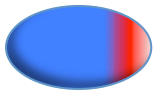
RISK MANAGEMENT

TOOLS AND THEIR APPLICATION

BLUERAD 

RISK AND OPPORTUNITY MANAGEMENT TOOLS AND THEIR APPLICATION

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SHORTLISTED alarm RISK AWARDS 2015

UPADI

FEU

Aims and Objectives

- How the risk tools are implemented in a traceable manner
- With a goal of understanding where they come from and why
- Scope of this presentation is to address shortfalls in the application of risk

Goal Setting

Why do we need the tools to evaluate the risk?

- Funding, budget control, overspend and Management of Change (MOC)
- **World Bank Corporate and Social Responsibility.**
- *Corporate Social Responsibility* (*CSR*) is the commitment of business to .... investments as a competitive advantage or a minimum requirement for *risk* mitigation. Ref: World Bank see append.
- To get the funding we have to satisfy the requirements of CSR.

For the European Union Its basically the same to get funding. It has to be a fully traceable and a transparent documented route.

- To protect the integrity of the company or organisation.
- Blueproof from Bluerad satisfies CSR.

The Tools

The tools can be found in EN ISO 17776:2002 Petroleum and natural gas industries-Offshore production installations –guidelines on tools and techniques for hazard identification and risk assessment.

- The standard does not provide a detailed description or practical application of the tools.
- Are they applicable to me?
- From contractual hierarchy. It does not just apply to Offshore!
- It also contains a list of key guidewords which are traceable.
- For the purpose of this presentation and time issues I will address the key tools.

What are they?

- HEMP Hazard Effect and Management Process

- HAZAN HAZard Analysis
- HAZID HAZard IDentification

- HAZOP HAZard and OPerability study
- HAZCON HAZard and CONstruction study
- HAZDEM HAZard and DEMolition study

What are they?

- CBA cost-benefit analysis
- CFD computational fluid dynamics
- EERA escape, evacuation and rescue analysis
- ESD emergency shutdown
- ETA event tree analysis
- FMEA failure modes and effects analysis
- FTA fault tree analysis
- HRA health risk assessment
- JHA job hazard analysis
- LOPA Level of protection analysis
- PHA preliminary hazard analysis
- PEM physical effects modeling
- QRA quantitative risk assessment
- SAR search and rescue analysis
- SIL safety integrity level

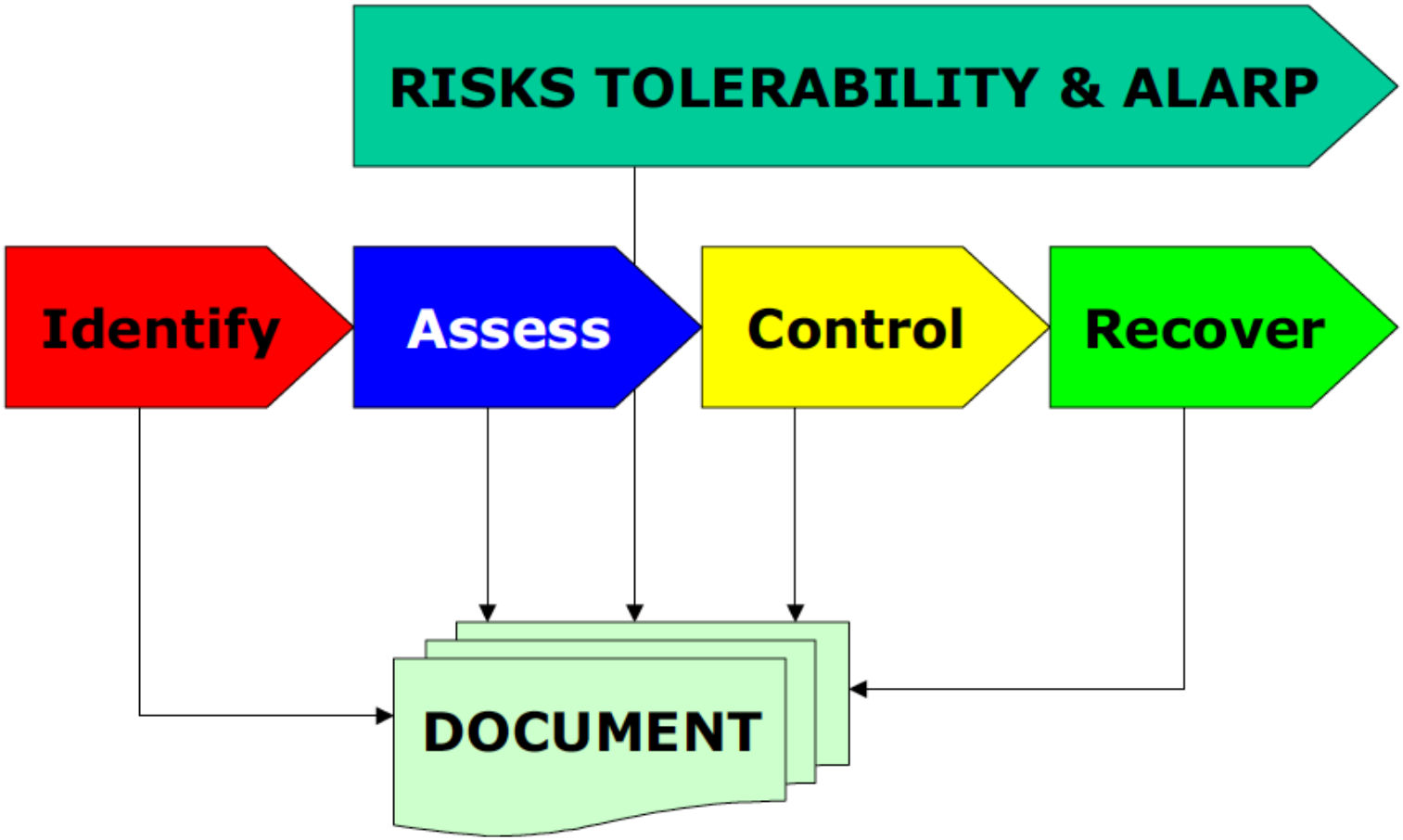
HEMP Hazards and Effects Management Process

- This is where you start (first introduced by Shell (Jim Tigg updated in 2004))
- Now implemented world wide. (ISO requirement)
- The Hazards and Effects Management Process (HEMP) is central to the effective implementation of the HSE Management System. The process ensures that hazards and potential effects are fully evaluated.
- To do this first identify and assess hazards, then put mitigation and recovery preparedness measures in place to reduce the consequences of any remaining risk.

Impact of HEMP

- Brought into practice in-house by the HSE, it became part of the development of SI 1995/743. Prevention of Fire and Explosion and Emergency Evacuation and to the first successful conviction for corporate manslaughter.
- Why? Sole Pit platform EPIC contract. 1985
- We needed a way to prosecute from the Owner, supplier down to the designers and workers.
- Led to traceability and auditing in the HSE after the formation of the Offshore Safety Division.
- Bluerad and its product Blueproof are subject to the most advanced HEMP system in the world. Blueproof being a safety barrier.

The HEMP Management System



Objectives

- The objectives set out in the HSE Management Systems (HSE MS) and subsequently the HSE Case effectively become the acceptance criteria for the risk determined in the hazards and effects management process (HEMP).
- The key Objective is ALARP.
- Social and Corporate Responsibility (SCR)
- Everyone involved in the concept and detail design of Blueproof was an expert in their field.

Risk Assessment Matrix (RAM)

- You need to develop this to your own particular need. A Technical Economic Commercial Organisational Political Ram is a good example.
- It also applies throughout the risk issues management process.
- The high level management RAM can be a separate exercise in the application of the screening process.
- It can be a separate RAM.

Risk Assessment Matrix RAM

TYPE		TECHNICAL					ECONOMIC		COMMERCIAL					ORG.	POLITICAL		LIKELIHOOD				
		Health	Safety	Environment	Quality	Integrity	Cost	Schedule	Legal	Finance	Marketing	Information	Resources	Reputation	Relationships		A	B	C	D	E
SEVERITY	5	Multiple fatalities (or PTD) or major systemic	Multiple (more than 3) fatalities or PTD's	Massive effect	Non conformances at critical systems	Extensive damage	>$100 million	> 6 months	Major legal exposure with potential to result in major impact on the company	Prudential financing	> 0.5 mjor. IHD sales commitment of 10 and above buildup profile	Highly confidential / essential company information at risk	>30 % skilled workforce	Intensive/ critical impact	Breakdown in high level relationships						
	4	1 to 3 fatalities (or PTD's) or more people's health effected	1 to 3 fatalities or PTD's at present Total Disabilities (PTD's)	Major effect	Non conformances in major functional systems	Major damage	>$100 million	< 6 months	Significant legal exposure present with potential medical impact on the company	Minimum debt financing	> 1.0 mjor. IHD sales commitment of 10 and above buildup profile	Confidential / important Company information at risk	>20% skilled workforce	Inherent impact	Urgent board problems at high level relationships				Level 1 (Critical Issues)		
	3	Major effect on a persons or minor effect on several people	Major injury	Local effect	Non conformances in minor systems	Localised damage	<$10 million	< 3 months	Drop in knowledge and/or controls over minor aspects of biz	Low level of debt financing	< 2.0 mjor. IHD sales commitment of 10 and medium buildup profile	Company information at risk	>70 % skilled workforce	Local impact	Communities, single level relationships or complete breakdown of minor relationships				Level 2		
	2	Minor effect on a persons or slight effect on several people	Minor injury	Minor effect on a persons or minor slight effect on several people	Sub-Severely meeting the specification	Minor damage	<$1 million	< 1 month	Reasonable knowledge - intention to be legally correct	Medium level of debt financing	< 2.0 mjor. IHD sales commitment of 10 and medium buildup profile	Low level Company information at risk	<30% skilled workforce	Limited impact	Urgent level relationships with minor level exclamation which can be overcome			Level 3			
	1	Slight effect on a person	Slight injury	Slight effect on a person	Substantially meeting the specification	Slight damage	<$0.1 million	< 2 weeks	Confident in knowledge of low no dispute likely	High level of debt financing	<4.0 mjor. IHD sales commitment of 10 and but buildup profile	Very good and timely exchange of accurate and secure information	<95% skilled workforce	Slight impact	Mainly supportive with minor relationships						
	0	No effect	No injury	No effect	Fully meeting the specification	No damage	No impact	No impact	Complete knowledge of low no element of a dispute	Minimum debt financing	Full business committed at 10 and total IHD buildup profile	Perfect flow of information - fast accurate and secure	100% skilled workforce	No impact	Completely Aligned						

RWC - Restricted Work Case
LTI - Lost Time Injury
PTD - Permanent Total Disability

Level 1	Critical Issues that require immediate action and management attention.
Level 2	Requires urgent attention, managed through the line.
Level 3	Managed through routine action setting, prioritisation, and monitoring.
	Minimal Risk

Issues Management Process

Chart No.:

Rev. No:

Preparer:

Manager:

