RISK ANALYSIS

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Document Identifier:	Risk Analysis Work Instructio	_
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Abstract:

This document describes methods to easily identify and manage risks.

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4.6	I	Identification of Functional Area Risks Ranking Potential Risks Calculating the Risk Priority Number Significance Analysis Example Functional Area: Employee Health & Safety	
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1.0 Scope

Identify the risks associated with products, activities or services that can be controlled and influenced and prioritize mitigation of the risk.

2.0 Objective

The identification of risks is a key element of the business operation, as these determine those issues and areas that should be the primary focus for monitoring control and improvement. Risks associated with products, activities or services should be evaluated and scored in terms of opportunity, probability and severity according to their risk. A risk can be defined as

A risk priority number (RPN) is calculated for each risk and graphed as a Pareto Distribution by sorting in descending order to prioritize risk mitigation efforts.

3.0 Process Steps

Identify risk categories,

Rate the opportunity, probability and severity for each risk,

Analyze risks by RPN using a Pareto Distribution,

Re-assess risks.

4.0 Requirements

4.1 Definitions

Opportunity Score

The opportunity score for a risk is the frequency the activity occurs. Using a scale from 1 to 5, an activity that occurs one time has an opportunity score of 1. If the activity occurs regularly then the opportunity score is 5.

Probability Score

The probability score is the likelihood that the risk will actually occur; 1 if not likely and 5 if most likely to occur.

Severity Score

The severity score indicates the level of risk on the business operation; 1 if no impact and 5 if there is a severe impact on cost, quality or schedule.

4.2 Identification of Functional Area Risks

The management team should use their best judgment regarding the level of detail required to conduct a comprehensive review. Once the management team has identified potential risk categories then

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The team should document the risks within a functional area using the worksheet in Figure 1 or Figure 2; for example,

The management team should rate the significance of each risk using a numerical ranking scale from 1 to 5 and the following criteria. The functional areas should below are common to all business operations but

Calculating the Risk Priority Number 4.4

he risk priority number (RPN) that is used in the Pareto Distribution chart	is
alculated by	
Figure 1 or Figure 2. The remaining column	
re summed and added to the product to weight the results, then the risk priori	ty
umbers are prioritized using a Pareto Distribution and actions are taken	to
nitigate each risk. The team should	
- see Figure 1 and Figure 2 examples.	

Typical Risk Categories and Potential Risks:

Risk Categories Schedule / Lead Time Cost Quality Potential Risks for **Potential Risks for Potential Risks for** Cost **Schedule** Quality

A guidance list of potential risks for functional areas is provided in the following tables. The management team should identify risk categories that are appropriate to the targeted functional area. The following risks are for illustrative purposes only the risk assessment team should brainstorm to generate a detailed list of potential tsks that are appropriate to the selected risk categories.

- 3				
	FUNCTIONAL AREA: EMPLOYEE HEALTH & SAFETY			
	PHYSICAL RISKS		HEALTH RISKS	
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FUNCTIONAL AREA: EMPLOYEE HEALTH & SAFETY		
PHYSICAL RISKS	HEALTH RISKS	
	3/5	
	101	

			20		
	FUNCTIONAL AREA: ENVIRONMENT				
AIR QUALITY RISKS	SOLID & HAZARDOUS WASTE RISKS	WATER QUALITY RISKS	LAND USE RISKS		

: O				
FUNCTIONAL AREA: PROPERTY				
BUILDING & OPERATIONS RISKS	SECURITY RISKS	SPILL & RELEA	ASE RISKS	
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FUNCTIONAL AREA: PROPERTY				
BUILDING & OPERATIONS RISKS	SECURITY RISKS	SPILL & RELEASE RISKS		
		ed world		

FUNCTIONAL AREA: RESOURCE		
CONSUMPTION RISKS	SCRAP RISKS	

FUNCTIONAL AREA: PRODUCT		
PRODUCT END USE RISKS PRODUCT CONTENT PRODUCT PACKAGING RISKS		
ipeci de la companya		

FUNCTIONAL AREA: OUTSOURCING			
COST RISKS SCHEDULE RISKS QUALITY RISKS			

4.5 Significance Analysis

After potential risks have been identified for a functional area, the significance ranking process will evaluate and score each risk according to the following criteria:

