizations, those organizations need to be involved in developing the treatment plan. • Define the scope of each treatment activity. • Identify the treatment task owner for each treatment activity (may be the primary risk Treatment Owner or one or more individuals assigned responsibility for each treatment activity). • Identify the cost of each treatment. • The Cost Estimating Tool (CET) provides assistance with determining treatment costs.

Sequence IDs	Responsible Party	Required Actions
		• More information about cost estimating is available in [FutureLink: <PPM001, *Program and Project Management Policy*>].
		• Identify the estimated completion date for each treatment.
		• Identify how the risk will be reduced to the projected level with implementation of each treatment.
		• Balance the cost and efforts of implementation against the benefits regarding legal, regulatory, mission, or other requirements to derive the best solution.
		• Determine if secondary risks are being introduced. Incorporate treatment for the secondary risks into the plan.
		• Clearly define the post-treatment residual risk level to give the decision-maker and stakeholders all necessary information before accepting the treatment plan.
		• Identify and document the individuals responsible for implementing the risk treatment plan.
		• For high consequence risks, consider whether the Risk Treatment Plan should undergo an independent review to ensure it will meet the treatment objectives.
		• Record the expected residual risk level in the organization's/project's Risk/Opportunity Register.
		The treatment plan should be integrated with existing processes at Sandia. Keep all stakeholders updated as necessary while implementing the treatment plan.
Q1.A1.S6.4	Organization or Project Manager	• Approve and implement the Risk Treatment Plan.
		Approval should be escalated if costs or other factors are beyond the authority of the Organization or Project Manager, or if treatment addresses a systemic risk and affects other organizations or projects.
		• Record the costs of implementing treatment in the organization's or project's Risk/Opportunity Register.
Q1.A1.S6.5	Treatment Owner	Execute the treatment plan.

Q1.A2: Manage an Opportunity

Sequence IDs*	Responsible Party	Required Actions
Q1.A2.S3	**Identify the Risk or Opportunity**	
Q1.A2.S3.1	Opportunity Manager (with assistance from members of the organization or project and the Organization or Project Manager)	Identify internal and external opportunities: • Identify the opportunities associated with new mission assignments and discuss with stakeholders. • Identify opportunities from previous internal and external assessments. • Identify opportunities from existing or previous opportunities captured in Sandia's Assurance Information System (AIS) or Sandia's organizational/project risk tool. • Identify opportunities from Sandia's Lessons Learned System. See Examples of Opportunities for more information.
Q1.A2.S3.2	Organization or Project Manager	Designate an Opportunity Owner to lead the effort to address the opportunity. For some organizations and projects, as appropriate, the Opportunity Owner may be the same person as the Organization or Project Manager, the Opportunity Manager, or both.
Q1.A2.S3.3	Opportunity Manager	Record the opportunity title, opportunity description, and the Opportunity Owner in the organization's or project's Risk/Opportunity Register.
Q1.A2.S4	**Analyze the Risk or Opportunity**	
Q1.A2.S4.1	Organization or Project Manager / Opportunity Owner	• Identify the reasons that the opportunity may be realized. • Identify if the opportunity can be realized across several organizations. • Use the Opportunity Likelihood Descriptor to determine the likelihood of the opportunity occurring. • Use the Opportunity Benefit Descriptor to determine the benefit of the opportunity if it occurs, factoring in that there may be multiple benefits.

Sequence IDs*	Responsible Party	Required Actions
		• Record the likelihood/benefit level in the organization's or project's Risk/Opportunity Register. Center, department, program, project, or activity/task levels may tailor their likelihood/benefit descriptors to match their unique requirements.
Q1.A2.S5	**Evaluate the Risk or Opportunity**	
Q1.A2.S5.1	Opportunity Owner	• Use the opportunity matrix to compare the selected likelihood and benefit rating and determine the opportunity level, which may be high, moderate, or low. • Prioritize opportunities based on their benefit level (high, moderate, or low). Consider legal, regulatory, and other applicable requirements when rating and prioritizing opportunities. • Determine which opportunities need treatment and the priority for treatment. • Determine if the opportunity ownership needs to be escalated. • Record the opportunity level in the organization's or project's Risk/Opportunity Register.
Q1.A2.S6	**Treat the Risk or Opportunity**	
Q1.A2.S6.1	Organization or Project Manager	Designate a Treatment Owner to lead the effort to identify treatment and prepare the treatment plan. Treatment Owner may be the Organization or Project Manager, Opportunity Manager, Opportunity Owner, or a new person depending on the nature and complexity of the opportunity.

