Risk, Issue & Opportunity Management Process

Prepared By: Martin Russell – Director IRCM Programs

Issued By: Carol Tomblin – Configuration Management

Authorized By: Tina Mooney – Director Quality Assurance

AMENDMENT SUMMARY

Rev	Date	Change Description
1	05 MAR 10	Initial issue
2	12 SEP 10	Update for lessons learned from initial Risk Management Plan execution
3	18 OCT 10	Added scope and related docs and forms to reference to ISO 9001:2008/AS9100/AS9110
4	06 JAN 11	Revised document to make it applicable to SELEX AS Registered (AS9100/9110) Sites usage (removed references to Huntsville).
5	19 DEC 17	Update to incorporate requirements of AS9100 Rev D
6	11 NOV 22	Update company name and logo. Minor wordage change
7	06 JAN 25	Update to combine best practices and include updated risk Assessment / Register template. Update to include guidelines for opportunities.

Table of Contents

1 Introduction

Programs and Projects within Leonardo Electronics US Inc. (LEI) are managed through a Life Cycle Management (LCM) process which comprises a series of Phase Reviews at key points during the lifetime of the Program or Project.

Risk Management is dealt with as an integral part of LCM. This ensures that risk is subject to independent assessment throughout the life of all programs. LEI operates in a high-risk industry, so the management of risk and opportunity is central to its operation. Risk management is therefore the concern of all levels of management in all parts of the Company.

This document sets out the Risk, Issue, and Opportunity (RIO) Management Process for all projects from the proposal phase through closure.

This document covers RIO as determined at the Organizational and Operational Process levels and will provide evidence of conformity to ISO 9001/AS9100/9110.

At the Organizational level RIO will involve areas such as the Quality Management System, strategic planning, new customers, business strategy, new market areas, etc.

At the Operational level RIO will be identified through expressions of severity and likelihood of having a potential impact to processes, products, services, customers, or end users.

Risk will be addressed using a risk-based thinking approach. Risk-based thinking ensures risk is considered from the beginning and throughout. Risk-based thinking makes prevention part of strategic and operational planning.

1.1 Process Approach

Processes can be managed using the Plan, Do, Check, and Act (PDCA) cycle as shown below:

- Plan – Set objectives and build processes necessary to deliver results.
- Do – Implement what was planned.
- Check – Monitor and measure processes and results against the objectives.
- Act – Take actions to improve results.

2 Scope

The objective of this standard is to provide reasonable and adequate guidance in the identification and control of RIO as well as the overall management responsibility.

This policy applies to all employees, to include temporary, contract and any representative acting on behalf of LEI.

This is achieved through the following objectives:

- Properly identify appropriate RIO including probability and severity.
- Assign specific owners with responsibility and accountability for robust analysis and evaluation.
- Thoroughly review and report.

Risk, Issues and Opportunities are defined as per below for the purpose of this policy:

Risk:
A risk is something unplanned that might happen that could have a negative impact on the project. A threat of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through preemptive action.

Issue:
An issue is something that is currently happening and is having a negative impact on the project. An event of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities.

Opportunity:
An opportunity is something unplanned that might happen that you could exploit to have a positive impact on the project. Also known as positive risk, is the possibility of a favorable outcome from an uncertain event.

2.1 Proposals

During proposal stages risk-based opportunities are assessed and mitigated, or accepted, during the proposal creation and review stage. These may or may not follow the full evaluation laid out in this document. The Program Manager, and review team, will determine the required evaluation.

All RIO identified are reported to the gate / phase review team for review.

3 Responsibilities

RIO at the organizational level is owned by Quality Assurance (QA). It is the responsibility of QA to use a risk-based thinking approach in planning to determine risk, issues and opportunities, considering the issues raised and requirements identified, to plan appropriate actions which will reduce undesired effects on the Quality Management System (QMS) and to evaluate the effectiveness of the system.

The planning will include opportunity to achieve improvements and an avenue to report the effectiveness of those improvements.

RIO at the operational process level is owned by Project / Program Management (PM) and supported by Integrate Product Team (IPT). RIO's are identified using a risk-based thinking approach by the PM and other cross functional team members as appropriate to form a Risk Management Board which shall include auditing risk registers, action / mitigation, and contingency plans.

Specific Program / Project Tailoring shall be described in the Program / Project Management Plan.

Other areas of Organizational risk such as Disaster Recovery and Contingency Planning is a shared responsibility between Quality Assurance and Operations Management.

