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PROJECT RISK MANAGEMENT

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Revision Summary

Revision Number	Date	Comments
R000	2019-03-26	Initial issue.
R001	2019-11-12	Removed duplication page in Appendix A
R002	2020-9-30	Removed and Replaced RMO with ePMX, added management of actions and issues, removed Risk department involvement with A level Gate 1 Risk Identification workshops, Removed impact criteria and replaced with RBS Category, added escalation of risks to portfolio level, added Portfolio Level assessment matrix, Schedule contingency for level A projects in Gate 2 made optional requirement

1.0 DIRECTION

All projects are inherently risky as they are unique undertakings with varying degrees of complexity. Project risk management aims to keep project risk exposure within an acceptable range by reducing drivers of negative variation, promoting drivers of positive variation, and maximizing the probability of achieving overall project objectives. Risk management is essential to successful project management and is applicable in every phase and every process group.

This document receives authority from Project Management standard [R1] and is a component of the overall Enterprise Project Management governance framework. The Enterprise Project Management governance is applicable to all projects planned and executed within OPG.

Each project needs to fulfil the specific risk requirements for the different project levels as defined in the Scalable Project Delivery Model [R2]. This includes the use of established Project Management Information Systems (PMIS) tools and software for managing related project work.

> The Scalable Project Delivery Model [R2] provides a scaled application of project management principles and processes reflective of a projects complexity and cost. The model provides the minimum requirements for a project by knowledge area. It is expected that Project Managers will apply the intent of the knowledge area and exceed the minimum requirements as appropriate. The Business Unit Execution Line Management and/or Project Management Office may define additional requirements based on the specific project and portfolio requirements.

All project information and documentation that does not exist within PMIS should be maintained and stored within SharePoint in a standardized project working folder structure. Related project records and controlled documents should be managed in accordance with the Project Communication and Stakeholder Management manual [R3].

Note: ***Strategic Projects and/or Programs*** may have additional or varied expectations or requirements for projects within the program, and for the overall program itself. These should be documented in a project controls plan (or equivalent) for the program.

1.1 Overview

Risk exists at two levels within every project. Each project contains individual risks that can affect the achievement of project objectives. It is also important to consider the riskiness of the overall project, which arises from the combination of *individual project risks* and other sources of uncertainty. Project risk management processes address both levels of risk within projects, and these are defined as follows:

- ***Individual project risk*** is an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives.
- ***Overall project risk*** is the combined effect of uncertainty on the project as a whole, arising from all sources of uncertainty including individual project risks. It

represents the exposure of the project to achieving the project objectives as a result of all uncertainty, both positive and negative.

Project Risk Management is a systematic approach to planning, identifying, analyzing, responding, and monitoring project risks. It provides the basis upon which to estimate the amount of cost and schedule contingency that are needed to cover risk response actions to a required level of confidence for meeting project objectives.

The Project Risk Management processes are:

- Plan Risk Management (Section 2.1)
- Identify Risks and Issues (Section 2.2)
- Perform Qualitative Risk Analysis (Section 2.3)
- Perform Quantitative Risk Analysis (Section 2.4)
- Plan and Implement Risk Responses (Section 2.5)
- Monitor Risks and Issues (Section 2.6)

Details on the scaled application of the project risk management in relation to the project life cycle and *phase-gates* are provided in Appendix C.

Desktop guides and templates associated with this manual are available on the Enterprise Project Management website.

2.0 RISK MANAGEMENT PROCESS

2.1 Plan Risk Management

Plan Risk Management is the process of defining how to conduct risk management activities for a project. The key benefit of this process is that it ensures that the degree, type, and visibility of risk management are proportionate to both the risks and the importance of the project to the organization. This process is performed once or at predefined points in the project.

2.1.1 The *risk management plan* should be included in the project management plan (PMP) as per Project Integration Management [R4] manual, and assessed periodically throughout the project as needed.

2.1.2 The *risk management plan* should be tailored to the project, and commensurate of the project size, complexity, importance and development approach (e.g. waterfall or agile). The plan should describe how the risk management activities will be structured and performed, aligned with the requirements defined in the Scalable Project Delivery Model [R2]. This may include methodology, roles and responsibilities, timing (frequency of reviews), and monitoring and tracking method.

Projects that are considered first of a kind (FOAK) or first in a while (FIAW) are inherently more risky in comparison to frequently performed projects. As such, projects of this nature require heightened risk management awareness, execution and oversight which should be reflected in the risk management plan, risk, and associated risk response actions.

