OSA Webinar Learning Series:

Introduction to Risk Assessments

June 23, 2022


No discussion or agreements, either explicit or implicit, regarding prices of particular products, services, or commodities nor of individual company scenarios, business plans, purchasing plans, or pricing.
ANTITRUST

Presenters

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Introduction

To the Onshore Safety Alliance Program

WORKING TOGETHER

to improve safety and reduce serious injuries and fatalities in U.S onshore operations

Companies commit to carry out defined **OSA PARTICIPANT ACTIONS** within their organization and in return, the OSA provides resources, guidance, tools and peer-to-peer **SUPPORT** to help companies implement the actions.

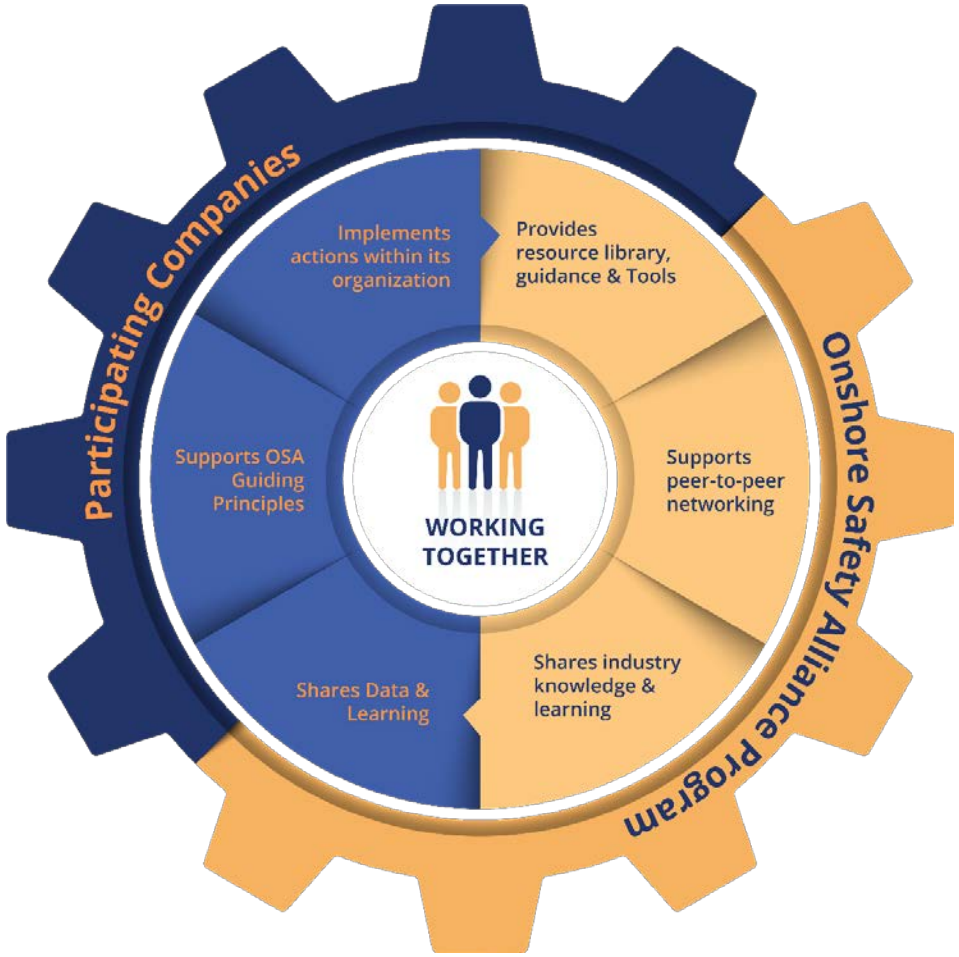
VOLUNTARY TO JOIN. NO DUES REQUIRED.

Through the OSA, companies are raising the BAR on safety, together.

BRIDGE
INDUSTRY KNOWLEDGE

ADVANCE
SAFETY CULTURES

REDUCE
SERIOUS INCIDENTS



OSA Foundational Framework

Program Structure

Action 1	Participate in and Support the Onshore Safety Alliance
Action 2	Implement a Life Saving Actions Program
Action 3	Ensure Worker Awareness & Knowledge of Life Saving Actions
Action 4	Implement an Incident Investigation and Learning Program
Action 5	Perform Risk Assessments for Common Process Safety Hazards
Action 6	Improve Effectiveness in Preventing and Mitigating High Consequence Well Control Incidents