3.1 RIO Management Boards

PM will establish and lead cyclic RIO management boards to ensure that current RIO's are managed, and the new RIO's are identified. PM will determine the appropriate cycle for these meetings as well as identify the required board members from among the project team. Reviews are typically held every 3 months.

Outcomes of the Risk Management Boards include:

- Creation / Updates to the RIO Register.
- Creation / Updates of Action / Mitigation / Contingency plans (As required).
- RIO Report (Submitted as part of the Program Management Review).

The minutes from these reviews shall be recorded using **BMS.RM.01 Appendix 1 Review Minutes**.

The review minutes shall record:

- Review Date.
- Attendees. (Review board members)
- New, Modified and Retired ROI's.
- Open Actions from review.

4 Related Documents & Forms

AS9100 / AS9100	Aerospace Standard
BMS.PM.01	Operations Lifecycle Management (LCM)
BMS.PM.04	Project Management Policy
BMS.RM.01 Appendix 1	Risk, Issues and Opportunities Register Template
BMS.RM.01 Appendix 2	Top Ten Risk Summary Template
BMS.RM.01 Appendix 3	Risk Action Plan Template
QP019	Documented Information

5 Abbreviations & Definitions

5.1 Abbreviations

ALARA	As Low As Reasonably Achievable
PMR	Project / Program Review
LCM	Life Cycle Management
SWOT	Strengths, Weaknesses, Opportunities, Threats
PM	Project Management or Program Management
LEI	Leonardo Electronics US Inc.
PDCA	Plan, Do, Check, Act
QMS	Quality Management System
QA	Quality Assurance
RIO	Risk, Issue and Opportunity

5.2 Definitions

Probability: Is the likelihood of occurrence.

Severity: Is the impact on technical performance, schedule or cost due to the risk, severity is the larger of the three impacts.

Risk Score: Probability x Severity. (Likelihood x Impact)

As Low As Reasonably Achievable (ALARA): This means that we reduce risk only to the point where further ‘control/s’ do not become grossly disproportionate to any achievable benefit.

Risk: A risk is something unplanned that might happen that could have a negative impact on the project. A threat of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through preemptive action.

Issue: An issue is something that is currently happening and is having a negative impact on the project. An event of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities.

Opportunity: An opportunity is something unplanned that might happen that you could exploit to have a positive impact on the project. Also known as positive risk, is the possibility of a favorable outcome from an uncertain event.

6 Risk, Issues and Opportunity Management Policy Overview

The five process components are described in the following sections at a level designed to establish a foundation for consistent risk management practices across the company:

1. Identify
2. Analyze
3. Evaluate
4. Mitigate / Promote
5. Report

The process outline, in figure 1 below, provides the context for the descriptions that follow. The mirrored halves of the diagram recognize that the same process is applicable to the active management of risk, issues and opportunity.