2.1.3 The *risk management plan* should reference the standardized Project Risk Assessment Matrix (Appendix A) and the Probability and Impact Matrix (i.e. heat map) (Appendix B).

2.2 Identify Risks and Issues

Identify risks is the process of identifying and documenting the characteristics of the *individual project risks* as well as sources of *overall project risk*. Risk identification is an iterative process, since new *individual project risks* may emerge as the project progresses through its life cycle and the level of *overall project risk* will also change. The frequency of iteration and participation in each risk identification cycle will vary by situation, and this will be defined in the *risk management plan*.

A project risk is an uncertain event or condition that, if it occurs, may have a negative effect on a project's objectives (*threat*) or a positive effect (*opportunity*). Both *threats* and *opportunities* are included within project risk management and the identification process.

An *issue* is a problem resulting from an event that has already occurred or will occur, which impacts the project objectives if not addressed. The Project Manager is responsible to identify and manage issues that may impact cost schedule or other aspects of the project. Examples of issues are problems, gaps, inconsistencies or conflicts that were identified or occur unexpectedly, as well as any risks that have been realized.

It is important to involve the project team (OPG and contractors as applicable) in risk identification activities so they can develop and maintain a sense of ownership and responsibility for identified individual project risks, the level of overall project risk, and associated risk response actions.

2.2.1 Risk identification activities should occur periodically through the project life cycle and, at a minimum, are an input into Project Phase-Gating [R5] requirements. Participants in risk identification activities may include the project manager, project team members, project risk management SME (if assigned), other subject matter experts, end users, other stakeholders, etc.

2.2.2 Project teams should review the PMP and other documents as inputs into the risk identification process. Relevant documents include:

- Project requirements (identify project objectives that contain potential elements of risk)
- Project schedule and cost management plans (identify areas that are subject to uncertainty or ambiguity)
- Project assumptions and constraints

- Project quality and resource management plans (identify areas that are subject to uncertainty or ambiguity, or where key assumptions have been made that might give rise to risk)
- Cost and duration estimates
- Operating Experience (OPEX) and lessons learned

2.2.3 Risk identification workshops should be performed on all level A and B projects during next phase planning (i.e. prior to project phase-gate decisions). For level A projects going through Gate 2 or 3 and projects that require Board approval, the workshops should be facilitated by a Risk Management SME from the Enterprise Project Management Office.

2.2.4 Project teams should record all identified risks within a risk register in accordance with the Scalable Project Delivery Model [R2]. The risk register captures details of identified individual project risks. The results of Perform Qualitative Risk Analysis, Plan and Implement Risk Responses, and Monitor Risks are recorded in the risk register as those processes are conducted throughout the project.

- **Project level A, B and C –** Project risks should be recorded and maintained in the Risk Module of the ePMX) tool which is a component of the PMIS framework.
- **Project level D –** Project risks should be recorded and maintained in the project teams working file SharePoint in the Risk Register template or equivalent (Refer to the Enterprise Project Management website).

2.2.5 The risk description recorded in the risk register should include the following:

- **EVENT –** The uncertain future event or condition which may or may not occur, but which would matter if it did occur.
- **CAUSE –** The event or circumstance which currently exists or is certain to exist in the future and which might give rise to the risk.
- **IMPACT** – The conditional future event or condition which would directly affect one or more project objectives if the associated risk occurs.

Note: the absence of any one of these critical items impacts the ability to accurately define an appropriate risk treatment.

2.2.6 Risk owners should categorize the risk event using the Risk Breakdown Structure (RBS) list (Appendix D) provided in ePMX. The RBS should be applied to categorize the EVENT, **not** the cause. This allows for trending of risks against a project or portfolio to understand common themes and trends.

2.2.7 Each project risk should be assigned a risk owner. The risk owner is responsible for ensuring that the risk response is appropriate and effective, and for planning additional risk responses if required.

2.2.8 Risk escalation is a process by which risks identified in a project that are significant enough that the events, activities or circumstances can adversely impact a portfolio and should be escalated to the appropriate level for oversight and management. Risks (for project level A, B, and C) that require escalation should be identified using the escalation checkbox within the risk module in ePMX. The portfolio manager should review these escalated risks and if agreed upon by the portfolio manager, create a portfolio level risk. The portfolio level risk will need to be assessed for probability and impact using the portfolio level assessment matrix (Appendix A). Certain elements of the risk may still be

managed at the project level, while the portfolio risk will be managed as per the Project Portfolio Management [R8] Manual.