PARTICIPANT ACTION 5:
Perform Risk Assessments for Common Process Safety Hazards

Planning

Perform risk assessment(s) for potentially high-risk activities associated with drilling, completions, flowback, well service and ongoing production operations. At a minimum, the participant will conduct risk assessments for the following activities, as applicable to their operations:

- Drilling – Loss of Well Control
- Drilling – Loss of Primary Containment
- Drilling – Wellhead/Tree Damage
- Completions/Flowbacks – Loss of Well Control
- Completions/Flowbacks – Loss of Primary Containment
- Completions/Flowbacks – Perforating Gun Performance
- Well Service – Loss of Well Control
- Ongoing Operations/Production – Loss of Primary Containment

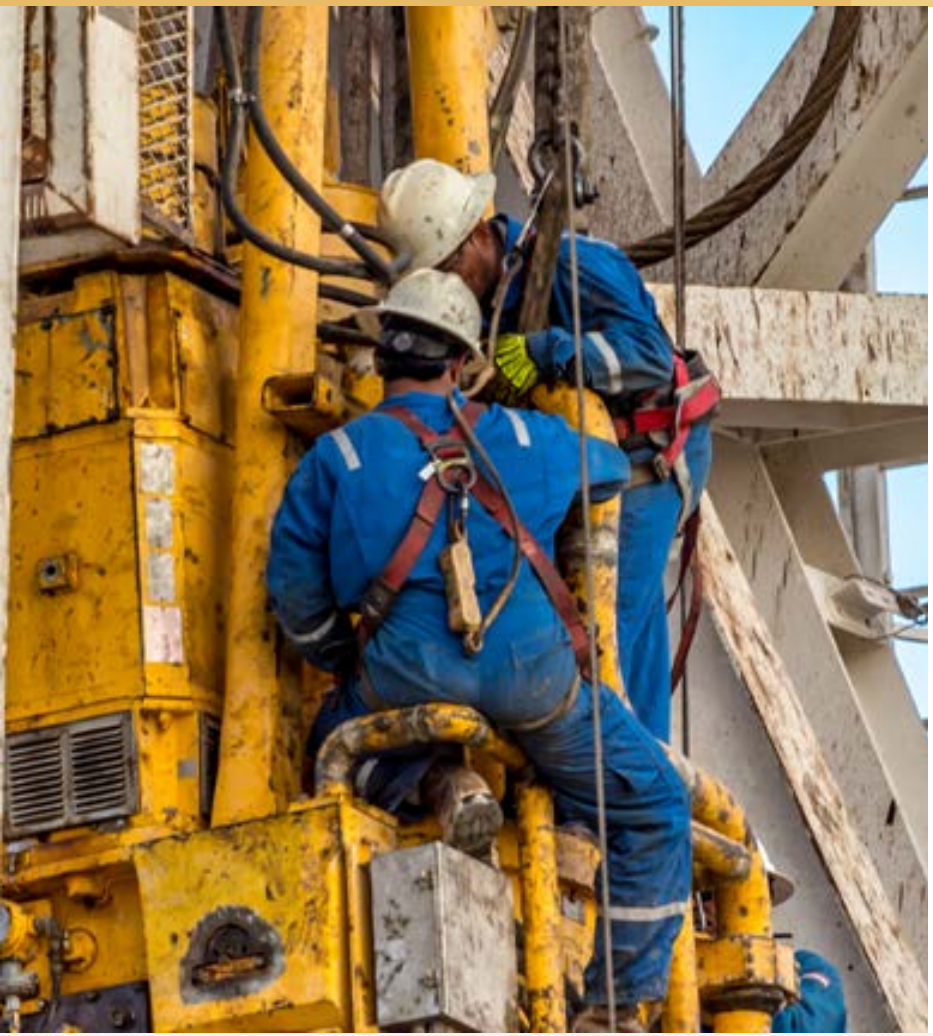
What is a Risk Assessment?

Value

A risk assessment is the process of evaluating risks to personnel safety and health from workplace hazards. It is a systematic examination of all aspects of work that considers:

- What could cause injury or harm;
- Whether the hazards could be eliminated and, if not;
- What preventive or protective measures are, or should be, in place to eliminate, reduce or control the risks.

What Makes an Effective Risk Assessment?