Responsible Party or Group(s) →

Activity

Issue Owner | Mgrs / Supvsrs Work/Coord.Teams | Issues Coordinator | Project Manager | Upstream Research Company (URC) | Senior Management

Project Issues Identified
- On-going throughout all project phases (initial list at Gate 2)
- Each issue has individual assigned as Issue Owner
- Potential Key Issues Identified

Project Issues Logged

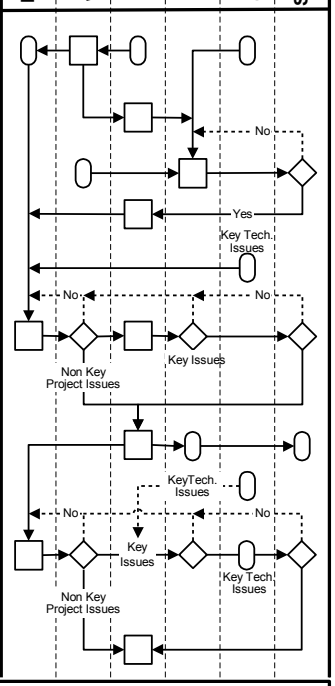
Key Issues Defined
- Potential Key Issues highgraded from Project Issues
- Research Company endorses proposed Key Technical Issues
- Senior Management designates Key Issues

Issue Resolution Plans Developed & Implemented
- By person responsible for each issue - Issue Owner
- Issue Management Plan (Worksheet) implemented
- Endorsed by supervisor / functional manager
- Collaborate with URC for Key Technical Issue resolution plans
- Key Issues plans approved by Senior Management

Issues Tracked & Stewarded
- Issues Register & Tracking Tool
- Project Issues stewarded by the Project Manager
- Key Issues stewarded by Project Manager and Senior Management

PMT & Functional Issues Resolution Sign Off
- Project Management confirms Project Issues resolution
- Senior Management approves Resolution of Key Issues
- Key Issues resolution confirmed with Gatekeeper at Gate 5

Close Out
- FEED to Capture Lessons Learned Process



Primary Responsibility for Activity | No / Yes Decision / Approval | Interface | Direction of Information Flow

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Examples of RAM

Severity	CONSEQUENCE				INCREASING PROBABILITY				
	People	Assets	Environment	Reputation	A	B	C	D	E
					Never heard of in EP industry	Has occurred in EP industry	Incident has occurred in Opco	Happens several times per year in Opco	Happens several times per year in location
0	No injury	No damage	No effect	No impact					
1	Slight injury	Slight damage	Slight effect	Slight impact					
2	Minor injury	Minor damage	Minor effect	Limited impact					
3	Major injury	Localised damage	Localised effect	Considerable impact					
4	Single fatality	Major damage	Major effect	National impact					
5	Multiple	Extensive	Massive	International					

Manage for continuous improvement

Incorporate risk reduction measures

Intolerable

PROBABILITY

CONSEQUENCES	A	B	C	D	E
I	1	1	1	2	2
II	1	1	2	2	2
III	1	2	2	3	3
IV	2	3	3	3	3

Probability Definitions

Category	Definition	Working Definition
A	Possibility of Repeated Incidents	20 or more times per facility life: or 5 or more times during project execution
B	Possibility of Isolated Incidents	5 times in facility life or once during project execution
C	Possibility of Occurring Sometime	Once in facility life cycle or 10% likelihood during project execution
D	Not Likely to Occur	10% likelihood of occurring once in facility life or 1% likelihood during project execution
E	Practically Impossible	Once in 100 or more facility lives or 0.1% likelihood during project execution

Where do we apply the RAM? At all stages and Screen

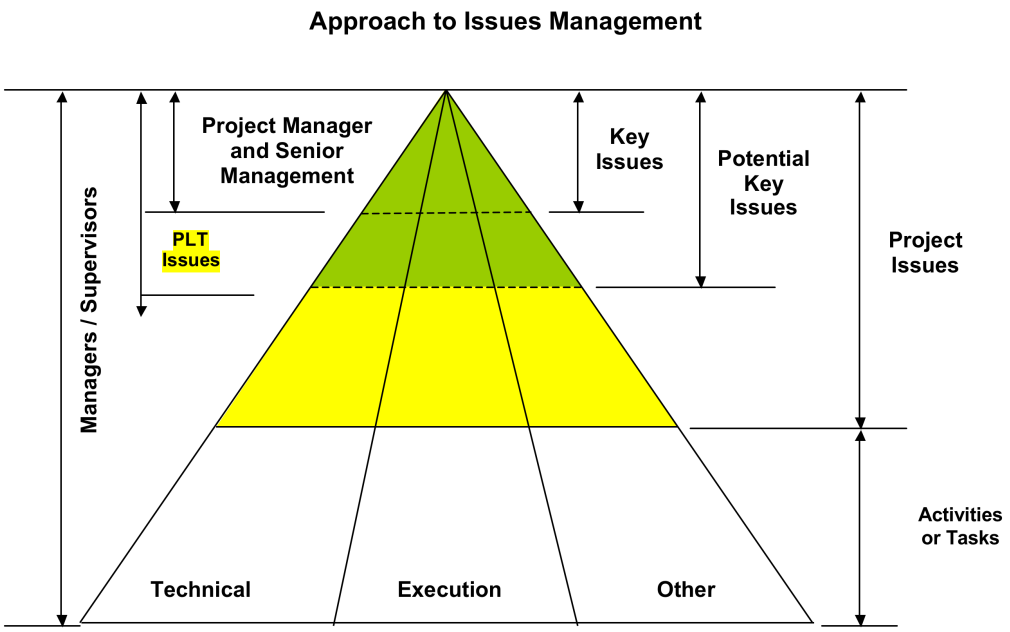
MOC # or Change Description: _____

Complete the questions below by circling to help determine if a risk assessment of the proposed change is required.

Is Risk Assessment applicable? Circle: Y / N

Risk Assessment required if any answer differs from the bolded selection with the asterisks.

	CIRCLE Condition Prior to the Change			CIRCLE Condition Post Change Implementation		
Select: Precautions and Notifications Required	**No**	**Yes**	**Maybe**	**No**	**Yes**	**Maybe**
Will Manufacturing be affected	*N*	Y	M	*N*	Y	M
Will existing systems be bypassed?	*N*	Y	M	*N*	Y	M
Will current design support the change?	N	*Y*	M	N	*Y*	M
Will current Systems be impacted?	*N*	Y	M	*N*	Y	M
Will existing system be adequate?	N	*Y*	M	N	*Y*	M
Will current design layout change?	N	*Y*	M	N	*Y*	M
Will potential for faces increase?	*N*	Y	M	*N*	Y	M
Will thread size be affected?	*N*	Y	M	*N*	Y	M
Will temperature be affected?	*N*	Y	M	*N*	Y	M
Will there be potential ergonomic considerations? (Noise, access, body position, reach, lighting, etc.)	*N*	Y	M	*N*	Y	M
Will existing personal protective equipment be adequate?	N	*Y*	M	N	*Y*	M
Will temporary connections be installed?	*N*	Y	M	*N*	Y	M
Will the potential for back flow or blocked flow be increased?	*N*	Y	M	*N*	Y	M
Will existing flow be adequate?	N	*Y*	M	N	*Y*	M
Will the potential for leak or release increase?	*N*	Y	M	*N*	Y	M
Will normal operating discharges increase?	*N*	Y	M	*N*	Y	M
Will materials differ from current standard practices?	*N*	Y	M	*N*	Y	M
Will checklists change?	*N*	Y	M	*N*	Y	M
Will Room Entry procedures be impacted?	*N*	Y	M	*N*	Y	M



ALARP

Although the tools used in its assessment vary, demonstrating ALARP always relies on the following practical steps:

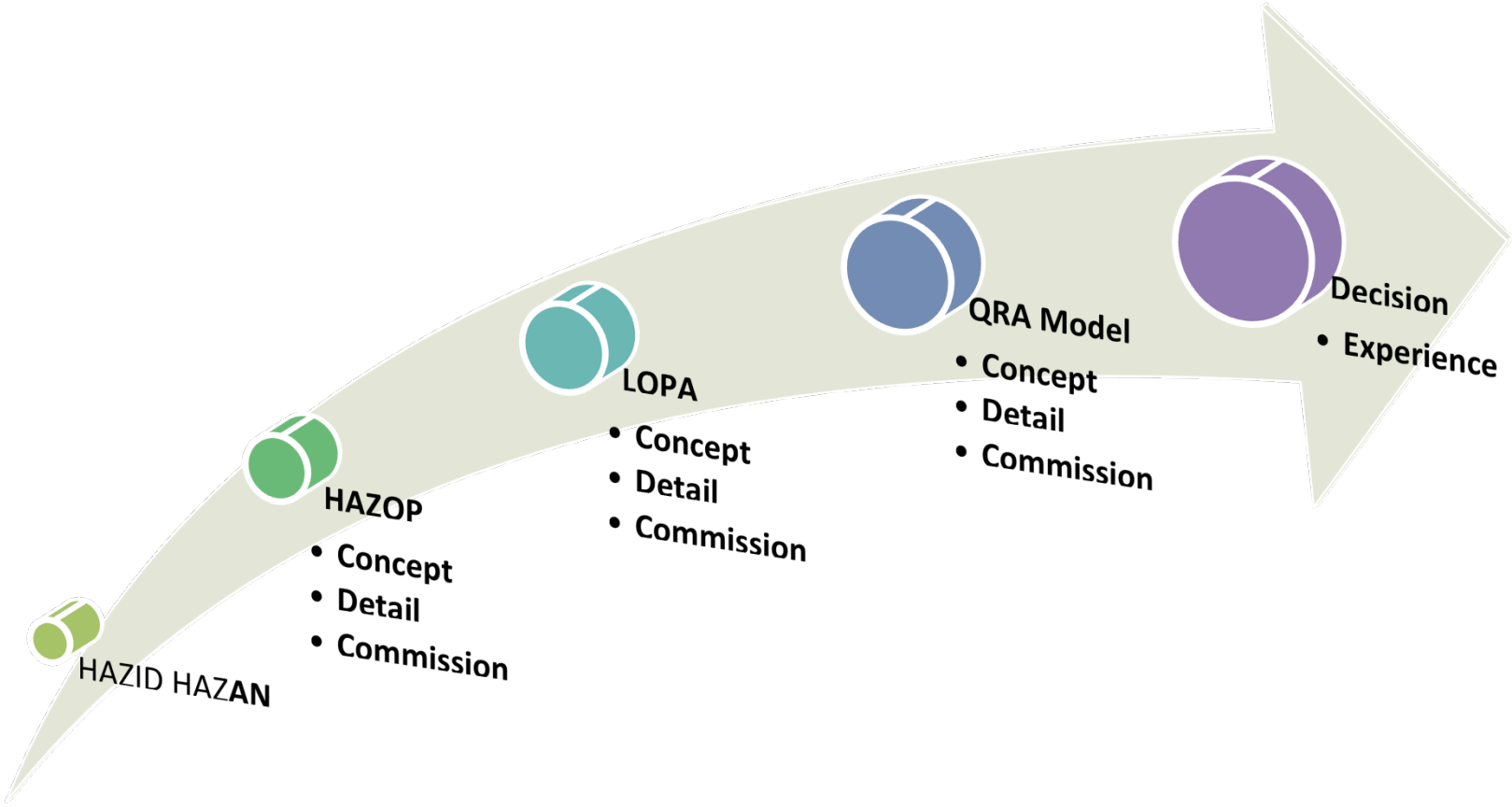
1. Identify various control options and estimate the cost of implementing each option.
2. Identify any applicable qualitative or quantitative standards for controlling the particular risk.
3. Assess (qualitatively or quantitatively) the level of risk that remains when each control is implemented.