Q1.A2.S6.2	Treatment Owner	• Select the best opportunity treatment option(s) for the specific situation:
		  o **Exploit** the opportunity to ensure that it happens. Determine that the timeframe for the return on investment justifies the expenditure to obtain the opportunity.
		  o **Share** the benefits of the opportunity between multiple parties.
		  o **Accept** the benefits if they occur but do not take direct action.
		• Record the selected treatment option(s) in the organization's or project's Risk/Opportunity Register.

Sequence IDs*	Responsible Party	Required Actions
Q1.A2.S6.3	Treatment Owner	Prepare the Opportunity Treatment Plan: • Document in the Opportunity Treatment Plan the chosen treatment option(s), why they were chosen, and how they will be implemented. Consider several treatment options that can be applied individually or in combination. • If the opportunity can be realized across several organizations, those organizations need to be involved in developing the treatment plan. • Define the scope of each treatment. • Identify the treatment owner for each treatment (if different from the primary opportunity treatment owner). • Identify the cost of each treatment. • The Cost Estimating Tool (CET) provides assistance with determining treatment costs. • More information about cost estimating is available in [FutureLink: <PPM001, *Program and Project Management Policy*>]. • Identify the completion date for each treatment. • Identify how the opportunity will be enhanced with implementation of each treatment. • Balance the cost and efforts of implementation against the benefits regarding legal, regulatory, mission, or other requirements to derive the best solution. • Determine if secondary risks are being introduced. Treatment for the secondary risks needs to be incorporated into the plan. • Clearly define the benefit and any residual risks after treatment to give the decision-maker and stakeholders all necessary information before accepting the treatment plan. • Identify and document the individuals responsible for implementing the opportunity treatment plan. • Identify the payback period on the investment (cost to implement/projected annual savings). The treatment plan should be integrated with existing processes at Sandia. Keep all stakeholders updated as necessary while implementing the opportunity treatment plan.
Q1.A2.S6.4	Organization or Project Manager	• Approve and implement the Opportunity Treatment Plan. Approval should be escalated if costs or other factors are beyond the authority of the Organization or Project Manager or if treatments affect other organizations or projects. • Record the costs of implementing treatment in the organization's or project's Risk/Opportunity Register.

Sequence IDs*	Responsible Party	Required Actions
Q1.A2.S6.5	Treatment Owner	Execute the treatment plan.

Q1.A3: Establish Cost and Schedule Contingency to Cover Impacts if a Residual Risk is Realized (As Applicable)

Q1.A3.1	Organization or Project Manager / Risk Manager / Risk or Opportunity Owner	These instructions only apply to organizations with scope, schedule, and cost baselines that need risk-based cost and schedule contingencies.
		• Enter the following additional information into the Risk/Opportunity Register for each risk or opportunity:
		o The percent likelihood of the residual risk occurring.
		o Cost impacts:
		▪ For risks, the best-case, most likely case, and worst-case cost impacts if the residual risk were to occur.
		▪ For opportunities, the best-case, most likely case, and worst-case cost benefit as a negative value (an opportunity cost savings is subtracted from a risk cost impact for an overall cost contingency).
		o Schedule impacts:
		▪ For risks, the best-case, most likely case, and worst-case schedule impacts if the residual risk were to occur.
		▪ For opportunities, the best case, most likely case and worst-case schedule benefit as a negative value (an opportunity schedule savings is subtracted from a risk schedule impact for an overall schedule contingency).
		• Enter the above information into a Monte Carlo software such as Oracle Crystal Ball to perform the analysis to establish the cost and schedule contingencies needed to address the residual risks while factoring in opportunities that have been realized by the organization or project.
		For more information about Monte Carlo analyses, see Monte Carlo Examples.