2.2.9 The project manager may also document and track issues (realized risks or other problems) within the Issue module of ePMX. Information to include is issue description, priority, issue owner, recovery plan, actions to mitigate or respond to the issue, recovery date and status.

2.3 Perform Qualitative Risk Analysis

Perform *Qualitative Risk Analysis* (e.g. risk scoring) is the process of assessing and prioritizing risks. It is used to gain a better understating of individual risks, considering a range of characteristics such as probability of occurrence, degree of impact on project objectives, manageability, timing of possible impacts, relationships with other risks, common causes or effects, etc. The outputs from qualitative assessments form the basis for determining appropriate risk responses and lays the foundation for *quantitative risk analysis.*

2.3.1 Qualitative risk analysis should be performed regularly throughout the project life cycle, as defined in the risk management plan, for all project risks. The results of the process should be recorded in the project risk register.

2.3.2 Qualitative risk analysis should follow the following process:

- **Step 1:** Rate each risk based on its *probability* of occurrence and its potential *impact* in accordance with the standardized Project Risk Assessment Matrix (Appendix A). The impact rating should be assessed for both cost and schedule and the higher of the two ratings will drive the overall score.
- **Step 2:** Calculate the overall risk score by multiplying the probability rating by the highest impact rating (cost or schedule).

2.3.3 For project level A, B, and C, the risk score should be calculated for the following:

- **Current score** – Reflects the current state of the risk, and is reviewed and updated regularly per the requirements of the Scalable Project Delivery Model [R2].

  Current score = Current Probability x Current Impact (Highest)

- **Post score** – Post Score is used to specify the residual impact of the risk after all response strategy actions have been successfully implemented, and changes throughout the course of the life cycle of the risk.

  Post score = Post Probability X Post Impact (Highest)

Note: Once a risk has been set to active status, the current score is saved as a one-time assessment snapshot, kept as history for the baseline (initial) score of the risk. As the project progresses and actions to mitigate the risk are completed, the current score may increase or decrease.

2.3.4 For project level D, only the current score is required to be registered in the project risk register.

2.4 Perform Quantitative Risk Analysis

Perform *Quantitative Risk Analysis* is the process of understanding the combined effect of identified risks on the project outcome. *Quantitative risk analysis* takes into account probabilistic or project-wide effects, such as correlation between risks, interdependency, and feedback loops, thereby indicating the degree of overall risk faced by the project. The results of quantitative analysis should be used to focus the development of appropriate responses, particularly the calculation of required contingency. *Quantitative risk analysis* may be performed periodically throughout the project.

Quantitative risk analysis:

- Predicts likely project outcomes based on combined effects of risks
- Uses probability distributions to characterize the risk's probability and impact
- Uses the project schedule and cost estimates
- Uses a quantitative method, requiring specialized tools
- Estimates likelihood of meeting targets and contingency needed to achieve desired level of confidence
- Identified risks with greatest effect on *overall project risk*

2.4.1 *Quantitative risk analysis* should be performed on A, B and C projects that may require contingency funding as per the details of the Scalable Project Delivery Model [R2]. The two methods of analysis are:

- ***Expected Monetary Value (EMV)* (project level C) –** Performed by the project team, EMV allows the users to calculate the weighted average (expected) value of an event that includes uncertain outcomes. It incorporates both the probability and impact of the uncertain event. The output of EMV is the expected contingency required given the individual (discrete) project risks. EMV does not consider the schedule and cost uncertainty, and does not calculate schedule contingency. Additional details on how to perform EMV is included in Risk Register template (Refer to the Enterprise Project Management website).
- ***Monte Carlo/PERT Risk Modelling* (project level A and B) –** Performed by the PMO Risk Management SME based on project team schedule, cost and risk input. Contingency estimate for the project is calculated based on three contributors – discrete risks (known unknowns), *cost uncertainty* and *schedule uncertainty*. Monte Carlo is used primarily for project schedule and cost risk analysis in strategic decisions, and provides answers to:
  - What is the probability of meeting the project's objectives?
  - How much contingency (e.g. time and cost) is needed to provide the organization with the level of certainty it requires based upon its risk tolerance?
  - Which individual risks contribute the most to *overall project risk*?

  The project team should populate the Monte Carlo input file for each risk identified in ePMX with support from the PMO Risk Management SME. The Risk Management SME should perform the modelling and provide a summary to the project team and document the inputs and outputs in ePMX. (Refer to the

Enterprise Project Management website for the Monte Carlo input file).