To reduce a risk to ALARP involves balancing the reduction in risk achieved by use of specific controls against the effort and cost of achieving this risk reduction.

ALARP represents the point at which the effort and cost of further reduction measures become unreasonably disproportionate to the additional risk reduction achieved.

The BRE Cost Benefit Analysis for Sprinkler systems report 264227 rev 1. displays that the cost outweighs the benefits. Blueproof at a fraction of the cost satisfies ALARP.

Timeline Concept revisit through each stage



Why not apply the other tools at the concept stage?

You do not need to unless you are fast tracking and then you need expert advice and input. It's a waste of time and money and is a corporate risk in itself. They need to be scheduled into a risk management plan.

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- Are structured brainstorming techniques that are particularly useful in the early stages of a development, either as a stand alone exercise or as part of a more general review. The ‘prompt’ or ‘checklist’ approach guides the less experienced and prompts the experienced.
- Success when using the techniques depends upon a properly constructed team being well managed and having the opportunity to think beyond the checklist and identify the unusual.
- Nb. A check list of guidewords can be found in the ISO.

HAZARD Identification

Some Key guidewords From ISO

Hazard Number	Hazard Description	Safety	Health	Enviro	Sources
H-01	Hydrocarbons				
H-01.01	Crude oil under pressure	MH	C	D	Flowlines, pipelines, pressure vessels and piping
H-01.02	Hydrocarbons in formation	MH		D	Oil wells especially during well drilling and entry/workover operations
H-01.03	LPGs (e.g. Propane)	MH	C	D	Process fractionating equipment, storage tanks, transport trucks and rail cars
H-01.04	LNGs	MH	C	D	Cryogenic plants, tankers
H-01.05	Condensate, NGL	MH	C	D	Gas wells, gas pipelines, gas separation vessels
H-01.06	Hydrocarbon gas	MH	C	D	Oil/gas separators, gas processing plants, compressors, gas pipelines
H-01.07	Crude oil at low pressures	MH	C	D	Oil storage tanks
H-01.08	Wax	F	C	D	Filter separators, well tubulars, pipelines
H-01.09	Coal	F	P	R	Fuel source, mining activities
H-02	**Refined Hydrocarbons**				
H-02.01	Lube and seal oil		C	D	Engines and rotating equipment
H-02.02	Hydraulic oil		C	D	Hydraulic pistons, hydraulic reservoirs and pumps
H-02	**Refined Hydrocarbons (cont'd)**				
H-02.03	Diesel fuel		C	D	Vehicle fuelling stations, vehicle maintenance
H-02.04	Petroleum spirit/gasoline	F	C	D	Vehicle fuelling stations, vehicle maintenance
H-03	**Other flammable materials**				
H-03.01	Cellulosic materials	F			Packing materials, wood planks, paper rubbish
H-03.02	Pyrophoric materials	F	C	D	Metal scale from vessels in sour service, scale on filters in sour service, iron sponge sweetening units

Alternative Concept
Integrated Development of the Shtokman Gas-Condensate Field Phase 1

Hazard Identification Workshop Worksheets of Node 1 (FPSO)

Date: Sept. 22nd-23rd 2009

Section: 1. External Hazards

Hazard Category: 2. Impact of the platform on the natural environment

Guideword	Cause	Consequence	Potential Risk Proba.impact		Prevention measure to be implemented	Protection measure to be implemented	Risk comparison (Higher/Same/ Lower)	Remark
			S	E				
3. Continuous platform discharges to soil	1. No difference identified						SAME	
4. Emergency / upset discharges	1. Increase of gas compression	1. Potential increase of EDP HC volume	P=3 I=3 R=ALARP	P=3 I=2 R=ALARP	1. Design of the flare system	1. Potential increase of heat shielding	HIGHER	
5. Waste disposal options	1. Condensate storage tank cleaning	1. Increase of volume of water to be treated via the existing sump tank; no particular consequence identified			1. None identified at this stage	1. None identified at this stage	SAME	

Section: 1. External Hazards

Hazard Category: 3. Impact of the platform on the human environment

Guideword	Cause	Consequence	Potential Risk Proba.impact		Prevention measure to be implemented	Protection measure to be implemented	Risk comparison (Higher/Same/ Lower)	Remark
			S	E				
1. Nature of the economical geographical environment (agriculture, commercial forestation, fish ponds, etc.)	1. More equipment in operations	1. More operators exposed to process equipments and to climatic conditions	Not quantified	N/A	1. None identified at this stage	1. None identified at this stage	HIGHER	
	2. Only one gas trunkline to shore instead of two	1. Less impact on people and on environment	Not quantified	Not quantified	1. None identified at this stage	1. None identified at this stage	LOWER	
2. Proximity to adjacent industrial installation	1. No difference identified						SAME	
3. Proximity to transport corridors	1. No difference identified						SAME	
4. Proximity to centres of population	1. No difference identified						SAME	

HAZOP

- One of the most widely accepted and powerful of the hazard identification and assessment tools available for reviewing the design of a project.
- It is carried out in varying degrees of detail throughout a project after design checks have been completed.
- HAZOP is not a design tool but a supplementary team checking exercise which also includes the operational aspect of a design as are HAZCON & HAZDEM.
- The HAZOP actions are recorded in a log and closed out. They are recorded during the session on specialist software.
- Key guidewords are used throughout the study. Flow, no flow etc.

HAZOP WORKSHEET

Node: 001

PARAMETER	CAUSE	CONSEQUENCE	SAFEGUARDS	ACTION	BY
Flow	**Item 003:** Corrosion inhibitor injection at well-pad fails.	Potential corrosion of gathering system.	Alarm provided at the CCR warning operator that corrosion inhibitor has stopped.		
Pressure	**Item 004:** Gathering system at wellheads and CPF isolated.	Pressure rises in gathering system due to solar radiation.	Content of gathering system are two phase. Overpressure will not occur.		
Temperature	No cause				
Reaction	No cause				
Level	No cause				
Composition	**Item 005:** Wellhead fluid is water saturated with 3 to 8% CO_2 and up to 8ppm H_2S	Potential corrosion of gathering system.	Fully rated piping spool from wellheads to well chokes removable and provided with corrosion resistant material. Corrosion inhibitor injection at wellheads (two injection points). Carbon steel flowlines and trunk-lines provided with 6 mm corrosion allowance. Manifolds protected by upstream corrosion inhibitor injection. Gathering system monitoring through corrosion probes and intelligent pigging.		

HAZOP WORKSHEET
Node: 001

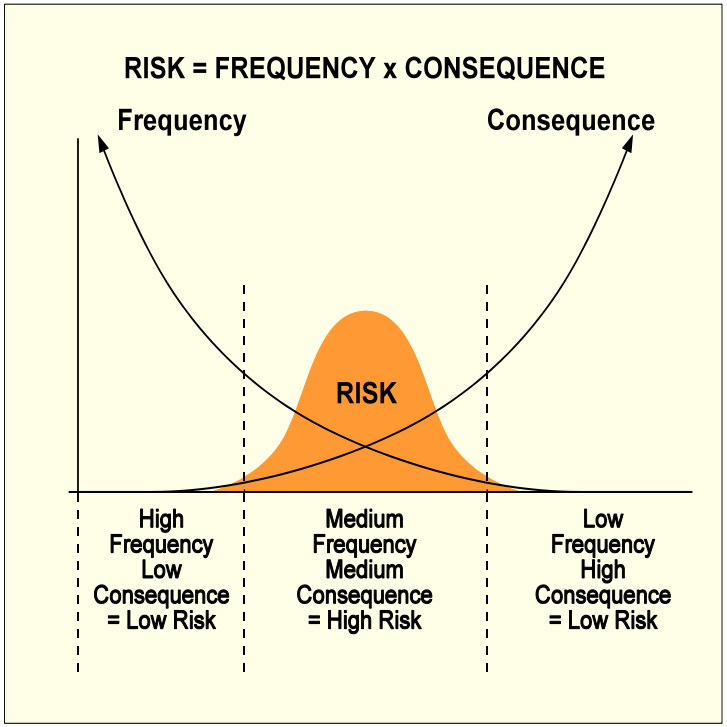
Quantitative Risk Assessment (QRA)

- QRA provides a structured approach to assessing risk and expresses this numerically. The main function of QRA is to identify high risk areas and assist in the comparison of design options with a view to establishing effective and efficient risk management.
- QRA helps to analyse options to establish whether or not ALARP has been achieved.
- The accuracy of QRA studies means that the comparison of calculated numbers with specified numerical criteria must be used with considerable caution.

QRA

- the risk calculated in a QRA is often in the **'Too High'** area and nowhere near the ‘Negligible’ area. This means that regardless of acceptance criteria set by authorities or others, there is a need to identify further improvements and to implement them if the cost, time and effort can be justified.
- there is always the temptation to use comparison with absolute risk criteria as a means to justify not carrying out risk reduction measures, with data being manipulated solely to meet the criteria. Playing the 'numbers game' in this way could lead to QRA being used to justify risk levels that could realistically still be reduced.
- using statistical likelihood values carries with them a set of inherent assumptions which may or may not be appropriate for the project being studied.

Determination of Risk



On the left side of the curve the consequences are too small to cause concern, regardless of the probability.

On the right side the consequences could be dramatic but the probability is so low that it would be more effective to invest in those risk reduction measures which concentrate on the events contributing to the peak of the risk curve.

This can be easily aligned with the Risk Matrix.

Hazards and Effects Register

An HSE Case has to demonstrate that:

- all hazards, effects and threats have been identified
- the likelihood and consequences of a hazardous event have been assessed
- that controls to manage potential causes (threat barriers) are in place
- that recovery preparedness measures to mitigate potential consequences have been taken.

Assembly of the Hazards and Effects Register, which forms part of the HSE Case, begins at the design and development stage of a project when hazards and effects from this phase are incorporated.