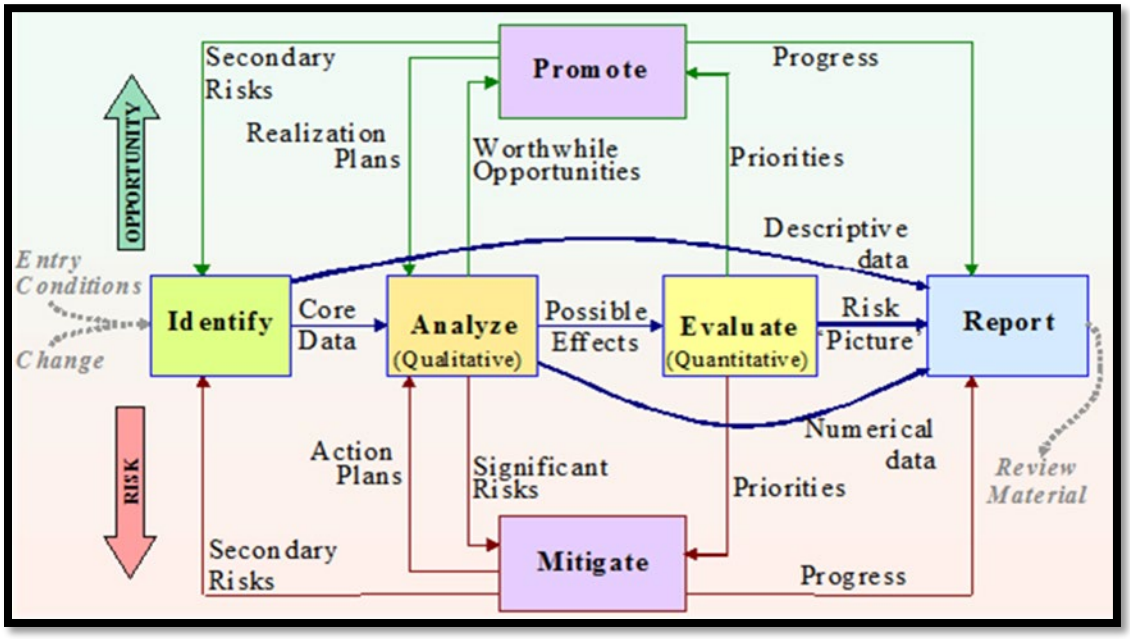

Figure 1. Risk Process Outline

The principal objectives of this RIO Management Plan are to ensure there is a consistent and robust management approach to identification and control of projects which will lead to project success. This is achieved through the following objectives:

- Clearly identify overall risk management responsibility.
- Properly identify appropriate risks, issues, and opportunities including definition of likelihood and consequences.
- Assign specific RIO owners with responsibility and accountability for analysis, mitigation, and effective control implementation.
- Conduct robust RIO analysis and evaluation,
- Establish, cost, and accept mitigation of risk.
- Exploit Opportunity in a similar robust way.
- Thoroughly review and report RIO to upper management and customers as required.

6.1 Identification

Risks, Issues and Opportunities shall be documented using RIO Register form **BMS.RM.01 Appendix 1**.

The process used for RIO Identification shall involve all key members of the project / program team. (Risk Review Board).

RIO Identification is based on, but not limited to, all or any of the following techniques: Brainstorming, Interviews with key staff, Checklists, SWOT, Prompt Lists Stakeholder Analysis, Crawford Slip Method, Monitoring of project progress, Assumptions analysis and Peer Reviews of project.

The RIO's identified in this manner are assembled in the risk register, which identifies the following:

- ID (Reference Number / Unique Identifier)
- Description
- Owner

RIO's shall be documented through carefully constructed wording of using the following form of description:

Risk:
"There is a risk that (event)……..,
Caused by (probability)…….,
With the effect of (impact)……"

Issue:
"There is an issue that (event)……..,
Caused by (probability)……,
With the result of (impact)……"

Opportunity:
"There is an opportunity that (event)……..,
Caused by (probability)……,
With the effect of (impact)……"

Rarely is an RIO a simple case of one singular cause resulting in one singular effect. More frequently, many contributing factors tend to line up in a certain way to create the RIO.

Be sure to record enough information to describe each RIO without getting overly detailed.

Each RIO must be assigned to an owner who understands the RIO, has an interest in its resolution and can lead the analysis and all further activity.

Note: The risk register should include a method of retiring and archiving RIO's for historical purposes. (Status = Active / Retired).

6.1.1 Exceptions

After initial identification, the risk management board reviews potential risks to remove irrelevant issues and approve further analysis and planning for those that remain. The Project Manager assigns a threshold value (e.g., $5K or 0.1% of the residual contract value), below which risks are categorized as baseline uncertainties and not subjected to further analysis. If the volume of these lower-level risks exceeds a reasonable aggregate threshold, liability limits may be reevaluated to prevent excessive exposure.

Risk analysis and mitigation or elimination must be performed on any risk that is deemed flight / life critical, regardless of estimated value or remote likelihood of occurrence.

6.1.2 Opportunity and Benefits

Proposed opportunities should provide benefits to LEI and the customers. Customer benefits are typically the potential to better manage costs and improve schedule.

Identifying opportunities starts with an active search for potential enhancements within the program's technical mission and stakeholder objectives. As opportunities are found or identified, the program evaluates the likelihood and potential benefits as well as the risks involved.

Candidate opportunities should be evaluated for costs, benefits, and potential risks before they are approved. If approved, the program should develop an opportunity management plan outlining how it will take advantage of the opportunity while continuing to manage risks and issues.

Opportunities may be identified before program execution and should be sought across the program life cycle. Sources of opportunities include system and program changes that yield reductions in total ownership cost.