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The management team should complete the worksheet by
evaluating the significance of each identified risk. The comment section of the
worksheet should be used to note the source of the risk. Also use the comment
section to
If the comment field is insufficient for the number of
If the comment field is insufficient for the number of comments, place a footnote number in the field and attach a page to the worksheet
referencing the comment in a footnote.
referencing the comment in a foothote.
4.6 Example Functional Area: Employee Health & Safety
4.6.1 Opportunity or frequency of occurrence of the risk - defined as the
frequency of occurrence of safety related employee accidents or incidents or the
frequency of employee accidents occurring compared to the facility as a whole.
Another point of view for this evaluation would be
Opportunity or Frequency of Occurrence of the Risk
1
2
3
4
5
4.6.2 Probability or likelihood of occurrence of the risk - defined as the
expected likelihood of occurrence of safety related employee accidents or incidents.
Probability or Likelihood of Occurrence of the Risk
2
3
4
(C)
5
4.6.3 Severity of the risk – defined as the actual or potential risk or seriousness
of an employee accident.
Severity of the Risk
1
2
3
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Severity of th	e Risk	
4		iige
5		12
4.6.4 Scale of	use of the risk – defined as the actual or potential size, volume or	,

4.6.4 **Scale of use of the risk** – defined as the actual or potential size, volume or magnitude of the resulting employee safety risk. This should be evaluated as to the number of employees that work in the functional area compared to the facility; obviously, the more employees that work in any given area will have a higher potential for accidents based on the risks for accidents in that area. The best approach is to

		0.5
Scale of Use	of the Risk	10
1		
2		:01
3		1 (19)
4		
5		

4.6.5 **Legal or regulatory concern** – defined as regulatory exposure of employee safety as related to applicable federal, state and local laws. If the functional area is subject to general safety regulations, the rating would the latest lat

Examples of specific regulations include:

Examples of opening against one intolegor			
SPECIFIC SAFETY MANAGEMENT PROGRAMS			

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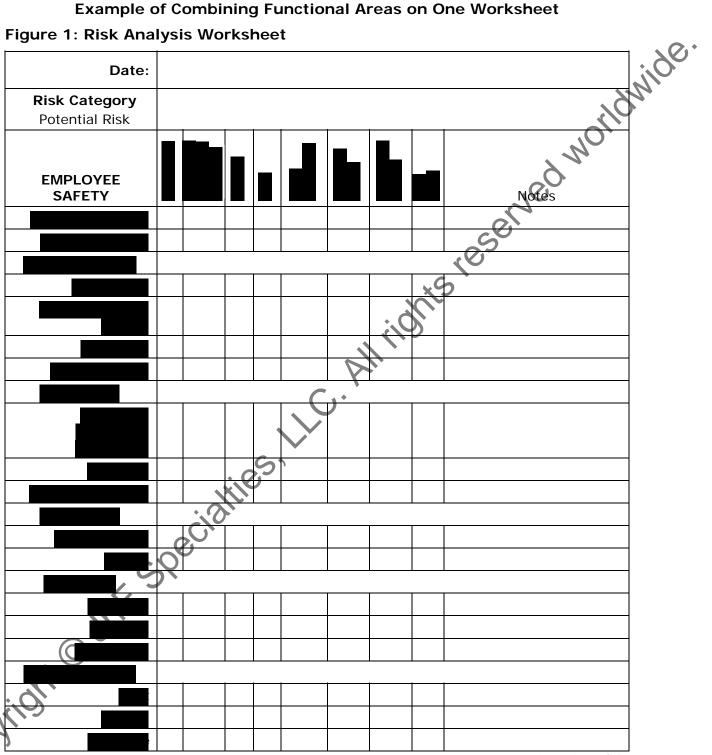
Legal or Reg	ulatory Concern of the Risk
1	
2	
3	
4	
5	
	of control or influence of the risk – defined as the level of control onal area has over employee health and safety; for instance,
Degree of Co	entrol or Influence of the Risk
1	
employees and	
Stakenoider	Concern of the Risk
1 ()	No site personnel, public, regulatory agency or interest group concern
2	
7.30	
Using the aborement t	ove sample functional area for Employee Health and Safety, the

