The Safety Case: Implementing a System for Identifying and Addressing Risks in Offshore Operations

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What is a Safety Case   -   Shell U.S. Perspective

- **Non-prescriptive** - Based on the premise that legislation and regulation set the broad safety goals to be attained and the operator develops the most appropriate methods of achieving those goals

- **Responsibility of the operator** - The ongoing management of Health, Safety, & Environmental Protection (HSE) is the responsibility of the operator and not the regulator. *Those that create the risk must manage it.*

- **Contents** - A HSE case is a document produced by the operator of a facility that:
  - Identifies the hazards and risks
  - Describes how the risks are controlled, and
  - Describes the safety management system in place to ensure the controls are effectively and consistently applied.
**Auditable** - A comprehensive, fully auditable process which clearly demonstrates how:

- HSE risks have been reduced in the field (not just on paper) and
- High risks and major hazards are actively managed during operations.

**Engages the entire workforce** - Preparation of Case involves the workforce in:

- Hazard Identification
- Evaluation of risks
- Identification of barriers and mitigations
- Establishment of Critical Tasks, Training, and Competencies
Case Development Process

- Evaluate each activity fully understanding the work scope and elements
- Identify Hazards, Barriers, and Mitigations
- Identify critical tasks, training, and competencies to prevent or mitigate risks
- Track risks and document risk reduction measures
- ALARP: As Low as Reasonably Practicable
- Continual monitoring and improvement during activity
- After action reviews and document learning's

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Multiple Cases – Multiple Hazids in each case

- Within the Shell Alaska Venture we work with multiple cases
  - Operations
  - Drilling
  - Marine Operations
  - Aviation

- Each case may consist of multiple Hazard assessments
  - Marine Mammal Monitoring & Mitigation Program activities;
  - Marine Science Projects;
  - Marine Operations Support Vessels (crew transfer, supply and emergency response);
  - Stakeholder engagement visits to remote villages.
The Hazard Identification Process

- All activities are evaluated
- Multiple disciplines are involved
- Exhaustive risk identification
- Potential consequences evaluated
- Barriers or mitigations identified
- When evaluating “Major Hazards,” additional tools are utilized

Mitigations may be as simple as proper PPE
Or as complex as a Blowout Preventer
The Bowtie

A Hazard Left Unchecked May produce an event That may lead to neg. consequence
The Bowtie

And may result in multiple possible consequences

Hence, A Bowtie

Event

HAZARDS

Execution

Poor Training

Poor Planning

Inadequate control

Oversight

Consequences

Consequence

Consequence

Consequence
Barriers, Controls, and Mitigations

Ideal Planning Identifies Barriers for Each Hazard

And Mitigations for Each Consequence

Event

Hazard

Consequence

Consequence

Consequence
Swiss Cheese Model

- **Ideal Barrier**: Hazard cannot penetrate
- **Typical Barrier**: Hazard can penetrate
- **Multiple Barriers**: Hazard not likely to penetrate
We train our personnel, we require high levels of competence, we make our requirements clear, we plan carefully, we practice, we employ physical and technological barriers, we test these barriers, etc.
Proactive Measures to Maintain Well Control

**Preparation**
- Training
- Risk Identification and Mitigation
- Contingency Planning
- Flexible Well Design
- Real Time Operations Center & Drilling Well On Paper Pre-planning

**Execution**
- Real Time Influx Assessment (RTOC)
- Well Control Equipment, Maintenance, Inspection and Testing
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 Blow Out Preventer Upgrades

- Back-Up BOP stacks for each rig
- Dual Blind-Shear capabilities on each Stack
- Total Re-Certification by OEM including Pressure Testing and Function Testing
- Redundant BOP Control System accessed via ROV on the sea-floor
RTOC Objectives

Data

Advice
RTOC Dual Hub Deployment

- Alaska
- Canada
- STX
- SVSA
- Brazil
- Other International Floater Operations

- RTOC Hub New Orleans
- RTOC Hub Houston
- Rig

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Summary

• HSE risks in the offshore are managed through adherence to a strict process of hazard identification and risk reduction
• Safety case approach is applied broadly to HSE hazards
• Major Hazards are identified and subject to full case development
• A full toolbox is of barriers, controls, and mitigations is utilized
• This process is fully documented and auditable