Management options should be evaluated in terms of cost, schedule, and performance potential benefits and risk, and the best option (or hybrid of options) selected. These options include:

- **Pursue now** – Fund and implement a plan to realize the opportunity. (Determination of whether to pursue the opportunity will include evaluation of the return of any investment when the opportunity would be realized, the cost, additional resources required, risk, and time to capture.)
- **Defer** – Pursue/cut-in later; for example, request funds for the next budget and request the S&T community mature the concept.
- **Reevaluate** – Continuously evaluate the opportunity for changes in circumstances.
- **Reject** – Intentionally ignore an opportunity because of cost, technical readiness, resources, schedule burden, or low probability of successful capture.

Given the selected option, the program should then choose an implementation approach.

6.2 Analysis

RIO analysis is qualitative and comprises qualifying and prioritizing the RIO that have been identified.

The analysis process consists of 2 key steps:

1. Scoring the probability (Likelihood) of each RIO against a defined matrix.
2. Scoring the severity (Impact) of each RIO against a defined matrix.

The RIO Register uses the highest-ranking impact between Technical Performance, Schedule, and Cost to ascertain the RIO score. (RIO Score = Probability x Severity).

6.2.1 Risk Probability

Risk probability is the likelihood of occurrence, as defined below:

Probability Rating	Probability Level	Probability Description
1	Low	Very Unlikely or little or no chance of incident occurrence
2	Minor	Unlikely or less than 50/50 chance of incident occurring.
3	Moderate	Possible or approx. 50/50 chance of incident occurring.
4	Major	Likely or more than 50/50 chance of incident occurring.
5	Significant	Very Likely or almost inevitable.

6.2.2 Issue Probability

All identified “issues” shall be rated as “5” Significant. (The event has occurred).

6.2.3 Opportunity Probability

Opportunity probability is the likelihood of occurrence, as defined below:

Probability Rating	Probability Level	Probability Description
-1	Low	Unlikely to achieve the opportunity, no known processes or alternatives are available.
-2	Minor	Existing approach and processes cannot achieve the opportunity, but alternative approach(es) might.
-3	Moderate	Existing approach and processes may achieve the opportunity, but alternative approach(es) may be required.
-4	Major	Existing approach and processes may achieve the opportunity based on similar cases.
-5	Significant	Expected to achieve the opportunity based on the existing approach and processes.

Opportunity is scored as a negative due to being classed as a positive risk with a benefit to the project.

6.2.4 Risk and Issue Severity

Risk and issue severity is the negative impact on technical performance, schedule or cost due to the impact level as defined below:

RIO Score	Impact Level	Description	Technical	Schedule	Cost*
1	Low	Project/Program success not impacted.	Technical Goals will still be met	Schedule will still be met.	<=0.1%
2	Minor	Negligible impact to project/program success.	Minor performance shortfall, no design or process change required.	Schedule will slip but all key milestones met.	<=1%
3	Moderate	Limited impact to project/program success.	Moderate performance shortfall, minor design or process change required.	Some key dates missed; workarounds available, Critical path not affected.	<=5%
4	Major	Project/Program success could be jeopardized.	Unacceptable performance shortfall, major design or process change required.	Critical path affected; workarounds available, Key Milestones not affected.	<10%
5	Significant	Project/Program success in doubt.	Unacceptable performance, workarounds not available.	Cannot achieve major milestones; re-baseline of IMS required.	>=10%

*Note: Cost Impact shall be the estimated cost if the risk is seen against the remaining fiscal year / contract period budget as a percentage.

6.2.5 Opportunity Severity

Opportunity severity is the positive impact (Benefit) on technical performance, schedule or cost due to the impact level as defined below:

RIO Score	Impact Level	Technical*	Schedule*	Cost*
1	Low	Slight increase to claimed benefits.	Slight acceleration of schedule, but key milestones not affected.	<=0.1%
2	Minor	Some increase to claimed benefits.	Some acceleration of schedule, but key milestones not affected.	<=1%
3	Moderate	Moderate increase to claimed benefits.	Acceleration of schedule, critical path moderately improved.	<=5%
4	Major	Major increase to claimed benefits.	Major acceleration of schedule, critical path optimized.	<10%
5	Significant	Significant increase to claimed benefits.	Significant acceleration of milestones, re-baseline of IMS required.	>=10%

*Notes:
Schedule benefits may not be applicable if the customer does not allow early delivery / execution. In this case then select “Low” impact for schedule impact.

Cost benefits may not be applicable for the customer for Firm Fixed Price contracts. These should still be treated as internal opportunities for LEI based on the cost possible savings.