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Example of Combining Functional Areas on One Worksheet

Figure 1: Risk Analysis Worksheet



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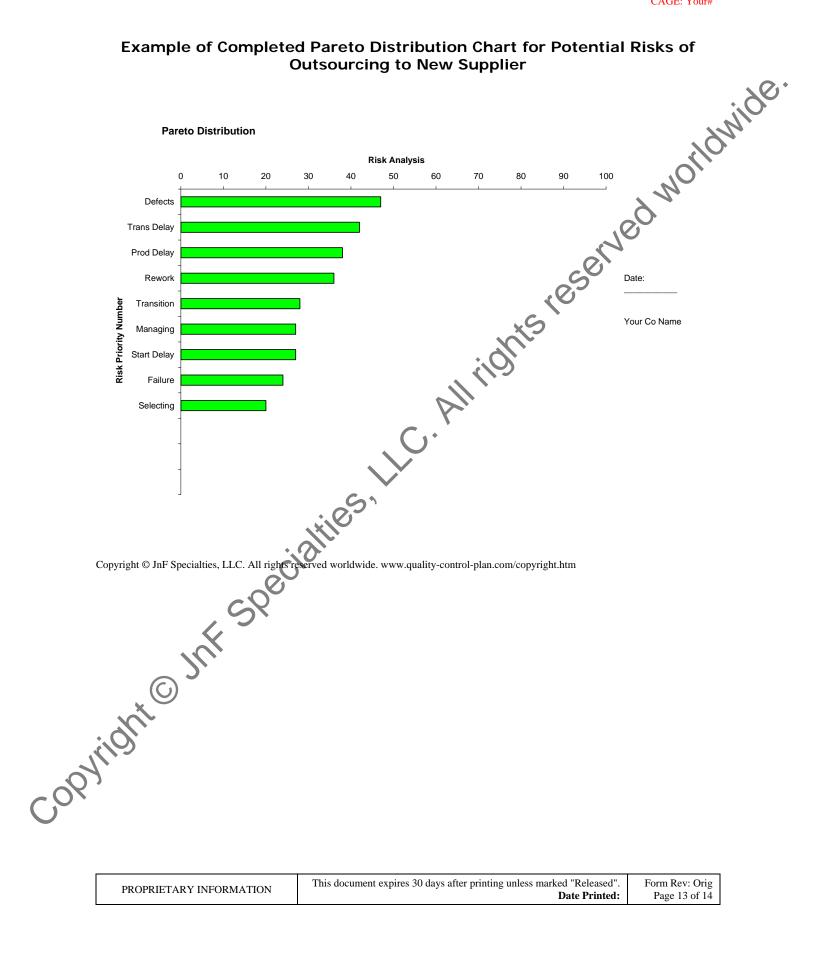
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Example of Completed Form for One Functional Area with 3 Risk Categories Figure 2: Outsourcing Risk Assessment

Date:	
Risk Category Potential Risk	
COST	Notes W
Cost of selecting new Supplier	
SCHEDULE	
Start-up delay	
QUALITY	.:(62,
Major / minor defects	
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Example of Completed Pareto Distribution Chart for Potential Risks of



Typical Functional Areas to Consider for Potential Risks

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Document Identifier:	Risk Mitigation and Planning
Date:	Latest Revision Date
Project:	Customer, Unique ID, Part Number
Document Status:	Draft, Redline, Released, Obsolete

Abstract:

This document describes the requirements for risk mitigation and planning.

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1.0 Purpose

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The risk mitigation and planning process uses information from risk identification, assessment and analysis to Common strategies are The mitigation and planning exercises must for \ mitigation and allocation of risks. Common documentation procedures Risk mitigation and planning efforts may necessitate that Suppliers Objectives of Risk Mitigation and Planning

The objectives of risk mitigation and planning are

The process identifies and It ensures that

Once the Planners, Engineers and Managers have

Three key questions can be posed for risk mitigation:

An understanding of these three questions is critical to risk mitigation and risk management planning. Question 1 addresses

An understanding of questions 2 and

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ildwide. 3 is necessary for **Risk Response Options** 3.0 Risk identification, assessment and analysis exercises A series of risk response actions can A response may be the following: The above categorization of risk response options The project development team must The strategies and actions include the following:

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Given a clear understanding of the risks, the	ir magnitude and the options for
response, an understanding of	This understanding will
include	
4.0 Risk Planning	Worldy
Risk planning involves	7 7
	Risk planning is
for the manag	gement of risk:
• Determine the methods to be used to	
•	
_	Nis
Diala alamaina	
Risk planning includes	
to	
Planning begins by	Early
efforts	
	describe the
and areas to consider,	
4.1 Risk Planning Documentation	
Each risk plan should	acts on projects with high levels of
uncertainty will	ects or projects with high levels of
uncertainty will	



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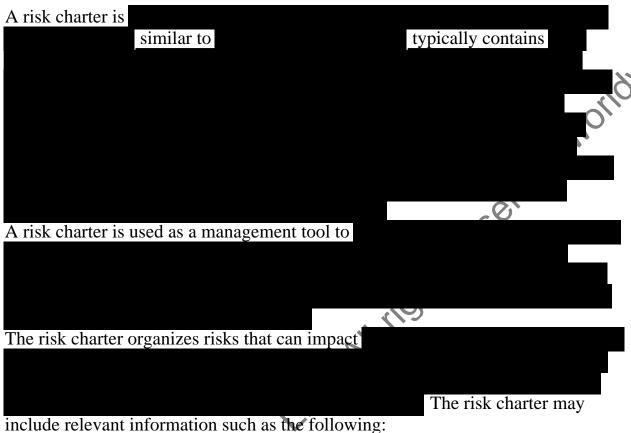
Projects that are smaller or contain minimal uncer	rtainties may require only the
4.2 Red Flag Item Lists	
A red flag item list is	O,
	perhaps
A red flag item list is a technique to identify risks	and focus attention on
See a sample list of risks in Appendix A. While the	nis sample list can be used to
create a list of red flag items for a project, it is	ins sample list can be used to
4.3 Risk Charters	
The creation of a risk charter is a more formal ide	entification of risks than the listing
of red flag items. Typically, it is	

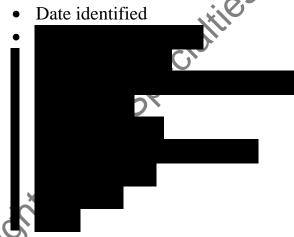


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Two examples of risk charters are in Appendix B and C. The first example is

The second example

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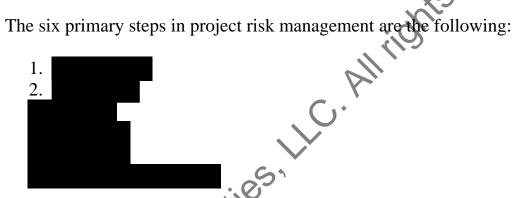
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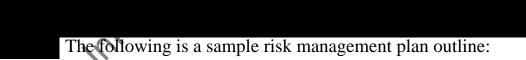


5.0 Formal Risk Management Plan

The strategy to manage risk provides developed during



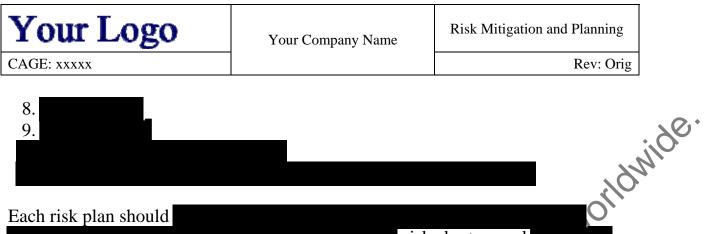
The plan is the road map that tells the Company and subcontractor teams how to





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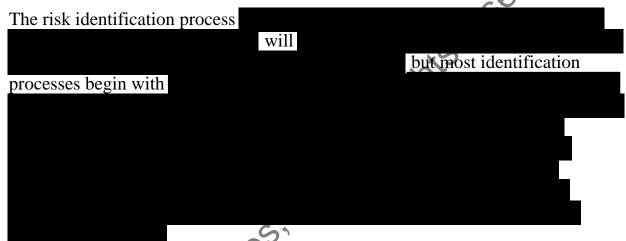
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Each risk plan should risk charters and

Risk Identification Process



Typical Risk Identification Checklist:



The team should examine and identify project events by reducing them to

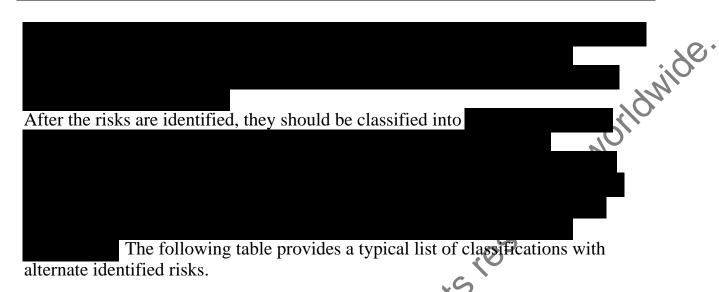
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CLASSIFICATION OF IDENTIFIED RISKS							
.0							
Inflation							

A number of documents and tools are
The following table provides

6.1 Risk Identification Tools and Techniques

Project risk can be identified multiple ways. At a minimum, the team should

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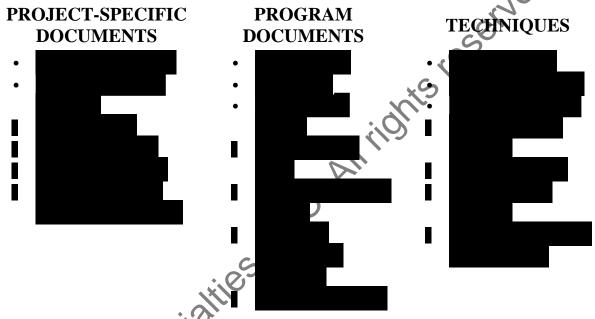


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lists potential risks and their inputs. ed wo

Risk identification tools and techniques



The key to success with any risk identification tool or technique is to

The risk identification process identifies and categorizes risks that

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6.2 Risk Allocation

The rigorous process of risk identification, assessment, analysis and mitigation allows for
In theory, best value is achieved by
The Company is more likely to
The contract is
in any contract offsets
in any contract affects
Best practice:
The goal of an optimal allocation of risk is to
However, if the Company and subcontractors take a long-term view and take into
consideration
The biggroup process of right identification, assessment, analysis and mitigation
The rigorous process of risk identification, assessment, analysis and mitigation allows for
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red mouldwide. The objectives of risk allocation can vary depending on Allocate risks to the party best able to manage them. Allocate the risk in alignment with 6.2.1 Allocate Risks to Party Best Able to Manage Them. A fundamental tenet of risks. Following this principle of allocating the risks Because of the advantages and disadvantages associated with 6.2.2 Risk Allocation in Alignment with Project Objectives Risks should be clear and concise must

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worldwide. Allocating risks in alignment with project objectives begins with The importance of clearly understanding and defining project objectives cannot be overemphasized. Project objectives directly determine 6.2.3 Risk Sharing The concepts of risk sharing and risk allocation are Risk allocation is defined as However, instead, In this situation, the Company is Communication among parties is a key to Risk-sharing provisions should

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6.2.4 Risk Allocation in Alignment with Customer-Oriented Performance Goals

The ultimate goal of risk allocation should be to

6.2.5 Risk Allocation Matrix

Perhaps the most widely used tool for risk allocation is

The matrix is intended to be

The matrix can be

It provides

Example of risk allocation matrix:

Enample of tisk anocation in	14411	
RISK		
•		_

Aflocation matrices are

. Appendix D provides

The matrix is also applicable to

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6.2.6 Innovative Contracting Tools and Techniques

The contract is the vehicle for risk allocation. The contract provisions determine which in turn

The following table provides

The Company can develop these

techniques and consider them
the Company should

Innovative contracting approaches for risk allocation:



6.2.7 Contingency Considerations

Any party assuming a risk must

Prudent companies use

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When a Company requires a subcontractor to assume a risk An option that This will obviously cost that subcontractor must is not often exercised is The subcontractor can spend