For Traceability In the HAZOP use ISO key prompts as they are traceable in the register and are tied to the Major Accident Hazards (MAH)

Table A2: QRA Major Accident Hazards and Effects Register

MAH Ref	MAH / Source	Event Ref	MAH Event Description	QRA			Physical Effects													Key Risk Modeling Considerations/Notes
				BL	PMP/PGU	MTI	RE_1 : Release – open Air	RE_2 :Release – Internal	RE_3 : Release – Subsea	RE_4 : Flammable Gas Buildup	UN_1 : Flammable Gas Dispersion – From Internal Source	UN_2 : Flammable Gas Dispersion – Open Air	UN_3 : Jet Fire – Liquid/Gas/2Phase	PF : Pool Fire	CF : Compartment Fire	VF : Vent Fire	EX : Explosion/ Flash Fire	SD_1 : Smoke Dispersion – From Internal Fire Source	SD_2 : Smoke Dispersion – Open Air Fire Source	
CD - Loss of Containment Conductors																				
DO - Dropped Objects																				
DO	Dropped/Swinging Objects	DO_1	Dropped Object : Deck Cranes : Overboard	'	Y	'	**See Appendix F: Dropped Objects**													• Dropped objects could be a cause of LOC during all phases - object could impact topsides flowlines (from wellbay etc) or be dropped overboard onto gas/liquid lines. Included in QRA as a cause of LOC • Crane 1 much more restricted in Phase MTI – increased potential for operator error • Crane 1 lifts in close proximity to OTM and GDM in Phase 1B/MTI – increased potential for LOC from these sources • Frequency of dropping FROG to take into account summer/winter and changes over the phases and more difficult crane ops (Crane 1) in Phase 1B/MTI
		DO_2	Dropped Object : Deck Cranes : Onboard	'	Y	'														
		DO_3	Dropped Object : Drill Floor	'	Y	'														
		DO_4	Dropped Object : BOP	'	Y	'														
		DO_5	Dropped Object : Personnel Transfer(Frog)	'	Y	'	**See Appendix J: Mari**													
VI - Vessel Impact																				
VI	Vessel Impact	VI_1	Large Errant Passing Vessel Impact	'	Y	'	**See Appendix**													
		VI_2	Attendant Visiting Vessel Impact	'	Y	'	**See Appendix**													
		VI_3	Offtake Tanker Impact	'	Y	I	**See Appendix**													

Risk Ranking	
C	Compulsory impact reduction
I	Intolerable
N	Not ranked
T	Tolerable

Code	Risk ID No.	Hazard ID Ref.	Location	Hazard	Threat/Risk Scenario	Barriers (Initial Control)	Recommendation for further control or mitigation	Initial Risk Ranking
1	**Hydrocarbons**							
1.01	Oil under pressure	Flowlines, pipelines, pressure vessels and piping	No simultaneous drilling and production					
1.02	Hydrocarbons in formation	Oil wells especially during well drilling and entry / workover operations	Hydrocarbons in reservoir	Loss of containment, well control issue, blowout, H_2S, SO_2, ignition, explosion, jet fire, fatalities, possible impact of whole island and neighbouring facilities		CHCD when drilling near reservoir, BOP, corporate drilling well control procedures, C and K, drilling systems, detection, ESD, electrical isolation, BA systems, cascade systems, TR system, IBEEV, emergency response system, TR impairment assessment, competence, personnel training, active and passive fire protection, FRA	Action 1: Conduct gap analysis of existing studies and procedures for applicability to this concept when moving into FEED	5B
1.03	LPGs (e.g. Propane)	Process fractionating equipment, storage tanks	Cutting gases	Personnel injury, fatality, explosion, BLEVE, missile, fragmentation		Standard controls relating to welding gases, corporate procedures	Action 2: Define safe location for the cutting gas stores	4A
1.04	LNGs	Cryogenic plants,						
1.05	Condensate, NGL	Gas wells, gas pipelines, gas separation vessels	See 1.01 above					
1.06	Hydrocarbon gas	Oil/gas separators,	See 1.02 above					
1.07	Oil at low pressures	Oil storage tanks	See 1.01 above					
1.08	Wax	Filter separators, well						
1.09	Coal	Fuel source, mining activities						
1.10	Gas released from other location		Gas release	Injury and fatality related to toxic H_2S/SO_2 threat, potential ignition if close to source		Detection system, inter-field emergency response, personnel protection and emergency response provisions on island		5B
2	**Refined hydrocarbons**							
2.01	Lube and seal oil	Engines and rotating equipment	Lube oil store and day tanks close to users	Loss of containment, possible ignition, possible injury and fatality localised to the situation, environmental impact				3A
2.02	Hydraulic oil	Hydraulic pistons,	See 2.01 above	See 2.01 above				3A
2.03	Diesel fuel	Engines, storage	As above, external store, internal day tanks, generators, boilers, cementing unit, incinerator, vehicles, wire line unit generators, IBEEVs, IB supply vessels, bunker systems	Potential for loss of containment, ignition, possible exposure to moving object, HRA, environmental impact		Fire detection, fire water monitors, main storage area is bunded, geotechnical layer on the island, housekeeping procedures, supervision, inspection tours, fire protection, environmental protective measures, environmental response measures		3A
2.04	Petroleum spirit/gasoline	Storage	Thinners, degreasing solvents	Localised fires, injury, fatality			Action 3: Review location and associated measures for these fluids, as part of the FEED FRA	3A
2.05	Miscellaneous mud and completion fluid additives						Note: Refer to MSDS during operations	
2.06	Grease / wax products		See 2.04 above					
2.07	Base Oil			Loss of containment, environmental impact, occupational hazard (slips)		Non-flammable, as above (2.03)		2A
2.08	Glycol			See base oil above		Small volumes in drums and as above (2.03)		2D
2.09	Aviation Fuel, only on the attendant aircraft							
3	**Other flammable materials**							
3.01	Cellulosic materials	Packing materials, wood planks, paper rubbish	Various locations, offices, LQ etc.	Ignition, localised fire, environmental / reputation, smoke, injury		Good housekeeping, site and corporate specific environmental policy, risk		2B

Priority H/M/L	People	Assets	Environment	Reputation	Risk Management Strategy	Target Completion Date	Progress Status	Target Date	Responsible Department	Actionee	Interested Party	Final Risk Ranking	Assets	Environment	Reputation	Source Code	Source Ref.	SHEAMS Ref.	ALARP Ref.	Risk Status

Freeze

What does a Freeze mean?
At the time of signing a contract, apart from changes in the law, all
Codes and standards are frozen otherwise you end up in a endless loop of change.

It is also the date that you freeze the design otherwise it becomes an endless circle of re design.

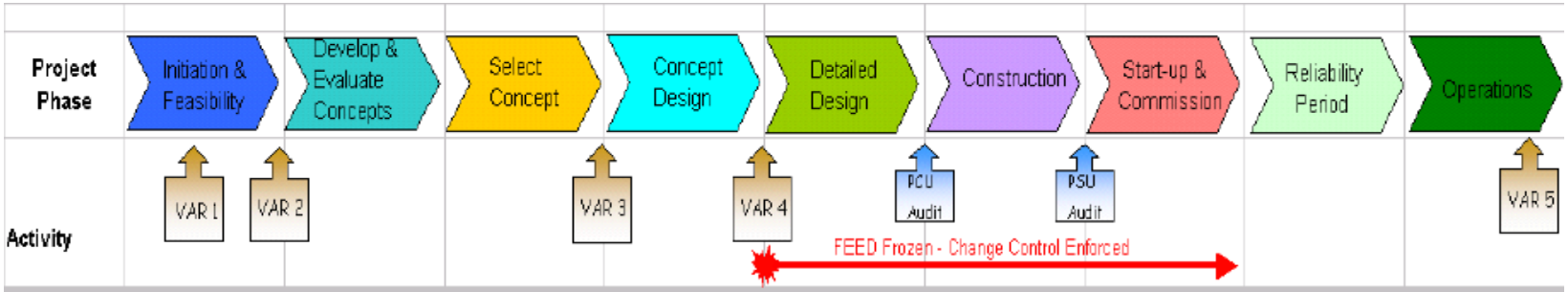
Prior to the freeze it's a positive change

After the freeze it's a negative change and change control is enforced.

Where the negative normally costs more than the positive.

This can be seen on the next slide.

Freeze



HSE-MS									
Management system	Input from subsurface (etc.) HSE management system			Major Project Team specific definition of DMP HSE-MS					Dissemination of Lessons learned during the Project
Regulatory requirements and Standards	Establish Strategic HSE & SD Objectives	Compile relevant legislation and Project Standards in HSE Premises Document	Review to check that alignment of concept with ISO 14001 will be possible (& other HSE standards as they are adopted by SEIC)	Alignment of Design with ISO 14001 (& other HSE standards as they are adopted by SEIC)	→	→	→		
HSE & SD Plan	Develop detailed HSE & SD Plan up to end of VAR3			Develop detailed HSE & SD Plan up to end of VAR4 and outline for remainder of Project	Develop detailed HSE & SD Plan up to and including Commissioning & Start-up	→			
Hazard & Risk Register	Initiate and maintain Hazard & Risk Register (based on HAZID output)	→	→	Review Hazard & Risk Register & close-out (where possible) before concept design is frozen	Review Hazard & Risk Register & close-out (where possible) before detailed design is frozen	→	Transfer remaining hazard and risks into the Asset Hazard & Effects Register		
HSE Audits and Reviews			Formal HSE Review of Evaluated Concepts and confirmation that selected one is acceptable	Formal HSE Review of FEED and supporting HSE studies. Ensure risks have been identified and addressed.	Review / audit to ensure implementation of all HEMP study recommendations	Pre Construction Audit	Pre Start-up Audit covering - technical aspects - organisational - HSE / SD issues		Post implementation Audit (VAR 5)
HSE Cases	Prepare HSE Content of Feasibility Report		Prepare Concept HSE Case - HSE justification of selected concept. Demonstration that risks are tolerable & ALARP.	*Update Concept HSE Case.* *Design/end FEED HSE Case/ALARP statement*	Begin preparation of Operational HSE Case	Prepare commissioning & start-up HSE case	→ Finalise Operational HSE Case Prepare Manual of Permitted Operations (MOPO)		
Technical									
Philosophies		Establish preliminary	→	Finalise philosophies for					

Fire Risk Analysis (FRA)

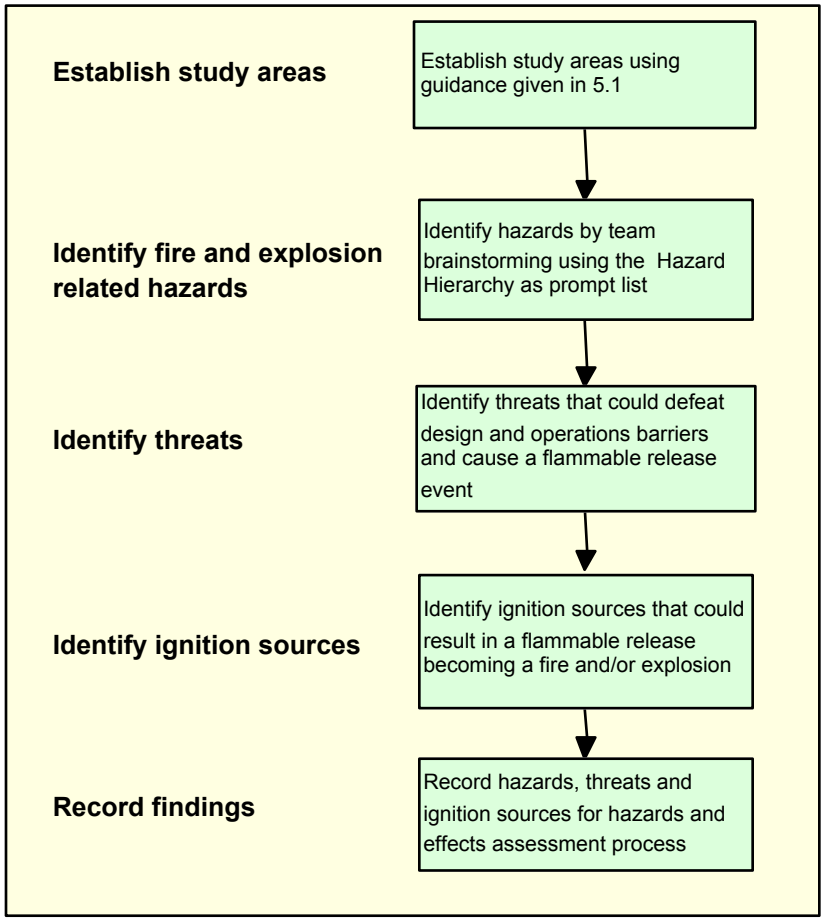
To identify deficiencies and opportunities for improvement in order to meet objectives with respect to fire and explosion management.