Technical Benefits may not be applicable for the customer if the benefit is not a technical requirement / benefit the customer can or will use. In this case then select “Low” impact for technical impact.

6.3 Evaluation

Evaluation is quantitative and comprises assessing risk and opportunity effects on project objectives and producing predictions on their individual Technical Performance, and collective time and cost implications.

The aim is to represent the risk position with as much clarity and confidence as possible.

Quantitative RIO Evaluation is undertaken estimating the Technical Performance Impact, Schedule Impact and Cost impacts. This will determine an overall RIO score for reporting purposes.

The evaluation process consists of:

a) The risk management board reviews the risks to eliminate spurious issues and approve risk strategy for those that remain.
b) The risk strategy is determined for each risk.
    i. The risk strategies shall be implemented using “As Low As Reasonably Achievable” (ALARA). This means that we reduce risk only to the point where further ‘controls’ do not become grossly disproportionate to any achievable benefit.
c) Create Action / Mitigation / Contingency Plans as required.

Note: During the evaluation process the RIO Matrix should be used to further evaluate the identified events and required actions.

6.3.1 RIO Matrix

The RIO Matrix shows the count of the relevant risks scores from the ROI register. Deriving risk/opportunity factors (or Criticality Scores) from the graded probability and impacts. The RIO Matrix criticality and actions are shown below:

Risk & Issue Matrix		Impact (Severity)				
		Low (1)	Minor (2)	Moderate (3)	Major (4)	Significant (5)
Likelihood of Occurrence (Probability)	**Significant (5)** Almost inevitable that an incident would result	5	10	15	20	25
	Major(4) More than 50/50 chance of occurring	4	8	12	15	20
	Moderate(3) 50/50 chance of occurring	3	5	9	12	15
	Minor (2) Less than 50/50 chance of occurring	2	4	6	8	10
	Low (1) Little or no chance of occurrence	1	2	3	4	5

Opportunity Matrix		Impact (Severity)				
		Low (1)	Minor (2)	Moderate (3)	Major (4)	Significant (5)
Likelihood of Occurrence (Probability)	**Significant (5)** Almost inevitable that an incident would result	-5	-10	-15	-20	-25
	Major(4) More than 50/50 chance of occurring	-4	-8	-12	-15	-20
	Moderate(3) 50/50 chance of occurring	-3	-6	-9	-12	-15
	Minor (2) Less than 50/50 chance of occurring	-2	-4	-6	-8	-10
	Low (1) Little or no chance of occurrence	-1	-2	-3	-4	-5

6.3.1.1 RIO Actions

The below actions should be taken regarding the identified RIO's.

Class	Required Action
Low Risk	Generally acceptable risk, no action required.
Med Risk / Issue	Review risks and issues in accordance with ALARA to see if risk can be reduced.
High Risk / Issue	Review risks and issues in accordance with ALARA – Mitigation / Contingency Plan Required.
Low Opportunity	Negligible impact, no action required.
Med Opportunity	Review opportunity to see if benefit can be increased to High.
High Opportunity	Optimized Technical Performance, Increased Cost Benefit, or Schedule Acceleration. No action required.

* ALARA stands for "as low as reasonably achievable."

6.3.2 RIO Strategy

After the initial evaluation has been undertaken, the RIO strategy is determined for each identified RIO, and mitigation plans are identified for each specific RIO as required and entered on the register. RIO strategies to be considered are:

- Mitigation: Reduce risk by action.
- Transference: Transfer Risk to other party.
- Avoidance: Implement Action Plan to Avoid.
- Acceptance: Accept as is.
- Contingency Plans: Plan for failure.

Ascertaining appropriate strategies and the associated likelihood of success, and related costs to implement the strategy is paramount to success.

In certain situations, the strategy selected will require significant resources and will require project managers to establish formalized action plans. In these cases, the risk register will reference the action plan.

6.3.2.1 Mitigation Strategy

For risks where the impact or probability can be lessened by reasonable actions, mitigation steps will be established and put in place.

Where there are minor actions with low cost and schedule impact, PM may list the action steps in the risk register. Mitigation strategy on the risk register will include:

- Description of the planned activities.
- Clear ownership of activity.
- Estimated cost to implement and reduced risk or increased opportunity impacts.

In certain situations, mitigation actions will require significant resources and will require project managers to establish formalized mitigation plans. In these cases, the risk register will reference the mitigation plan. Using **BMS.RM.01 Appendix 3**, Risk Action Plan Template.