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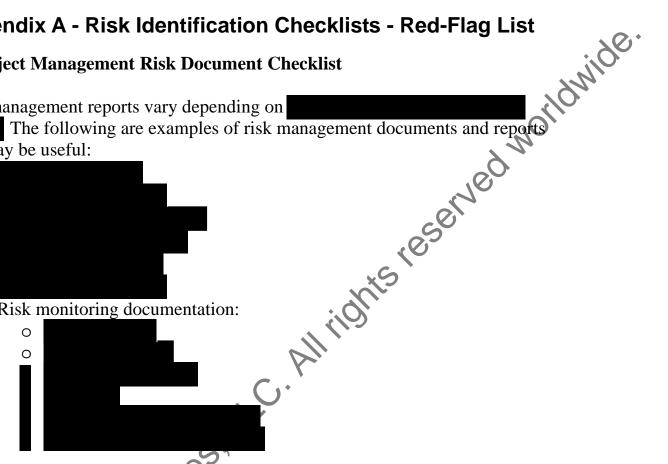
Appendix A - Risk Identification Checklists - Red-Flag List

1. Project Management Risk Document Checklist

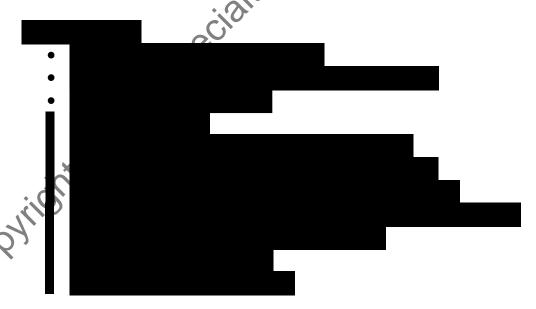
Risk management reports vary depending on that may be useful:



Risk monitoring documentation:



2. Sample Red Flag Item List (reduce list as required)



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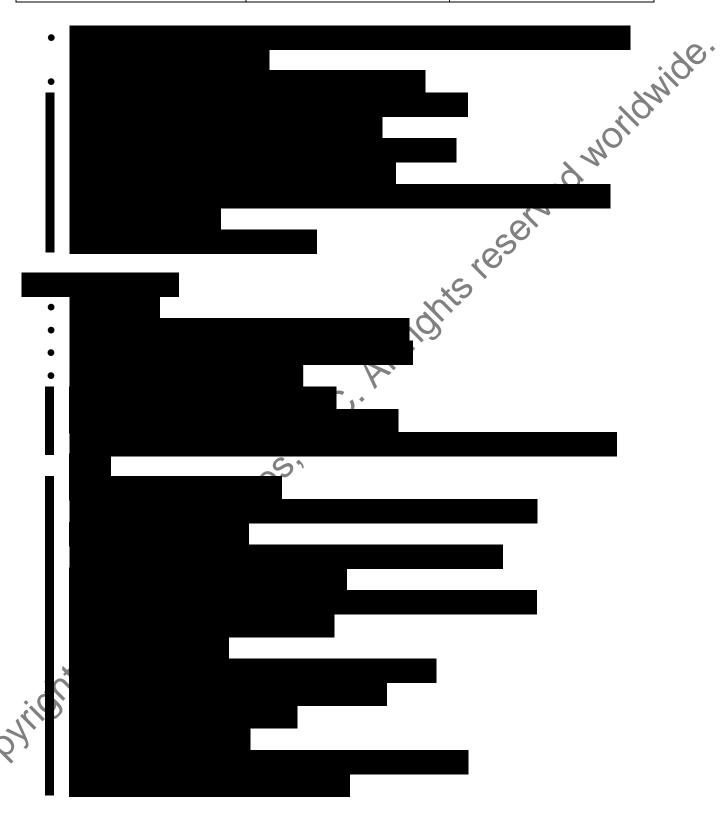


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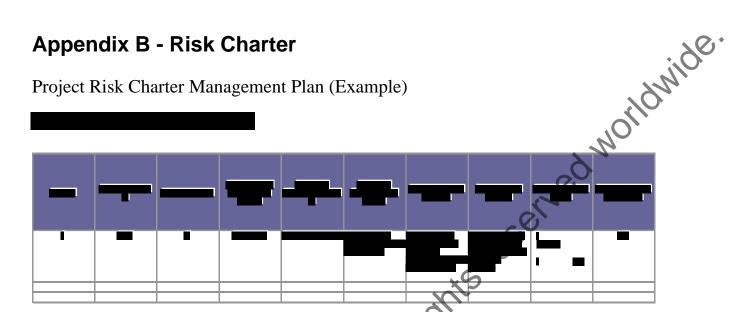