The FRA methodology is, of necessity, an iterative process which begins by either using an existing Fire and Explosion Scenario (FES) or creating an FES objectives statement.

Once assessments or reviews of prevention and protection levels have been made and initial recommendations recorded for each study area, the FES should be re-visited to ensure that the recommendations are in line with the objectives and are also realistic.

Control of ignition sources can form part of both threat and escalation controls within the HEMP process.

Fire Risk Analysis



Once hazard areas have been established the process of hazard identification can start.

Hazards will not all be of the hydrocarbon type although these are likely to be the major ones.

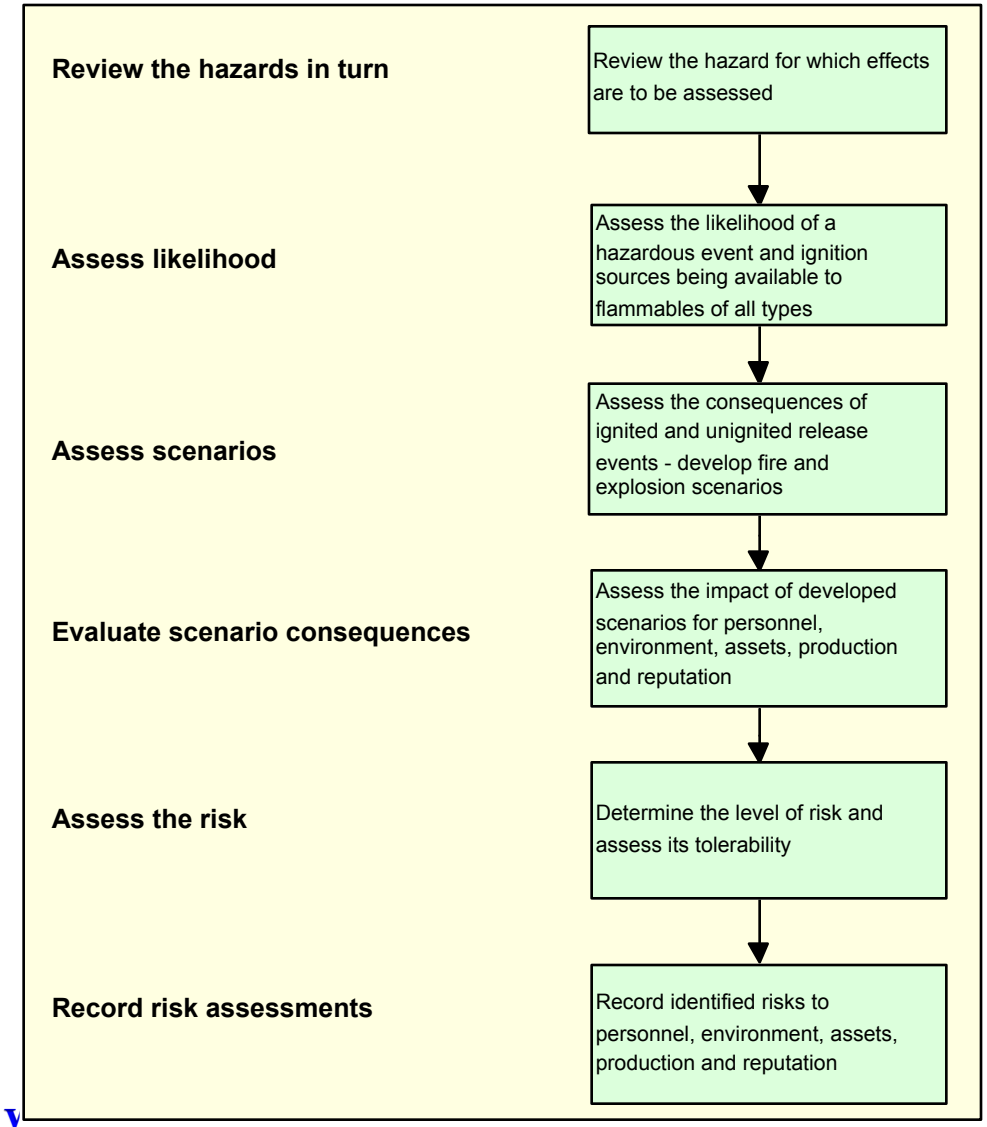
Other hazards relating to fire and sometimes explosions are found in control rooms, transformer rooms, switchgear rooms, turbine enclosures and accommodation.

Tie to the ISO H-01 hydrocarbons (flammable Hazard) for traceability

5.1 Establish study areas with the potential for fires and explosions as follows:

- divide the building into study areas for analysis
- focus the team on each study area in sequence
- establish the criticality of the furnishings and threat in each area

Fire Risk Analysis



Assess threat control measures

Review threats for each hazard
In turn

Assess the threat control
Measures (barriers)
(Where in industry a smoke or fire detector depowers electrical ignition sources, in the home it Just gives alarm)

Record findings

BLUERAD

Performance Standards

A performance standard is a specification, either qualitative or quantitative, of the performance required of a safety critical element or item of equipment and which is used as the basis for managing the hazard through its life-cycle.

They illustrate the relationship between the Major Accident Events (MAE) and safety critical

elements. It also describes the roles that each safety critical element is associated with:

- cause – system has the potential to initiate the MAE;
- prevention – system exists to prevent the MAE occurring;
- detection – system provided to detect hazards which lead to the MAE; and,
- mitigation - systems that exist to aid activities designed to protect life / assets / environment when the MAE occurs. They should be traceable back to ISO and numbered accordingly.

Performance Standard

EPE Barrier Ref	DETECTION SYSTEMS – DS001	**SCE Goal**	• To detect all flammable gas accumulations, oil mist accumulations, the presence of toxic gases (H2S and CO) and all fires that could lead to a Major Accident Hazard (MAH) • To inform control room personnel through panel indication • To provide input to executive action.(note Executive actions not applicable to Oil Mist or Toxic gas detection).

SAFETY CRITICAL ELEMENT 001/003: PILTUN-B FIRE & GAS DETECTION & CONTROL SYSTEM (PS 001)

Function No.	Function Criteria (Functional requirement of the SCE pan EPE)	Generic Acceptance Criteria (Required content as written pan EPE)	Local Acceptance Criteria (Required content but criteria - measurable parameters, inventories, locations etc - will be site specific)	Acceptance criteria			Assurance			
				Tag Number	Measured Standard	Unit	Freq	Origin of Frequency	Task List ID	Assurance Task
1	Flammable Gas Detectors To measure the concentration of flammable gas across a defined range. Upon detection of sufficient quantities of flammable gas will generate the appropriate indications and panel alarms and to initiate executive actions as detailed in the Fire & Gas Cause and Effects.	XXPS-F001-01-01 Flammable Gas Detection Function Test and Calibration Check for Point, Beam & Gas Turbine Gas Detectors: The detectors for area monitoring and/or HVAC ducting shall alarm at the following levels: (see Local Acceptance Criteria)	Point gas detectors: General area coverage (Hazardous or non-hazardous areas), all ventilation exhausts from hazardous areas. Low Level Gas - 20%LEL High Level Gas - 50%LEL All air Intakes (Ventilation or combustion), turbine air exhausts, cranes Low Level Gas - 10%LEL High Level Gas - 20%LEL Ref. Fire and Gas System Design Philosophy 3400-T-30-06-S-7001-00-05. (Section 6.32) Executive action will be as defined in "Fire and Gas System Cause and Effect Charts" 3000-T-30-06-Z-7001	All the tag numbers are located in "Fire and Gas System Cause and Effect Charts" 3000-T-30-06-Z-7001-00 -G	20 % (Low) 50% (High) 10 % (Low) 20% (High)	% Vol LEL	2Y	IPF Review SIL-2 (To be confirmed)	RUDEGD-11	Field devices to be function tested every 2 years using calibrated methane gas. The designated Technical Authority review the quality of the Standard text procedures are clear and refine the acceptance standards. Technical Authority review the history records are specific to the Tag Functional Location and acceptance standards have been achieved the scheduled frequency.

Health Risk Assessment HRA

Is the issue and commitment to mitigating the impact of the risk.

- Specific policies, solutions and relevant documents

The HRA is governed by the Health Hazards and Effects Management Process part of HEMP.

The first stage is to develop the HRA RAM.