2.4.2 The project team may engage the estimating subject matter experts in supporting the determination of the cost impact of a risk, and the evaluation of the cost uncertainty range compared to the project plan and estimate.

2.4.3 The project manager and PMO Risk Management SME should jointly conduct the risk contingency adequacy review (project levels A/B) and the Project Manager may consult with risk team for contingency adequacy review for project level C. The project should use Association for the Advancement of Cost Engineering (AACE) standards as the guideline to evaluate contingency adequacy range per estimate classification.

2.4.4 The results of *quantitative risk analysis* (i.e. cost contingency and schedule contingency if applicable) is an input into project planning and phase-gating as per Project Phase-Gate Management [R5]. Any changes to the final approved cost and schedule contingency vs the output from the quantitative risk analysis should be justified and documented within the gated package.

2.4.5 *Quantitative risk analysis* should be refreshed annually for project level A and as required for project level B.

2.5 Plan and Implement Risk Responses

Plan Risk Response is the process of developing options, selecting strategies, and agreeing on actions to address *overall project risk* exposure, as well as to treat *individual project risks*. The key benefit of this process is that it identifies appropriate ways to address *overall project risk* and *individual project risks*. The responses are executed as planned in order to address *overall project risk* exposure, minimize individual project *threats*, and maximize individual project *opportunities*. This process is applicable to project levels A, B and C and performed throughout the project life cycle.

2.5.1 For each risk identified in the *risk register*, the risk owner should perform the following:

- **Communicate** the risk and resulting plans with key stakeholders to ensure full acceptance.
- **Define the risk related roles and responsibilities** including risk owner and risk action owner. A single risk owner should be assigned to every identified risk, and each agreed-upon risk response action should have a single risk action owner.
- **Specify timing of responses** and schedule as appropriate.
- **Provide resources, budget and schedule**. Each response should be planned as appropriate including the estimation of resources, costs and duration; updating the budget and schedule; obtaining approvals from management; and obtaining commitment from the risk owners and risk action owners. Any changes to *performance measurement baselines* are to be performed in accordance within the Project Integrated Change Control manual [R7].
- **Address interaction of risks and responses** e.g. ten small, related risks combined and pose a big risk to the project.
- **Ensure SMART and agreed-upon responses** i.e. specific, measurable, achievable, realistic and timely.
- **Address *threats* and *opportunities*.**

2.5.2 For each risk identified, the risk response strategy and risk response should be documented in the project *risk register* in accordance with the scalable project delivery model [R-2]. The applicable risk response strategies are:

Threat

Avoid	Risk Avoidance is a risk response strategy whereby the project team acts to eliminate the *threat* or protect the project from its impact. Examples include: Extending schedule, changing strategy or de-scoping
Mitigate	Risk Mitigation is a risk response strategy whereby the project team acts to reduce the probability of occurrence or impact of a risk.
Transfer	Risk Transference is a risk response strategy whereby the project team shifts the impact of a *threat* to a third party, together with ownership of the response. Examples include purchasing insurance or contractual arrangements with vendors to transfer the project risk.
Accept	Risk Acceptance is a risk response strategy whereby the project team decides to acknowledge the risk and not take any action unless the risk occurs. Contingency of fallback plans may be developed ahead of time, to be implemented if the risk presents itself.

Opportunity

Exploit	Exploit strategy may be used for risks with potentially positive impacts where the organization wishes to ensure that the *opportunity* is realized.
Enhance	Enhance strategy is used to increase the probability and/or the positive impacts of an *opportunity*.
Share	Sharing an *opportunity* involves allocating some or all of the ownership of the *opportunity* to a third party who is best able to manage the *opportunity* for the benefit of the project.
Accept	Accepting an *opportunity* is being willing to take advantage of the *opportunity* if it arises, but not actively pursuing it.

2.5.3 The risk owner along with the risk management SME from the Enterprise Project Management Office should review the predicted residual exposure for the *individual* and *overall project risks* and determine whether additional response planning is required.

2.6 Monitor Risks and Issues

Monitor Risk is the process of monitoring the implementation of agreed-upon risk response plans, tracking identified risks, identifying & analyzing new risks and evaluating risk process effectiveness throughout the project. The key benefit of this process is that it enables project decisions to be based on current information about *overall project risk* exposure and *individual project risks*. This process is performed throughout the project.

2.6.1 Project risk monitoring and control should be integrated with project monitoring and control. The project manager should maintain risk awareness by ensuring that risk management reports are a regular item on project status meeting agendas, and that risk management is integrated into all project management decisions.