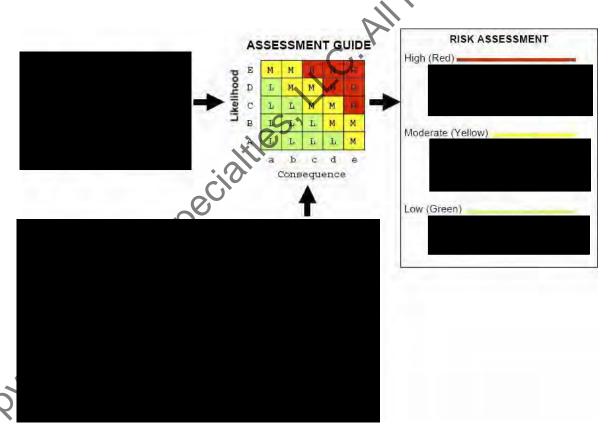
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Appendix B - Risk Charter

Project Risk Charter Management Plan (Example)





below...

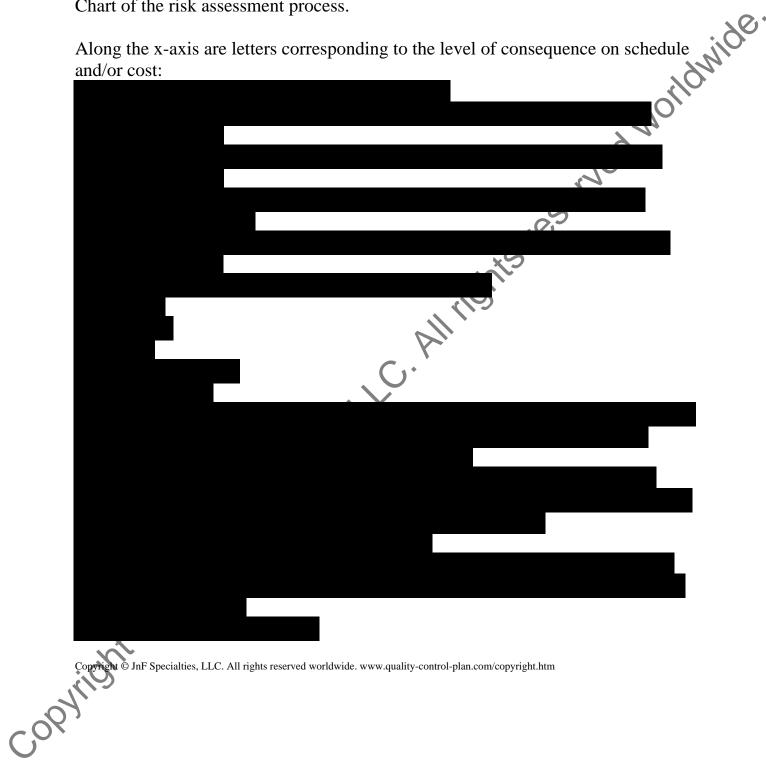
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Chart of the risk assessment process.



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Appendix C - Risk Register

Appendix C - Risk Register Project Risk Register Management Plan (Example)										
Risk 1	Permitting and Interagency Agreements	Permits required from approval agencies could be delayed;		Positive between Cost and Schedule (i.e. Duration) of Both	25% (0.25)	Triangular		Triangular		
Risk 2	Regulatory Approval	Grantee documentation of readiness to enter into full funding	B. Regulatory Approval	Duration) of Bott	10%	No Significant Effect	No Significant Effect		2 mos.	
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Appendix D - Design-Build Risk Allocation Matrix