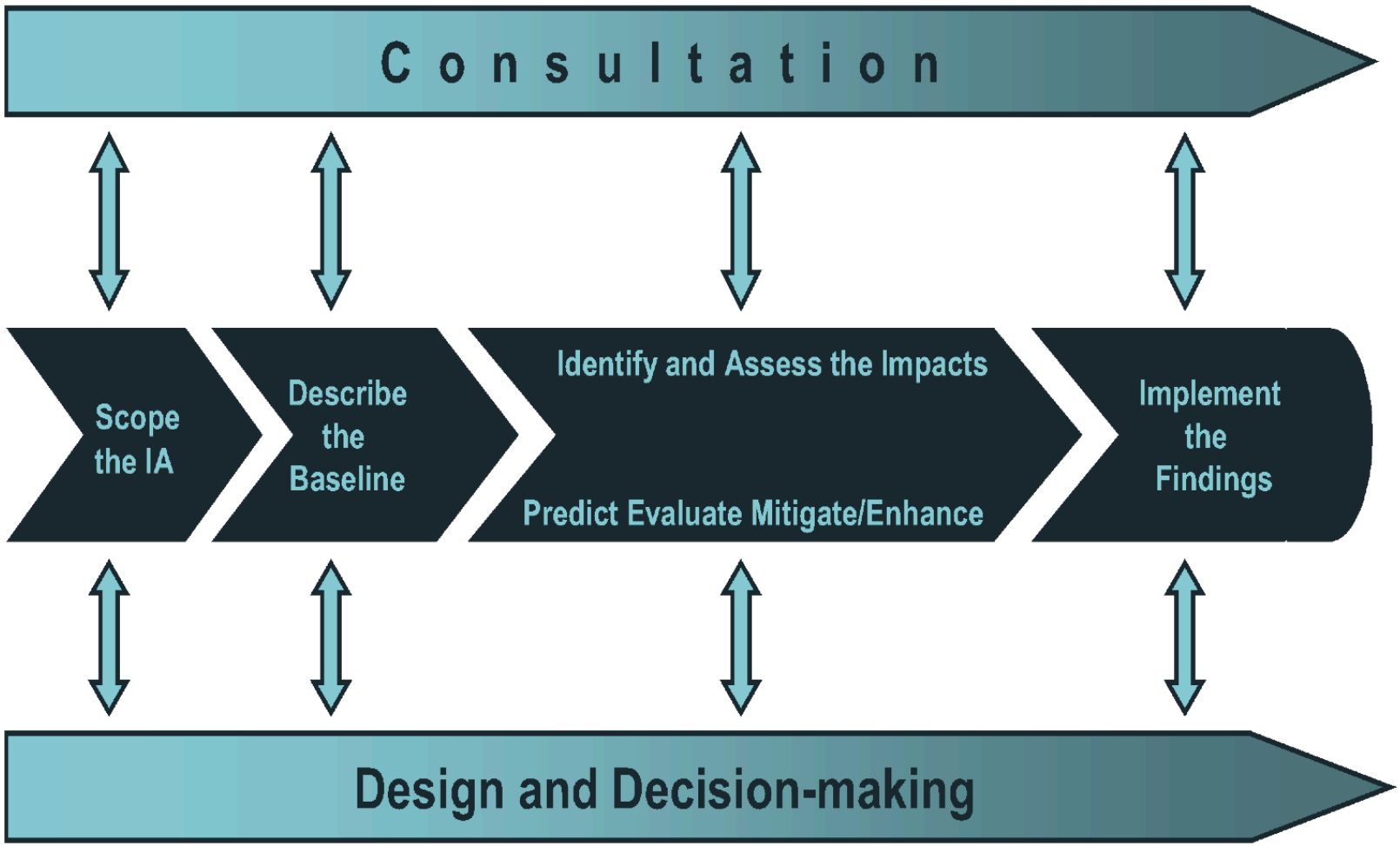
The second stage is to address the Health Impact Assessment (HIA).

The third stage is to build the assessment sheets.

HRA (People Environment Asset Reputation (PEAR)) RAM

Potential Consequences					A	B	C	D	E
Harm to People P	Environmental Impact E	Asset Damage A	Reputation Impact R		Never heard of in the industry	Heard of in the industry	Incident has occurred in BLURAD LTD.	Happens several times per year in BLURAD LTD.	Happens several times per year at location
No injury or damage to health	Zero Effect	Zero Damage	No Impact	0	Low	Low	Low	Low	Low
Slight injury or health effects (including FAC and MTC), not affecting work performance, or causing disability	Slight effect: local environmental damage within fence and subsystems	Slight damage: no disruption to process (costs less than US$10,000 to repair)	Slight impact: public awareness but no public concern	1	Low	Low	Low	Low	Low
Minor injury or health effects affecting work performance (eg RWC or minor LTI < a few days, reversible health effects)	Minor effect: contamination, single complaint,no permanent effect	Minor damage: brief process disruption (costs less than US$100,000 to repair)	Limited impact: local public concern (eg may include media/political)	2	Low	Low	Low	Medium	Medium
Major injury or health effects (eg prolonged work absence, irreversible health damage)	Local effect: limited loss of discharges of known toxicity, beyond fence	Localised damage: partial shutdown (costs up to US$1,000,000 to repair)	Considerable impact: regional public or slight national media/ political attention	3	Low	Low	Medium	Medium	High
1 to 3 fatalities or Permanent Total Disability from injury or occupational illness	Major effect: severe environmental damage	Major damage: partial operation loss, eg 2 Weeks shutdown (costs up to US$10,000.000)	National impact: national public concern, mobilisation of action groups	4	Low	Medium	Medium	High	High
Multiple fatalities from injury or occupational illness	Massive effect: persistent severe environmental damage	Extensive damage: substantial or total loss of operation (costs in excess of US$10,000,000)	International impact; extensive negative attention in international media		Medium	Medium	High	High	High

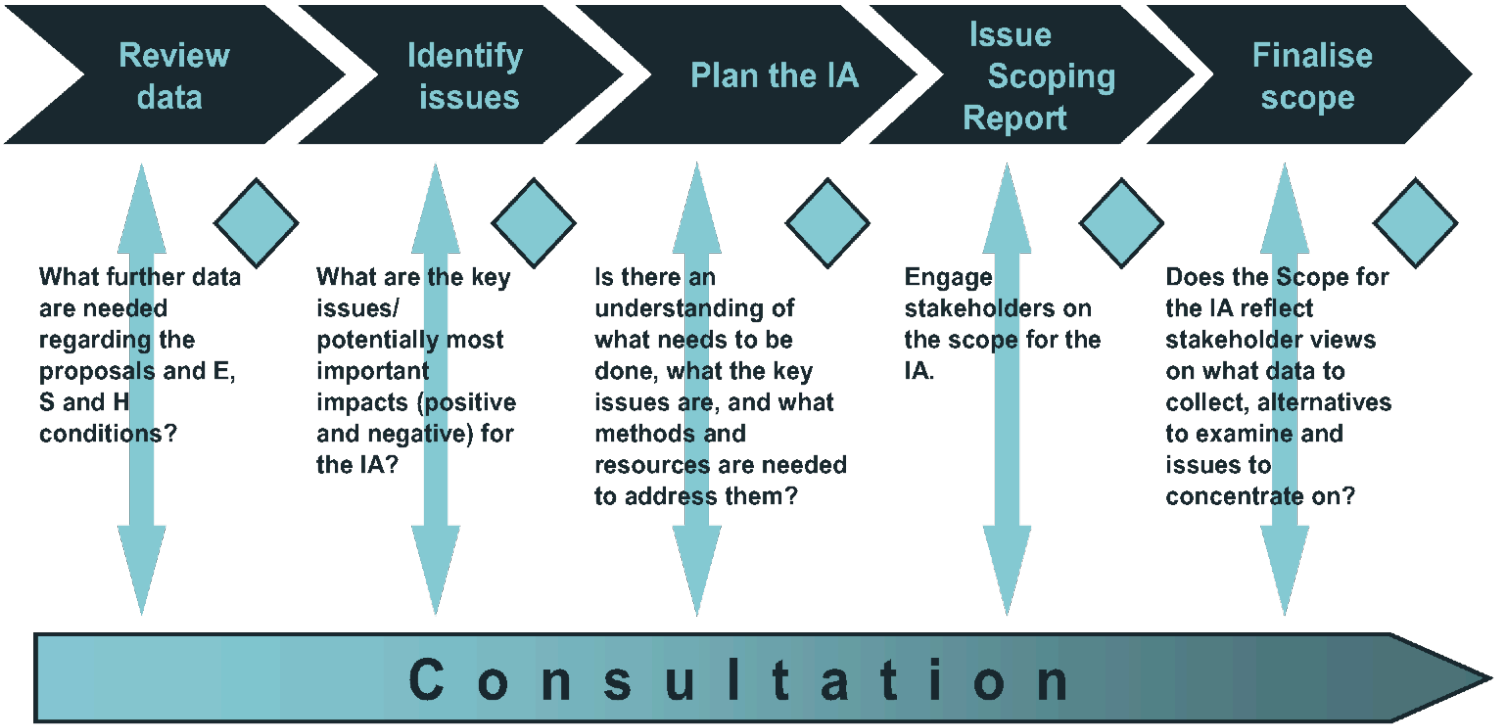
Overview of the Health Impact Assessment HIA Process



Techniques

The following are general techniques for performing a health impact assessment:
Establishing data collection mechanisms e.g., sentinel data points, focus groups, community sampling that survey health status and other details about the community of interest;

- Seeking the views of interested or affected parties through mediation/enhancement;
- Using standard data collections of epidemiological, health, or vital health statistics; and,
- Performing a health risk assessment or comparative risk assessment.



Assessment Sheet

HEALTH HAZARDS AND EFFECTS MANAGEMENT PROCESS

HAZARD:

POSSIBLE CONSEQUENCES, ACUTE:

POSSIBLE CONSEQUENCES, CHRONIC:

ASSESSMENT

EXPOSURE THREATS:

CONTROLS

NUMBER	TYPE	EV

RECOVERY

NUMBER	TYPE	EV

RAM Rating | Risk to Health | Assessor: | Da

HEALTH HAZARDS AND EFFECTS MANAGEMENT PROCESS

HAZARD: Diesel

POSSIBLE CONSEQUENCES, ACUTE: Narcotic, vapour can cause headaches, dizziness, drowsiness, nausea, unconsciousness. Flammable hazard.

POSSIBLE CONSEQUENCES, CHRONIC: Skin irritation, dermatitis. The presence of benzene could indicate potential for anaemia and other blood diseases, including leukaemia (see Benzene). Low potential for skin and scrotal cancer following chronic exposure.