2.6.2 The project manager should perform periodic risk assessments, including risk identification, analysis, and response planning at reasonable intervals as specified in the project management plan. Typical reasons for risk reassessment are: occurrence of a major or unexpected risk, need to analyze a complex change request, phase end review, project re-planning or major plan elaboration, and periodic review to ensure that the information remains current. For project level A, B, and C, the project manager should hold a periodic risk management review meeting of their project *risk register* with the risk management SME from the Enterprise Project Management Office at a frequency defined in the scalable project delivery model [R-2].

2.6.3 When a risk event is no longer relevant to the project, has been successfully mitigated, or the exposure window has passed, the project manager should ensure that the risk is closed with an appropriate closure rationale and provide closure comments.

2.6.4 At project closure, the project manager should ensure that a description has been given of the closure of every risk in the *risk register*, for example: (a) did not occur; (b) occurred and contingency plan invoked; or (c) occurred and impact to the project (i.e. time, cost and quality).

2.6.5 Cost and schedule contingency reserves should be monitored in conjunction with identified risks to determine whether the reserves will remain sufficient

2.6.6 When a risk event occurs, and/or ceases to become uncertain, the risk converts to an *issue* or benefit. In the case of a realized threat, an issue may be created in the Issue module and linked to the threat.

2.6.7 Issues should be analyzed and associated actions to respond to the issue should be documented. For issues documented in the issues module of ePMX, actions should also be linked in the ePMX tool to the associated issue.

2.6.8 The project manager should ensure issues are periodically reviewed and managed by priority, and actions tracked to completion to ensure that issues are appropriately addressed.

3.0 ROLES AND RESPONSIBILITIES

3.1 Project Manager

(a) Plans, identifies, and documents risks in risk register, including conducting periodic risk assessments

(b) Identifies cost and schedule contingency

(c) Manages project risk, including risk responses and monitoring, and associated project schedule & cost contingency.

3.2 Program/Portfolio Manager

(a) Plans, identifies, and documents portfolio risks in risk register, including conducting periodic risk assessments

(b) Manages program/portfolio risks, including risk responses and mitigating strategies.

(c) Evaluates any aggregation of project risks and the collective impact, as well as any interdependencies between high priority portfolio projects.

3.3 Risk Owner

(a) Ensures that the risk response is appropriate and effective, actions are implemented to address the risk, and plans additional risk responses if required.

3.4 BU PMO

(a) As required, assists the project manager with the identification and management of risks including assessing cost and schedule impacts and cost and schedule contingency.

3.5 Enterprise PMO

(a) Acts as single point of contact for gate methodologies, processes, and associated tools and templates.

(b) Manages the PMIS risk management tool (risk, issues, and actions modules of ePMX).

(c) Facilitates risk identification and review workshops to review and document key project risks, mitigation, and opportunities.

(d) Reviews accuracy of risk management information provided by internal and external (i.e. vendor) sources and challenge as required.

(e) Performs cost contingency and schedule contingency modelling.

(f) Conducts project level risk review meetings.

(g) Conducts portfolio level risk reviews and interfaces with the Enterprise Risk Management department.

4.0 DEFINITIONS AND ACRONYMS

4.1 Definitions

Cost Uncertainty	Lack of certainty of cost estimate based on the classification of estimate.
First In A While (FIAW)	Reflecting the risks associated with a task / project caused by an extended period since the job (or a similar job) was performed.
First Of A Kind (FOAK)	Reflecting the risks associated with completing a task for the first time (no exact or similar experience).

Individual Project Risk	An uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives.
Issue	A certain event or condition that has negative consequences for a project.
Opportunity	A risk that would have a positive effect on one or more project objectives.
Overall Project Risk	Is the effect of uncertainty on the project as a whole, arising from all sources of uncertainty including individual risks, representing the exposure of stakeholders to the implications of variations in project outcome, both positive and negative.
Qualitative Risk Analysis	The process of assessing and prioritizing risks.
Quantitative Risk Analysis	The process of understanding the combined effect of identified risks on the project outcome.
Risk Management Plan	The process of defining how to conduct risk management activities for a project.
Risk Register	Captures details of identified individual project risks.
Strategic Projects And/or Programs	A large and complex project/program approved by the Enterprise Leadership Team as strategic, and executed by the Enterprise Projects Organization.
Schedule Uncertainty	Lack of certainty of schedule based on duration of activities that may be higher or lower than estimated.
Threat	A risk that would have a negative effect on one or more project objectives.