- Hazard identification
- Risk analysis
- Risk control

Risk Assessment Methodologies

HAZID

- Broad, loosely structured brainstorming
- Often does not include risk ranking

Checklist

- Process of activity related checklists
- IDs missing activities/design details that could create hazards

What-If

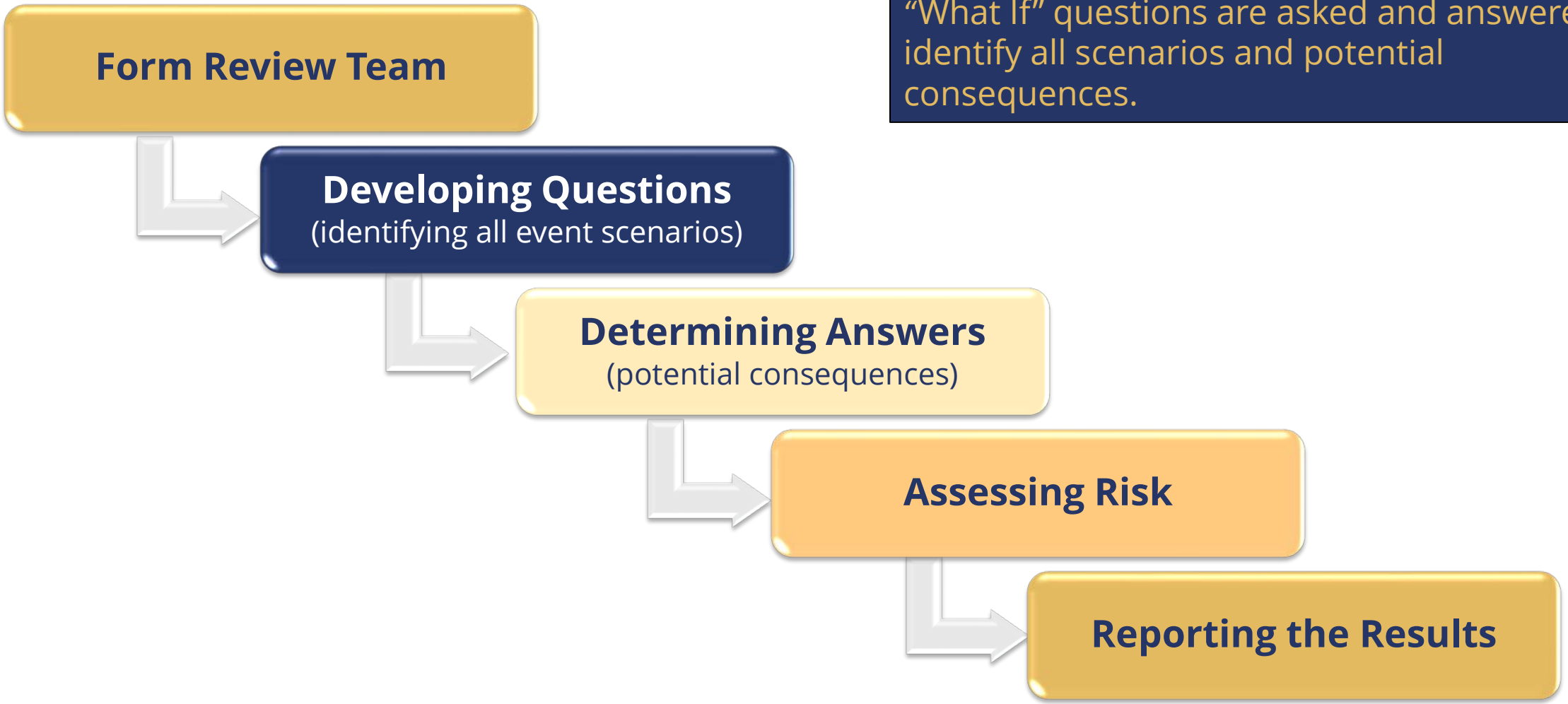
- Structured assessment method
- IDs potential consequences and likelihoods

HAZOP

- Systemic technique using series of guide words
- Questions every part of a process to discover deviations, causes and consequences

The What-If Analysis Methodology

"What If" questions are asked and answered to identify all scenarios and potential consequences.



What-If Methodology: Form Review Team

- Operating & maintenance personnel
- Design & operations engineers
- Drilling engineers
- Structural engineers
- Risk assessment facilitator

What-If Methodology: Developing Questions

Formulate "what-if" questions around human errors, process upsets, and equipment failures

Initiating Causes

- What if the control valve fails to open?
- What if the operator performs step 2 before step 1?

Describing consequences or concerns

- What if the line ruptures?
- What if the vessel is empty?
- What if there is a fire?

What-If Methodology: Determining Answers

What would be the result of that situation occurring?

What are the potential causes that could lead to the consequence scenario?

What are the conditions that allow the failure to occur?