The components of the mitigation plan should include:

- Description of the planned activities.
- Clear ownership of the planned activities.
- Start date for the plan or trigger events that would cause the plan to be put into effect.
- Budget, the costs of carrying out the plan including resources that will be needed.
- Consideration of secondary risks generated by the plan.

Risk mitigation activities should be scheduled into the programs Integrated Master Schedule (IMS).

The risk register will include a reassessment of the criticality/severity of a risk after the mitigation plan has been executed. Estimating the post-mitigation probability and the impact on technical performance, cost, and schedule with a “Acceptance” strategy.

6.3.2.2 Transference Strategy

Risk transference where possible, risk may be transferred to a third-party using Firm Fixed Price Contracts, insurance or terms and conditions.

If the Risk Management Board identifies a use for this strategy, the risk will be retired once transferred.

6.3.2.3 Avoidance Strategy

Risk avoidance is the removal or the situation where the risk could take place. It usually involves changing a project's execution strategy to select a lower risk option. Where these are minor actions with low cost and schedule impact, project managers may list the mitigation steps in the risk register otherwise an Action Plan is required detailing the avoidance requirements.

The risk register will include a reassessment of the criticality/severity of a risk after the avoidance has been executed. Estimating the post-mitigation probability and the impact on technical performance, cost, and schedule.

If the Risk Management Board identifies a use for this strategy, the risk will be retired once avoided.

6.3.2.4 Acceptance Strategy

Risk acceptance will be used whenever the cost to manage the risk exceeds the impact of the risk itself.

As Low As Reasonably Achievable (ALARA): This means that we reduce risk only to the point where further 'control/s' do not become grossly disproportionate to any achievable benefit.

No further action shall be required.

6.3.2.5 Contingency Strategy

In some cases, there will remain a significant residual risk after mitigation. In these cases, the risk management board must decide whether a contingency plan should be developed for execution if the corresponding risk occurs, the remaining risk shall be re-evaluated post plan and actioned accordingly.

An estimate of the cost to execute the contingency plan is considered and reviewed.

The funding to execute the plan must be considered in the projects Estimate At Completion (EAC).

6.4 Reporting

Results from risk meetings will be communicated to top management and to relevant parties (Stake holders / customers / suppliers) who could be impacted by those risks as required by contract in accordance with **BMS.PM.04**, Project Management Policy.

The minutes from these reviews shall be recorded using **BMS.RM.01 Appendix 1 Review Minutes**.

6.4.1 Internal Reporting:

RIO shall be presented as part of the Monthly Program Management Review (PMR) to management.

A Top Ten Risk Summary, **BMS.RM.01 Appendix 2** may be used as necessary to present the Top Risks with open mitigation / / contingency action plans at each PMR for visibility of status and progress. The selection of the most significant risks is based upon the ROI Matrix score.

6.4.2 External Reporting:

Shall be in an agreed format as per the relevant Program Management Plan (contract or statement of work), if required.

6.5 Basic Guide

How do I start identifying my risks?
First, you need to examine your operations, seek out potential hazards within those operations and categorize them.

How do you do this?
By asking. You can survey and audit your operations, like you normally would, but figure out the potential hazards from all areas of the business.
Think about the problems that could occur, and how likely they are to occur. You'll probably get a lot of hazards, and a host of probabilities. The key is to collect and analyze the hazards and then categorize them.

Evaluating the risks?
When doing this, keep in mind that risk evaluation and risk assessment are not automatic. Math is tricky; it doesn't always solve the problem, especially in operations.

The reality is that the tool (**BMS.RM.01 Appendix 1 Risk Register / Matrix**) is there to help you guide your decisions and risk calculations, but the ultimate decisions on how to handle risk should come from people / experience.

This is done by gathering as a risk review board (team) and reviewing risk calculations to confirm that the probability and Impacts reflect what will be done in the real-world. The treatment of risk should be a combination of people, process, and tools.

Strategy?
The next step is to determine what you're going to do if there is a risk. This is where a cross-functional team comes in handy to review the different risk outcomes, and then determine how you're going to handle different risk levels.

The takeaway here is that risk is not just something that stands on its own and is automatic; it is a calculation of hazards and the likelihood of that hazard manifesting itself.

The key is that when you know your hazards, and you can estimate the probability of those hazards and the impacts, then you have risk management in place.

7 Records

Records will be maintained in accordance with QP019 Documented Information.