4.2 Abbreviations and Acronyms

AACE	Association for the Advancement of Cost Engineering
EMV	Expected Monetary Value
EPMO	Enterprise Project Management Office
FIAW	First in a While

FOAK	First of a Kind
OPEX	Operational Experience
PMBOK	Project Management Body of Knowledge
PMIS	Project Management Information Systems
PMO	Project Management Office
PMP	Project Management Plan
RMP	Risk Management Plan
ePMX	Enterprise Project Management Extensions

5.0 REFERENCES

5.1 References

5.2 Performance References

Ref #	Document Number	Document Title
R1	OPG-STD-0148	Project Management Standard
R2	OPG-MAN-00120-0010	Project Integration Management – Appendix A: Scalable Project Delivery Model
R3	OPG-MAN-00120-0017	Project Communication and Stakeholder Management
R4	OPG-MAN-00120-0010	Project Integration Management
R5	OPG-MAN-00120-0019	Project Phase-Gate Management
R6	OPG-STD-0076	Developing and Documenting Business Cases
R7	OPG-MAN-00120-0016	Project Integrated Change Control
R8	OPG-MAN-00120-0020	Project Portfolio Management

5.2.1 Developmental References

WANO-GL 2003-01, Guidelines for Operating Experience at Nuclear Power Plants

Construction Industry Institute. Applying Probabilistic Risk Management in Design and Construction Projects. Implementation resource 280-2. June 2012

Project Management Institute. Practice Standard for Project Risk Management (2009)

Project Management Institute. Project Management Body of Knowledge (PMBOK Guide)

WANO SOER 2015-2 Risk Management Challenges

AACE International

Appendix A: Project Risk Assessment Matrix

EPO Projects Risk (Threat) Assessment Matrix

	Risk Attribute	Definition	1 (Minimal)	2 (Minor)	3 (Notable)	4 (Substantial)	5 (Major)
	Probability	The probability that a risk will occur	<20%	20%-40%	40%-60%	60%-80%	>80%
Strategic Projects	**Financial Impact**						
	Program	Financial consequences of a risk should it occur	< $5M	$5M-$20M	$21M-$50M	$50M-$200M	> $200M
	Projects (Bundles)		< $1M	$1M-$10M	$11M-$25M	$26M-$100M	> $100M
	Schedule Impact						
		The impact that a risk would have on the project/program critical path	No Delay	< 7 days	7 - 14 days	14 - 42 days	> 42 days
Portfolio Projects	**Financial Impact**						
	> $20M Typically Type A Projects	Financial consequences of a risk should it occur	< $2M	$2M-$5M	$5M-$10M	$10M-$20M	> $20M
	$10M - $20M Typically Type B Projects		< $700K	$700K-$2M	$2M-$5M	$5M-$8M	> $8M
	$5M - $10M Typically Type C Projects		< $400K	$400K-$1M	$1M-$2M	$2M-$5M	> $5M
	<$5M Typically Type D Projects		< $200K	$200K-$500K	$500K-$1M	$1M-$2M	> $2M
	Schedule Impact						
	> $20M Typically Type A Projects	The impact that a risk would have on the project critical path	No Delay	< 7 days	7 - 14 days	15 - 42 days	> 42 days
	$10M - $20M Typically Type B Projects		No Delay	< 3 days	3 - 7 days	7 - 14 days	> 14 days
	$5M - $10M Typically Type C Projects		No Delay	< 2 days	2 - 5 days	5 - 10 days	> 10 days
	<$5M Typically Type D Projects		No Delay	< 1 days	1 - 3 days	3 - 7 days	> 7 days