Q1.A4: Monitor, Review, and Close a Risk or Opportunity

Q1.A4.1	Risk or Opportunity	Throughout the implementation of the risk and opportunity management process:

	Manager / Risk/Opportunity Owners / Organization or Project Manager	• Ensure that risk and opportunity identification is effective in identifying emerging risks/opportunities. • Ensure that additional information is obtained to improve risk/opportunity assessments if reviews indicate that it is necessary. • Ensure that treatment is effective and efficient. • Identify changes in the external or internal context that may require changes in risk/opportunity assessments or treatments and priorities. • Monitor and review the implementation of risk/opportunity management and ensure that it is part of the decision-making process. • Monitor and review implementation of treatment for each risk/opportunity to ensure that treatment is effective. • If a risk is realized, it becomes an issue and transferred to the Sandia Assurance Information System (AIS) or Sandia's organizational/project risk tool. • When a risk is closed, record any lessons learned in addressing the risk in the Sandia Lessons Learned System.
Q1.A4.2	Risk or Opportunity Manager / Risk or Opportunity Owner	Close the risk or opportunity when one of the following conditions is true: • Risk has been eliminated. • The opportunity has passed or expired. • The conditions no longer exist (e.g., work stopped, work completed, technological changes, etc.). • Risk has been mitigated to a very low level and treatment monitoring has been institutionalized and regularly monitored. • The risk occurred and is now handled as an issue in AIS or Sandia's organizational/project issue management tool. • Risk has been merged into another risk. • Opportunity has been achieved. • Closed risks should be reevaluated at regular risk/opportunity meetings to determine if conditions have changed to warrant reopening the risk. These reevaluations should continue for as long as the risk has potential to recur. • Some risks should be placed on a watch list for long-term monitoring, even if mitigated for high risk, high hazard operations.
Q1.A4.3	Organization or Project Manager	• Approve risk closure. Closure approval should be escalated if the risk originated from a higher-level manager.

		• Record risk or opportunity closure in the organization's or project's Risk/Opportunity Register.

Requirement Drivers – Policies

- [FutureLink: <MA001, *Enterprise Risk, Opportunity, and Issues Management Policy*>]
- [FutureLink: <PPM001, *Program and Project Management Policy*>]

Resources

Related Processes

[FutureLink: <MA001.2, *Identify and Manage Issues*>]

Reference Documents and Supplemental Documents

- Examples of Opportunities
- Examples of Risks
- Monte Carlo Examples
- Opportunity Benefit Descriptor
- Opportunity Likelihood Descriptor
- Opportunity Matrix
- Risk Identification Methods
- Risk Likelihood Descriptor
- Risk Matrix

Forms and Templates

Risk/Opportunity Register

Systems, Applications, Websites

Sandia's Assurance Information System (AIS)

Tools

Cost Estimating Tool (CET)

Measures and Metrics

See Operational Management Review (OMR) Information.

Records Retention and Disposition Schedule

This process follows record series CP-101-227-000, *Policy System Documents*. See the Records Retention and Disposition Schedule to determine the retention requirements for records created when following this process. See IT010, *Manage Records Policy*, for additional information.

Training

N/A

Contacts

Process SME(s)	Policy Lead (PL)	Process Manager(s) (PRM)	Legal Advisor(s)	Policy Manager (PM)
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Exceptions

Exception requests to this process must be approved in advance by the Policy Manager, or the Process Manager, if delegated. Click the Exception Request button to begin an exception request.

Consequences

Process violations or failure to follow the Laboratory Policy System exception process may be cause for disciplinary action up to and including termination of employment.

Important Notice

A printed copy of this process may not be the version currently in effect. The official version is located on the Sandia National Laboratories Sandia Restricted Network (SRN). Refer to IT011, *Prepare and Release Information Policy*, before externally releasing any Laboratory Policy System document.

Metadata	
(will not appear in published text)	
Field	Values
Enterprise Taxonomy Area *For example: Management & Support Services, Financial Services, Human Resources/Workforce Management*	Mission Assurance
Original LPS Document Number	CG100.6.1
Keywords for Search *List words for controlled vocabulary search.*	