What-If Methodology: Assessing Risk

Risk Prioritization Matrix

Likelihood Qualitative Descriptions	# of Barriers		Risk Level (Likelihood with confirmed Barriers and Consequence without Barriers)					
Expect to occur - Likely	0	5	Decreasing Likelihood	6	7	8	9	10
Conditions may allow to occur - Occasional	1	4		5	6	7	8	9
Exceptional conditions may allow to occur - Seldom	2	3		5	5	6	7	8
Reasonable to expect will not occur - Unlikely	3	2		3	4	5	6	7
Has occurred once in the industry - Remote	≥4	1		2	3	4	5	6

Consequence Descriptions and Index (without Barriers)		Decreasing Consequence				
	Consequence Category	1	2	3	4	5
		Incidental	Minor	Moderate	Major	Severe
	Health and Safety	One injury or illness requiring treatment but not life altering	More and than one injury or illness requiring treatment but not life altering	One or more injuries or illnesses with potential life altering effects	One or more life altering injuries or illnesses	One or more fatalities
	Environment	Limited on pad spill, temporary impact, remediation efforts require less than 1 week cleanup	Localized spill on pad or immediate surrounding areas, remediation efforts require between 1 week to 6 months to cleanup	Localized spill on pad and or surrounding areas, remediation efforts take between 6 months to 1 year to cleanup	Long -term, widespread impact, remediation requires 1 to 5 years to cleanup	Long-term, widespread impact, restoration is greater than 5 years

Barriers or Safeguards

Equipment or Actions that Directly Prevent or Mitigate an Incident

Barrier Characteristics

- Effective in preventing or reducing the likelihood of a scenario
- Effective in significantly mitigating the consequence of a scenario

When conducting risk assessments, teams must decide:

- Whether the safeguard has a direct role in preventing the scenario or reducing the ultimate potential consequences i.e., Is it a device, system or action that would likely interrupt the chain of events?
- And based on available documentation, knowledge and expertise of the team members, will the safeguard work if needed, i.e., is the supporting management system in place and functioning?

What-If Methodology: Assessing Risk

Identifying the consequence, probability and resulting risk levels

Likelihood Qualitative Descriptions	# of Barriers	
Expect to occur - Likely	0	5
Conditions may allow to occur - Occasional	1	4
Exceptional conditions may allow to occur - Seldom	2	3
Reasonable to expect will not occur - Unlikely	3	2
Has occurred once in the industry - Remote	≥4	1

SECOND STEP

FIRST STEP

Consequence Descriptions and Index (without Barriers)

Risk Level (Likelihood with confirmed Barriers and Consequence without Barriers)

Decreasing Likelihood

	6	7	8	9	10
	5	6	7	8	9
	5	5	6	7	8
	3	4	5	6	7
	2	3	4	5	6

Risk Level

Decreasing Consequence

Consequence Category	1 Incidental	2 Minor	3 Moderate	4 Major	5 Severe
Health and Safety	One injury or illness requiring treatment but not life altering	More and than one injury or illness requiring treatment but not life altering	One or more injuries or illnesses with potential life altering effects	One or more life altering injuries or illnesses	One or more fatalities
Environment	Limited on pad spill, temporary impact, remediation efforts require less than 1 week cleanup	Localized spill on pad or immediate surrounding areas, remediation efforts require between 1 week to 6 months to cleanup	Localized spill on pad and or surrounding areas, remediation efforts take between 6 months to 1 year to cleanup	Long -term, widespread impact, remediation requires 1 to 5 years to cleanup	Long-term, widespread impact, restoration is greater than 5 years

What-If Methodology: Reporting the Results

Table of Contents

The Role of the Facilitator

Facilitator Skills

- Soft Skills
- Be able to prepare for and lead the risk assessment team
- Identify Nodes
- Know how to use and populate the OSA What-If Form
- Know how to rank risks using the OSA 5x5 Matrix

Facilitator Soft Skills

Facilitate, Don't Dictate

In Person Meetings Preferred

Group Engagement

- Maintaining Focus
- Operator Input
- Regular Breaks
- Minimize War Stories

Respectful Debate

- Hearing All Perspectives
- Use Parking Lot for Detailed Discussion of Complex Issues

Scribe

- Should not be the facilitator unless very simple PHA with only 3-4 participants

Risk Assessment Preparation

Preparation is important and should be done in advance. The facilitator manages:

Team Formation

- Who should participate?
- What experience needed?
  - Process
  - Operations
  - I&E
  - Maintenance, Specialty

Documents & Pre-Reads

- What documents need to be available? P&ID as minimum, but enough to define:
  - What is being installed,
  - Where it goes,
  - How it is connected into the existing system,
  - How it is controlled, and how it is protected