EPO Risk (Opportunity) Assessment Scale

	Risk Attribute	Definition	1 (Minimal)	2 (Minor)	3 (Notable)	4 (Substantial)	5 (Major)
	Probability	The probability that a opportunity will occur	<20%	20%-40%	40%-60%	60%-80%	>80%
Strategic Projects	**Financial Saving**						
	Program	Financial savings of a opportunity should it occur	< $5M	$5M-$20M	$21M-$50M	$50M-$200M	> $200M
	Projects (Bundles)		< $1M	$1M-$10M	$11M-$25M	$26M-$100M	> $100M
	Schedule Duration Reduction	The schedule duration reduction that a opportunity would have on the project/program critical path.	No Schedule Reduction	< 7 days	7 - 14 days	14 - 42 days	> 42 days
Portfolio Projects	**Financial Saving**						
	> $20M Typically Type A Projects	Financial savings of a opportunity should it occur	< $2M	$2M-$5M	$5M-$10M	$10M-$20M	> $20M
	$10M - $20M Typically Type B Projects		< $700K	$700K-$2M	$2M-$4M	$4M-$8M	> $8M
	$5M - $10M Typically Type C Projects		< $400K	$400K-$1M	$1M-$2M	$2M-$4M	> $4M
	<$5M Typically Type D Projects		< $200K	$200K-$500K	$500K-$1M	$1M-$2M	> $2M
	Schedule Duration Reduction						
	> $20M Typically Type A Projects	The schedule duration reduction that a opportunity would have on the project/program critical path.	No Delay	< 7 days	7 - 14 days	15 - 42 days	> 42 days
	$10M - $20M Typically Type B Projects		No Delay	< 3 days	3 - 7 days	7 - 14 days	> 14 days
	$5M - $10M Typically Type C Projects		No Delay	< 2 days	2 - 5 days	5 - 10 days	> 10 days
	<$5M Typically Type D Projects		No Delay	< 1 days	1 - 3 days	3 - 7 days	> 7 days

EPO Portfolio Risk (Threat) Assessment Matrix

Risk Attribute	Definition	1 (Minimal)	2 (Minor)	3 (Notable)	4 (Substantial)	5 (Major)
Probability	The probability that a risk will occur	<20%	20%-40%	40%-60%	60%-80%	>80%
Financial Impact						
	Financial consequences of a risk should it occur	< $5M	$5M-$20M	$21M-$50M	$50M-$200M	> $200M
		OR				
		< 2%	2-5%	6-10%	11-14%	>15%

Appendix B: Probability and Impact Matrix

Impact Score						
	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
RED = Major Risks YELLOW=Significant Risks GREEN = Minor Risks		1	2	3	4	5
		Probability Score				

Appendix C: Risk Management relating to Phase-Gates

Type A Project		Gate 1	Gate 2	Gate 3	Gate 4
		Gate Progression			
Deliverables at the Gate					
i	Risk Identification Workshop Completed /Updated		LED BY PMO RM	LED BY PMO RM	
ii	Qualitative Risk Assessment Completed/Updated (Risk Score per the Risk Assessment Matrix)				
iii	Risk Register Recorded & Updated in the ePMX tool (Including Linkage to Issues & Actions)				
iv	Risk Response Developed: Mitigation Plans / Contingency Plans				
v	Quantitative Risk Assessment (Probability , Cost & Schedule Impact) - Update Contingency Template Provided by EPO RM				
vi	Cost Contingency Evaluation via Approved Contingency Model - Led by PMO RM and Concurred by Project Team		LED BY PMO RM	LED BY PMO RM	
vii	Schedule Contingency Evaluation via Approved Contingency Model - Led by PMO RM and Concurred by Project Team		LED BY PMO RM (Optional)	LED BY PMO RM	
viii	Breakdown and Rationale of Requested Contingency (Dollars and Days)				
ix	Contingency Percentage within the Acceptable Range as per the AACE Recommended Practice and Concurred by Project Management				
x	Risk Management Plan to be Included in the Project Management Plan				
xi	Identify the Major Changes in Risk Register Comparing to Last Gate Release (New/Cancel/Close Risks, Score Changes, etc)				
xii	Lessons learned and Effectiveness of Risk Management included in PIR				
Risk Monitoring and Controls					
i	**Monthly** Risk Review Meeting with EPMO Risk SME			LED BY PMO RM	LED BY PMO RM
ii	Included in Portfolio Risk Reviews (e.g.. Risk Oversight Committee)				
iii	Project Team Risk Reviews (as Determined by Project Manager)		PER PMP	PER PMP	PER PMP
iv	Contingency Annual Refresh via Modeling				LED BY PMO RM