ASSESSMENT

EXPOSURE THREATS:

1	Inhalation, skin and eye exposure when transferring diesel from ships to storage tanks.
2	Inhalation and skin exposure from leaks and spillages.
3	Inhalation and skin exposure during filter changing and coalescer maintenance work.
4	Inhalation and skin exposure during sampling and laboratory testing.
5	Inhalation and skin exposure while using diesel to clean engine parts and other equipment
6	Inhalation of diesel fumes from process e.g. turbines, generators

CONTROLS

No.	Type.	Evidence
1-5	Diesel is covered by the application of the Chemwatch process.	SCAT
1	The loading, storage and delivery process is mainly sealed, so exposure should be confined to spillages when connecting and decoupling hoses	MSDS
2	Leaks are repaired as soon as they occur. Spillages cleaned up as soon as operationally possible. Specific diesel	monitoring programmes
4	Samples are taken at specially designed sample points. Location diesel surveys	
4	Standards for sampling and testing are given in OCOP 1.012 Diesel Fuel Oil Monitoring at Onshore supply bases and on Offshore Installations.	
5	Other proprietary chemicals are substituted for diesel to conduct this activity.	
6	Monitoring of Diesel fume ingress into areas such as Control Room and accommodation modules. Surveys have been conducted within the Industry for what can be a sporadic problem. Ingress of fumes may emanate from Turbines, Generators etc. Technical specifications of the plant and operational procedures may need to be reviewed to resolve the issue	
6	Oil mist samples should be taken and analysed if there is a problem at your location	

RECOVERY

No.	Type.	Evidence
1-5	Leaks and spillages are absorbed on spill kit media which is then appropriately disposed. Environmental Procedures	
1-5	Skin exposures are washed off immediately, using soap and water	TROIF records
1-5	Effects of vapour exposure are treated by removing victim to fresh air and allowing rest.	FA training
6	Planned surveys to determine root cause and effect remedial action plan	

RAM Rating	4	B	Risk to Health		Medium		Assessor:	Date:

Appendix

Appendix 1

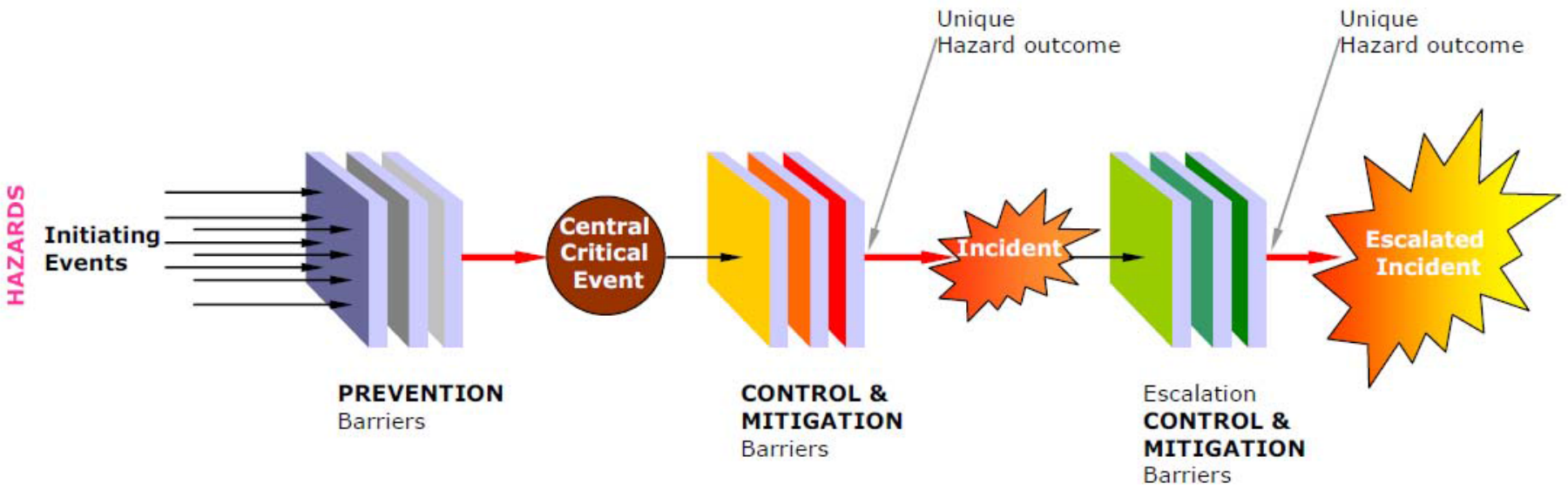
- HSE Figures

		Values (2003 Q3) [1]
FATALITY		£1,336,800 (times 2 for cancer)
INJURY		
Permanently incapacitating injury	Moderate to severe pain for 1-4 weeks. Thereafter some pain gradually reducing but may recur when taking part in some activities. Some permanent restrictions to leisure and possibly some work activities.	£207,2000
Serious	Slight to moderate pain for 2-7 days. Thereafter some pain/discomfort for several weeks. Some restrictions to work and/or leisure activities for several weeks/months. After 3-4 months return to normal health with no permanent disability.	£20,500
Slight	Injury involving minor cuts and bruises with a quick and complete recovery.	£300
ILLNESS		
Permanently incapacitating illness	Same as for injury.	£193,100
Other cases of ill health	Over one week absence. No permanent health consequences.	£2,300 + £180 per day of absence
Minor	Up to one-week absence. No permanent health consequences.	£530

Appendix 2 Reverse ALARP

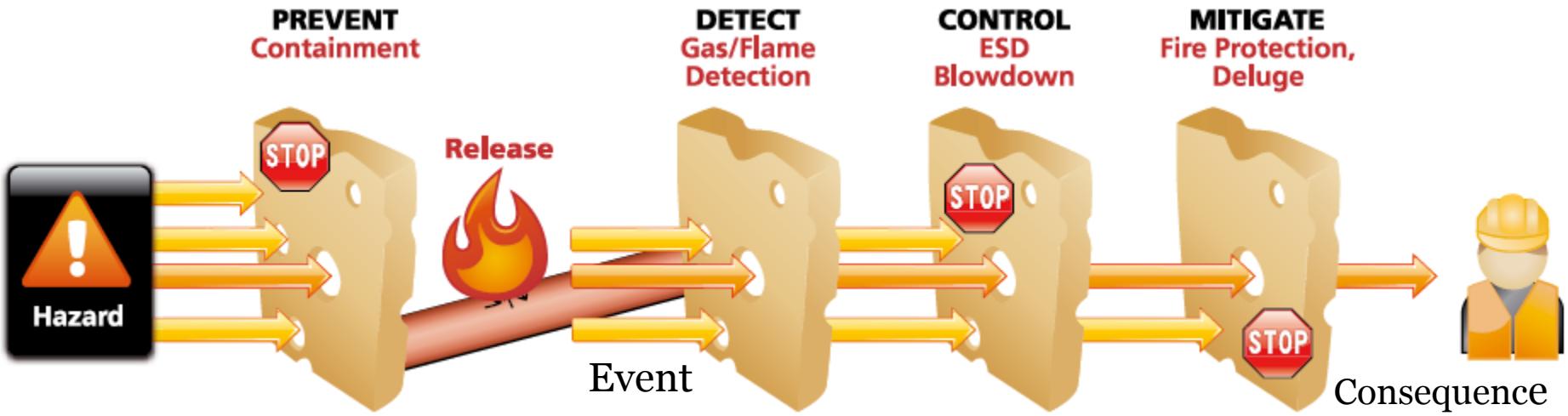
- From time to time Companies have tried to show through QRA and Cost benefit analysis that moving to a less protected situation will meet the legal requirement to reduce risks to ALARP, arguing that the increase in risk is more than balanced by gains in reduced operational costs or in increased operating profit – a “reverse ALARP” argument. In the UK the legal requirement to reduce risks to as low as reasonably practicable rules out the possibility of the HSE Legislator accepting a less protected but significantly cheaper approach to the control of risks when assessing options.
- Blueproof even though it is significantly cheaper in terms of cost benefit analysis also enhances the protection.

Barriers


HAZARDS
Initiating Events
PREVENTION
Barriers
Central Critical Event
Unique Hazard outcome
CONTROL & MITIGATION
Barriers
Incident
Unique Hazard outcome
Escalation
CONTROL & MITIGATION
Barriers
Escalated Incident

‘Swiss cheese’ model

- No barrier is 100% effective
- Some holes due to latent conditions
- Some holes due to active failures



- Aim to 1) eliminate holes 2) make holes small & short-lived
- Multiple barriers reduce chance that holes ‘line up’

Reference: OGP report No. 415

Barriers

Offshore facilities		
Object / hazard outcome description	**Tolerance level [annual frequency of occurrence]**	**Comments/Description**
Vulnerable Objects		
Escalation of external fire or explosion into: • Living Quarter, • Temporary Refuge and muster area • Central Control Room	10^{-4}	Accumulated frequency for each type of load (e.g. fire or explosion from process, utility, riser, blow-out (for drilling rig) etc). Endurance time to be defined.
Impairment of escape ways due to fire, smoke or excessive environmental impact	10^{-2} per demand	For escape possibilities the impairment frequency shall be applied area by area. In order to have impairment, all escape possibilities must be impaired for the personnel that have a reasonable probability of survival of the initial accidental event. This can mean that escape facilities will need to be available for personnel even if they may be within the same fire zone where the accident occurs, if they have a reasonable probability of survival.
Safety Barrier		
Accident escalation through fire/explosion barriers into an other topside process or utility fire area.	10^{-3}	Accumulated frequency considering all potential fire and explosion events (process and utility events) on all barriers surrounding the specific area
Progressive collapse of primary structure due to fire and/or explosion	10^{-4}	Accumulated frequency considering all potential fire and explosion events (process, utility, riser, blow-out etc).

safety or job hazard analyses. The results of these analyses should be prioritized as part of an action plan based on the likelihood and severity of the consequence of exposure to the identified hazards. An example of a qualitative risk ranking or analysis matrix to help identify priorities is described in Table 2.1.1.

2.1 General Facility Design and Operation

Integrity of Workplace Structures

Permanent and recurrent places of work should be designed and equipped to protect OHS:

- Surfaces, structures and installations should be easy to clean and maintain, and not allow for accumulation of hazardous compounds.
- Buildings should be structurally safe, provide appropriate protection against the climate, and have acceptable light and noise conditions.
- Fire resistant, noise-absorbing materials should, to the extent feasible, be used for cladding on ceilings and walls.
- Floors should be level, even, and non-skid.
- Heavy oscillating, rotating or alternating equipment should be located in dedicated buildings or structurally isolated sections.

Severe Weather and Facility Shutdown

- Work place structures should be designed and constructed to withstand the expected elements for the region and have an area designated for safe refuge, if appropriate.
- Standard Operating Procedures (SOPs) should be developed for project or process shut-down, including an evacuation plan. Drills to practice the procedure and plan should also be undertaken annually.

Table 2.1.1. Risk Ranking Table to Classify Worker Scenarios Based on Likelihood and Consequence

Likelihood	Consequences				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catas-trophic 5
A. Almost certain	L	M	E	E	E
B. Likely	L	M	H	E	E
C. Moderate	L	M	H	E	E
D. Unlikely	L	L	M	H	E
E. Rare	L	L	M	H	H

Legend
E: extreme risk; immediate action required
H: high risk; senior management attention needed
M: moderate risk; management responsibility should be specified
L: low risk; manage by routine procedures

Workspace and Exit

- The space provided for each worker, and in total, should be adequate for safe execution of all activities, including transport and interim storage of materials and products.
- Passages to emergency exits should be unobstructed at all times. Exits should be clearly marked to be visible in total darkness. The number and capacity of emergency exits should be sufficient for safe and orderly evacuation of the greatest number of people present at any time, and there should be a minimum two exits from any work area.

IFC International Finance Corporation World Bank Group

Performance Standard 2
Labor and Working Conditions

January 1, 2012

Introduction

1. Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental[1] rights of workers. For any business, the workforce is a valuable asset, and a sound worker-management relationship is a key ingredient in the sustainability of a company. Failure to establish and foster a sound worker-management relationship can undermine worker commitment and retention, and can jeopardize a project. Conversely, through a constructive worker-management relationship, and by treating the workers fairly and providing them with safe and healthy working conditions, clients may create tangible benefits, such as enhancement of the efficiency and productivity of their operations.