Define Nodes

- On P&ID's
- Create List with attributes

Pre-populate Forms

Previous Incidents & Lessons Learned

Schedule & Invite

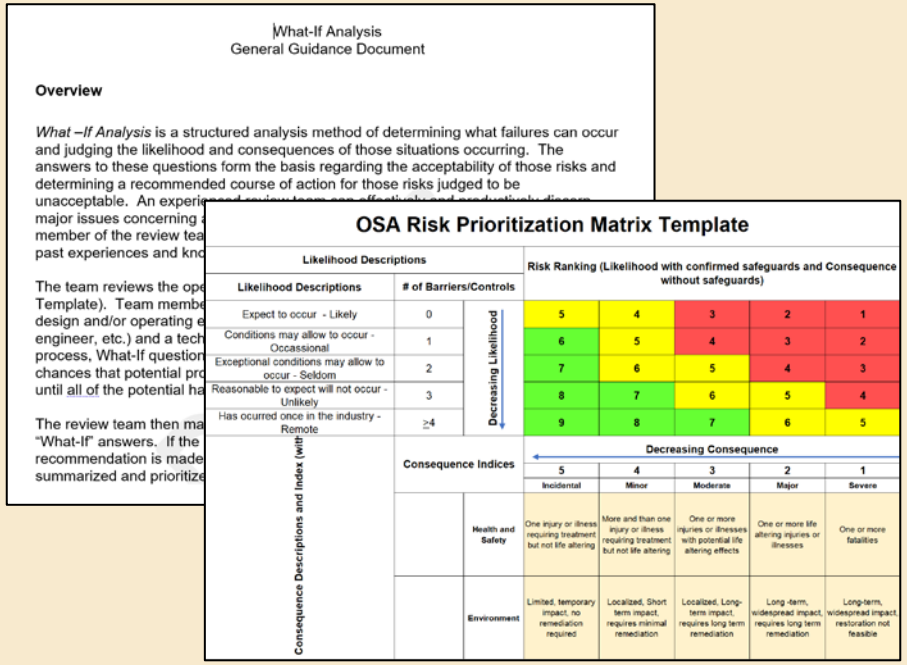
OSA Resource Library & Implementation Tools

Risk Assessment Guidance

The OSA provides guidance, best practices and tools to assist participating companies as they work to implement the **OSA Participant Actions** within their organization.

RISK ASSESMENT GUIDANCE:

- What-If Methodology User Guide, *How to Conduct a Risk Assessment Using the What-if Methodology*
- What-if Methodology risk assessment template
- 5x5 simplified risk prioritization matrix
- Risk assessment report examples (Summer 2022)



What-If Analysis
General Guidance Document

Overview

What –If Analysis is a structured analysis method of determining what failures can occur and judging the likelihood and consequences of those situations occurring. The answers to these questions form the basis regarding the acceptability of those risks and determining a recommended course of action for those risks judged to be unacceptable. An experie
major issues concerning
member of the review tea
past experiences and kn

The team reviews the ope
Template). Team membe
design and/or operating e
engineer, etc.) and a tech
process, What-If question
chances that potential pr
until all of the potential ha

The review team then ma
"What-If" answers. If the
recommendation is made
summarized and prioritize

OSA Risk Prioritization Matrix Template

Likelihood Descriptions	# of Barriers/Controls		Risk Ranking (Likelihood with confirmed safeguards and Consequence without safeguards)				
Expect to occur - Likely	0	Decreasing Likelihood	5	4	3	2	1
Conditions may allow to occur - Occassional	1		6	5	4	3	2
Exceptional conditions may allow to occur - Seldom	2		7	6	5	4	3
Reasonable to expect will not occur - Unlikely	3		8	7	6	5	4
Has ocurred once in the industry - Remote	≥4		9	8	7	6	5

Consequence Descriptions and Index (with	Consequence Indices		Decreasing Consequence				
			5	4	3	2	1
			Incidental	Minor	Moderate	Major	Severe
		Health and Safety	One injury or illness requiring treatment but not life altering	More and than one injury or illness requiring treatment but not life altering	One or more injuries or illnesses with potential life altering effects	One or more life altering injuries or illnesses	One or more fatalities
		Environment	Limited, temporary impact, no remediation required	Localized, Short term impact, requires minimal remediation	Localized, Long-term impact, requires long term remediation	Long -term, widespread impact, requires long term remediation	Long-term, widespread impact, restoration not feasible

https://www.onshoresafetyalliance.org/Resources/Risk-Assessment

Become an OSA Participant!

The OSA welcomes participation from both companies and trade associations.

Voluntary to join, and no dues required.

For additional information, contact:

- **Emily Hague – manager@onshoresafetyalliance.org**

onshoresafetyalliance.org

Thank You!