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Type B Project		Gate 1	Gate 2	Gate 3	Gate 4
		Gate Progression			
Deliverables at the Gate					
i	Risk Identification Workshop Completed /Updated				
ii	Qualitative Risk Assessment Completed/Updated (Risk Score per the Risk Assessment Matrix)				
iii	Risk Register Recorded & Updated in the ePMX tool				
iv	Risk Response Developed: Mitigation Plans / Contingency Plans				
v	Quantitative Risk Assessment (Probability , Cost & Schedule Impact) - Update Contingency Template Provided by EPO RM				
vi	Cost Contingency Evaluation via Approved Contingency Model - Led by PMO RM and Concurred by Project Team		LED BY PMO RM	LED BY PMO RM	
vii	Breakdown and Rationale of Requested Contingency (Dollars and Days)				
viii	Contingency Percentage within the Acceptable Range as per the AACE Recommended Practice and Concurred by Project Management				
ix	Risk Management Plan to be Included in the Project Management Plan				
x	Identify the Major Changes in Risk Register Comparing to Last Gate Release (New/Cancel/Close Risks, Score Changes, etc)				
xi	Lessons learned and Effectiveness of Risk Management included in PIR				
Risk Monitoring and Controls					
i	**Quarterly** Risk Review Meeting with EPMO Risk SME			LED BY PMO RM	LED BY PMO RM
ii	Included in Portfolio Risk Reviews (e.g.. Risk Oversight Committee)				
iii	Project Team Risk Reviews (as Determined by Project Manager)		PER PMP	PER PMP	PER PMP
iv	Contingency Annual Refresh via Modeling (As Required)				LED BY PMO RM

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Type C Project		Gate 1	Gate 2	Gate 3	Gate 4
		Gate Progression			
Deliverables at the Gate					
i	Qualitative Risk Assessment Completed/Updated (Risk Score per the Risk Assessment Matrix)				
ii	Risk Register Recorded & Updated in ePMX tool				
iii	Risk Response Developed: Mitigation Plans / Contingency Plans (As Required)				
iv	Quantitative Risk Assessment (Probability , Cost & Schedule Impact) - EPO Type C Project Contingency Template				
v	Contingency Developed via Expected Monetary Value (EMV) in EPO Type Project Contingency Template via Project Team Assessment				
vi	Breakdown and Rationale of Requested Contingency Dollars				
vii	Contingency Percentage within the Acceptable Range as per the AACE Recommended Practice and Concurred by Project Management				
viii	Risk Management Plan to be Included in the Project Management Plan				
ix	Lessons Learned and Effectiveness of Risk Management included in PIR				
Risk Monitoring and Controls					
i	**Semi-Annual** Risk Review Meeting with EMPO Risk SME			LED BY PMO RM	LED BY PMO RM
ii	Project Team Risk Reviews (as Determined by Project Manager)		PER PMP	PER PMP	PER PMP

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Type D Project		Gate 1	Gate 2	Gate 3	Gate 4
		Gate Progression			
Deliverables at the Gate					
i	Qualitative Risk Assessment Completed/Updated (Risk Score per the Risk Assessment Matrix)				
ii	Risk Register Recorded in Project File in EPO Type C&D Project Risk Register Template (or equivalent)				
iii	Risk Response Developed: Mitigation Plan / Contingency plans (As Required)				
iv	Cost contingency aligned with BCS Writing Guidance (Expected Accuracy Range in Estimate Class Table) & Schedule Contingency Range via Project Team Assessment				
v	Contingency Percentage within the Acceptable Range as per the AACE Recommended Practice and Concurred by Project Management				
vi	Risk Management Plan to be Included in the Project Management Plan				
vii	Lessons Learned and Effectiveness of Risk Management included in PIR				
Risk Monitoring and Controls					
i	Project Team Risk Reviews (as determined by Project Manager)		PER PMP	PER PMP	PER PMP

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Appendix D: Risk Breakdown Structure

The RBS should be applied to categorize the risk EVENT, **not** the cause or the impact. This allows for trending of risks against a project or portfolio to understand common themes and trends.

- Health and Safety *(e.g potential for injury to personnel or public)*
- Integration *(e.g competing projects, coordination efforts)*
- Quality *(e.g rework due to poor quality – infrastructure, work packages, components, products)*
- Resources *(e.g competing projects inside/outside the organization, attrition, restructuring, organizational changes)*
- Project Management *(e.g processes and documentation)*
- Procurement – Material *(e.g long lead items, supplier issues)*
- Security/Cyber Security *(e.g data breach, physical breach)*
- Stakeholder/Reputational *(Reputational - e.g loss of revenue/capital, Stakeholder – e.g changing stakeholders)*
- Technical *(e.g design issues, usability, experimental components)*
- Licensing & Regulatory *(e.g licence applications, changes in regulations)*
- Environmental *(e.g spills, wildlife endangerment)*
- Force Majeure/Business Continuity *(e.g Catastrophic weather events – earthquakes, tornadoes, hurricanes, pandemic)*
- Commercial – Contract/Legal *(e.g unforeseen regulatory/licensing requirements)*
- Other