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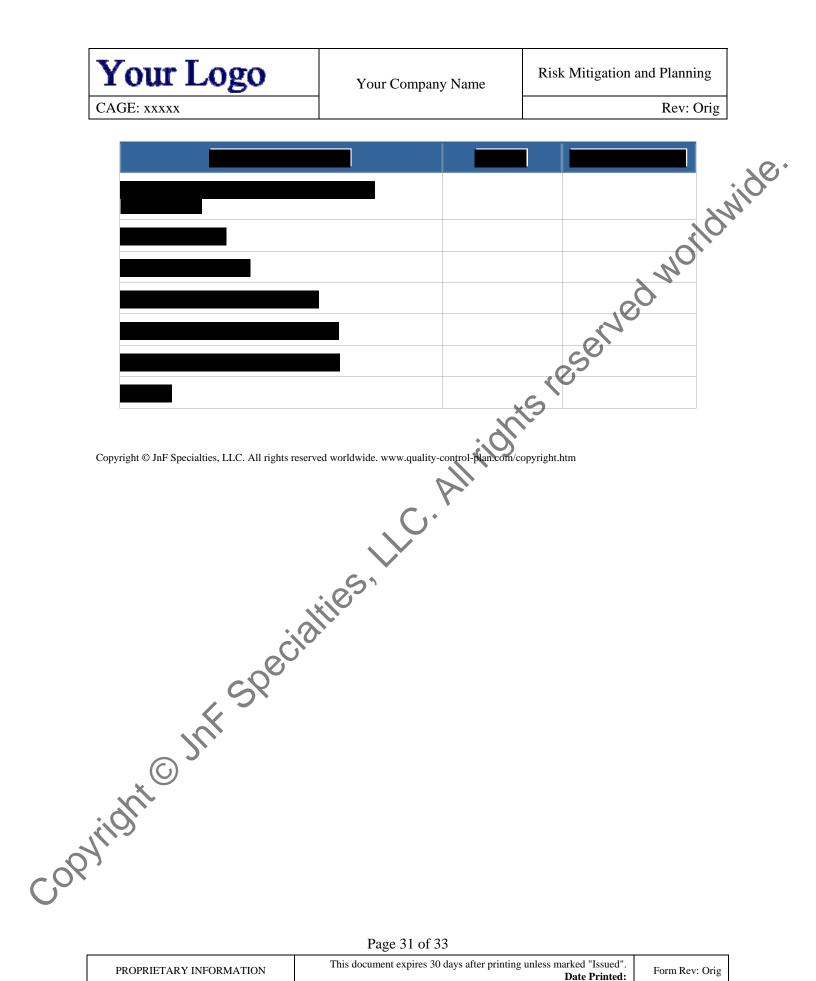
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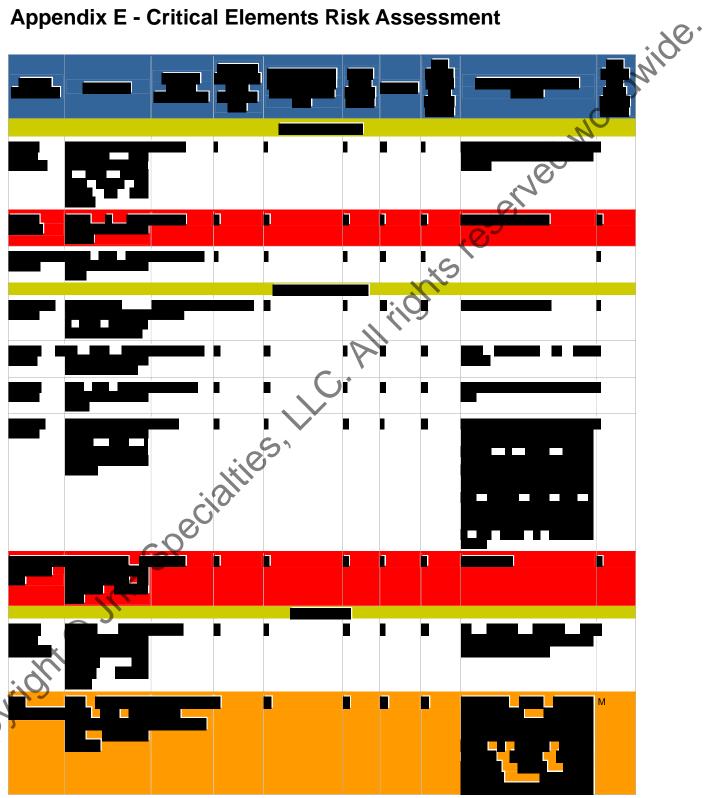
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Appendix E - Critical Elements Risk Assessment



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