2. The requirements set out in this Performance Standard have been in part guided by a number of international conventions and instruments, including those of the International Labour Organization (ILO) and the United Nations (UN).[2]

Objectives

- To promote the fair treatment, non-discrimination, and equal opportunity of workers.
- To establish, maintain, and improve the worker-management relationship.
- To promote compliance with national employment and labor laws.
- To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain.
- To promote safe and healthy working conditions, and the health of workers.
- To avoid the use of forced labor.

Scope of Application

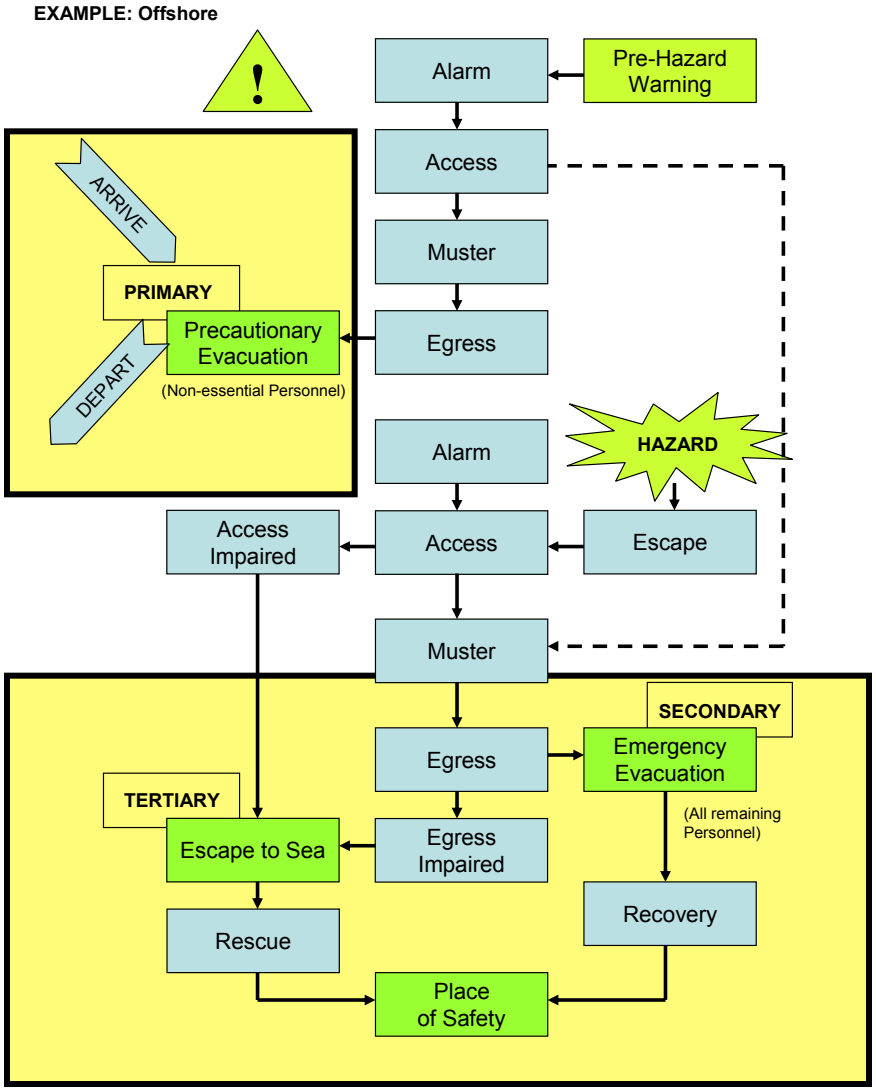
3. The applicability of this Performance Standard is established during the environmental and social risks and impacts identification process. The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client's Environmental and Social Management System (ESMS), the elements of which are outlined in Performance Standard 1.

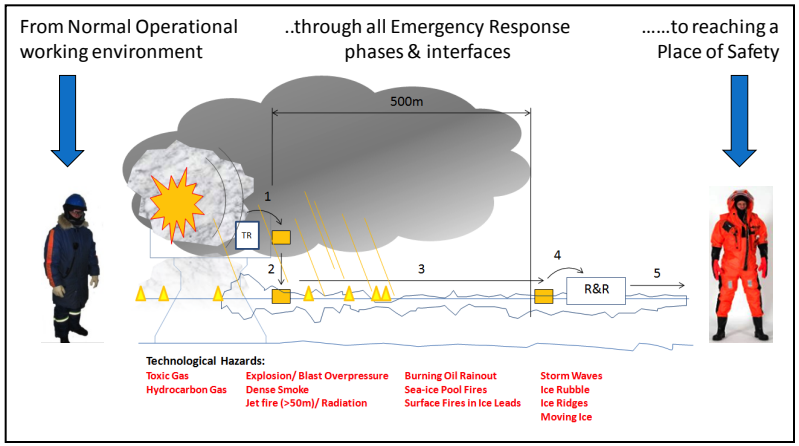
4. The scope of application of this Performance Standard depends on the type of employment relationship between the client and the worker. It applies to workers directly engaged by the client (direct workers), workers engaged through third parties to perform work related to core business

[1] As guided by the ILO Conventions listed in footnote 2.

[2] These conventions are:
ILO Convention 87 on Freedom of Association and Protection of the Right to Organize
ILO Convention 98 on the Right to Organize and Collective Bargaining
ILO Convention 29 on Forced Labor
ILO Convention 105 on the Abolition of Forced Labor
ILO Convention 138 on Minimum Age (of Employment)
ILO Convention 182 on the Worst Forms of Child Labor
ILO Convention 100 on Equal Remuneration
ILO Convention 111 on Discrimination (Employment and Occupation)
UN Convention on the Rights of the Child, Article 32.1
UN Convention on the Protection of the Rights of all Migrant Workers and Members of their Families

Components of Evacuation & Rescue





Risk and Actions with Status Comments

shtokman

SDAG

Filter: ([Package] = 'HSE' And [Status]="Open')

ID	Title	Category	Prob.	Conseq.	Responsible / Division
0076	**Risk for design change as EER & PS not completed**		H	H	Halle, Oyvin
	The offshore site is 550 km from Teriberka with no local emergency response infrastructure or neighbouring rigs or vessel support; in the event of an offshore incident support would take a long time to get offshore and helicopter dwell time on site would be very limited;Offshore emergency response for the survey part is in place and operating. Possible design changes due to incomplete EER and PS (Performance Standard) & Misalignment between FEED and DED. Lack of corporate HSE Statement – Legal Consequences.Previous title 3: Risk for design change as EER & PS not completed, FEED & DED misalignedPreviuos title2: Performance based EER(Escape Evacuation Rescue) not in place, risk for design changes				Offshore

Mitigation	Action/Action Comments	Due Date	Responsible	Action Status
0076.05	SDAG Operations and HSE department to jointly define the additional SDAG requirements for SAR helicopters	29-Feb-12	Halle, Oyvin	Open
*	Will be part of criteria in draft performance standard workshop on 18-19 of October 2011. In addition waiting for BV review.	12-Oct-11	Ganemi, Bager	
0076.06	Re-evaluate the use of helicopters as an evacuation concept given closer shore base and an additional helideck offshore (MRV)	29-Feb-12	Halle, Oyvin	Open
*	belongs to HSE (Phase 1).	12-Oct-11	Ganemi, Bager	
*	Will be part of criteria in draft performance standard workshop on 18-19 of October 2011.	12-Oct-11	Ganemi, Bager	
0076.07	Clarify SDAG requirements for helicopter operations so that potential helicopter service providers can be effectively assessed	29-Feb-12	Halle, Oyvin	Open
*	Will be part of criteria in draft performance standard workshop on 18-19 of October 2011.	12-Oct-11	Ganemi, Bager	
0076.08	Evaluate and provide the available facilities, rescue resources and medical resources on Novaya Zemlya (Rogachevo) to ensure casualties or evacuees are effectively supported on return to shore	29-Feb-12	Halle, Oyvin	Open
*	Will be part of criteria in draft performance standard workshop on 18-19 of October 2011.	12-Oct-11	Ganemi, Bager	
0076.11	Close out of Hazeer / EER study action register	30-Nov-11	Knight, Stephen	Open
*	All other HAZEER/ EER actions are recorded for various disciplines to coordinate and close in the 'Emergency Response Work Plan' - ref: SH1-30-0940-000069 Rev00	29-Nov-11	Knight, Stephen	
*	Will be part of criteria in draft performance standard workshop on 18-19 of October 2011.	12-Oct-11	Ganemi, Bager	
*	The draft MOM have been circulated to EER workshop attendees (ref: SH1-0940-0940-MOM-00xx).Actions are recorded in the MOM for various discip[lines to close	29-Nov-11	Knight, Stephen	
0076.13	Re-evaluate the synergy afforded by SDag taking overall responsibility for field helicopter operations (not by each contractor)	05-Dec-12	Halle, Oyvin	Open
*	To be discuused with Gazprom through logistics, belongs to phase 1-3.	12-Oct-11	Ganemi, Bager	
*	Will be part of criteria in draft performance standard workshop on 18-19 of October 2011.	12-Oct-11	Ganemi, Bager	

0616	**Alignment of required int. and RF standards and norms for ERP**	Reputation HSE	H	H	Halle, Oyvin
	HSE ERP is based on international standards but it is not clear wether it is aligned with RF standards, norms and other regulations. Risks:• HSE ERP misalignment with Russian standard, this including SAR (Search And Rescue), evacuation plan and oil spill on ice• ERP to rescue standby vessel is not preparedMoved to HSEQ after agreement ref. risk meeting Oct.11,2011.				HSEQ
0621	**Lack of HSE requirements and industry safety standards for vessels**	Reputation HSE	H	H	Halle, Oyvin
	Lack of HSE requirements and industry safety standards for vessels				Offshore
0728	**Suspension of offshore work activities due to possible major incidents/accidents on site**	HSE Schedule CAPEX/OPEX	M	H	Halle, Oyvin
	Suspension of offshore work activities due to possible major incidents/accidents on site				Offshore

Mitigation	Action/Action Comments	Due Date	Responsible	Action Status
0728.01	Clarify consequences of possible fatality accidents	29-Feb-12	Halle, Oyvin	Open
0728.02	Clarify the setup of investigation team in case of fatal accidents	29-Feb-12	Halle, Oyvin	Open
0728.03	Procedure for accident and incident handling	29-Feb-12	Halle, Oyvin	Open

0620	**Lack of Safety Procedure and Personal Protective Equipment**		L	L	Halle, Oyvin
	Lack of Safety Procedure and Personal Protective Equipment.We do have a draft PPE strategy being developed but not finalised.Moved to HSEQ ref. agreement in HSE risk meeting Oct.11th, 2011.				HSEQ

Mitigation	Action/Action Comments	Due Date	Responsible	Action Status
0620.01	Establish and implement personnel HSE procedure and equipments being used on sites	15-Nov-11	Halle, Oyvin	Open

0751	**Organisational uncertainties related to PS**				Halle, Oyvin
	Currently there is still a misalignment in understanding and defining requirements in PS.				Offshore

Risk Actions coloured