Operating in the Post Piper Alpha environment - An Operator's Perspective

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Presentation to the Society for Underwater Technology

13th June 2018

Agenda

- Post Piper Alpha, Summary of Findings
- The Safety Case
- Inherent Safety through Design and Case Study
- Process Safety
- Human Factors and HSE Culture
- The Case for Change, Safety Collaboration in Australia

Post Piper Alpha
– The Findings

The Main Cullen findings [1]:

- New legislation requiring safety cases;
- Goal-setting legislation;
- A single regulator;
- Offshore safety reps and safety committees;
- Revision of permits to work;
- Process control;
- Mandatory incident reporting;
- Hydrocarbon inventory;
- Fire and gas detection and emergency shutdown;
- Fire and explosion protection;
- Emergency centres and system;
- Pipeline emergency procedures;
- Evacuation, escape and rescue plans and equipment;
- Standby vessels;
- Command in emergencies;
- Regular drills and Emergency training

106 recommendations:

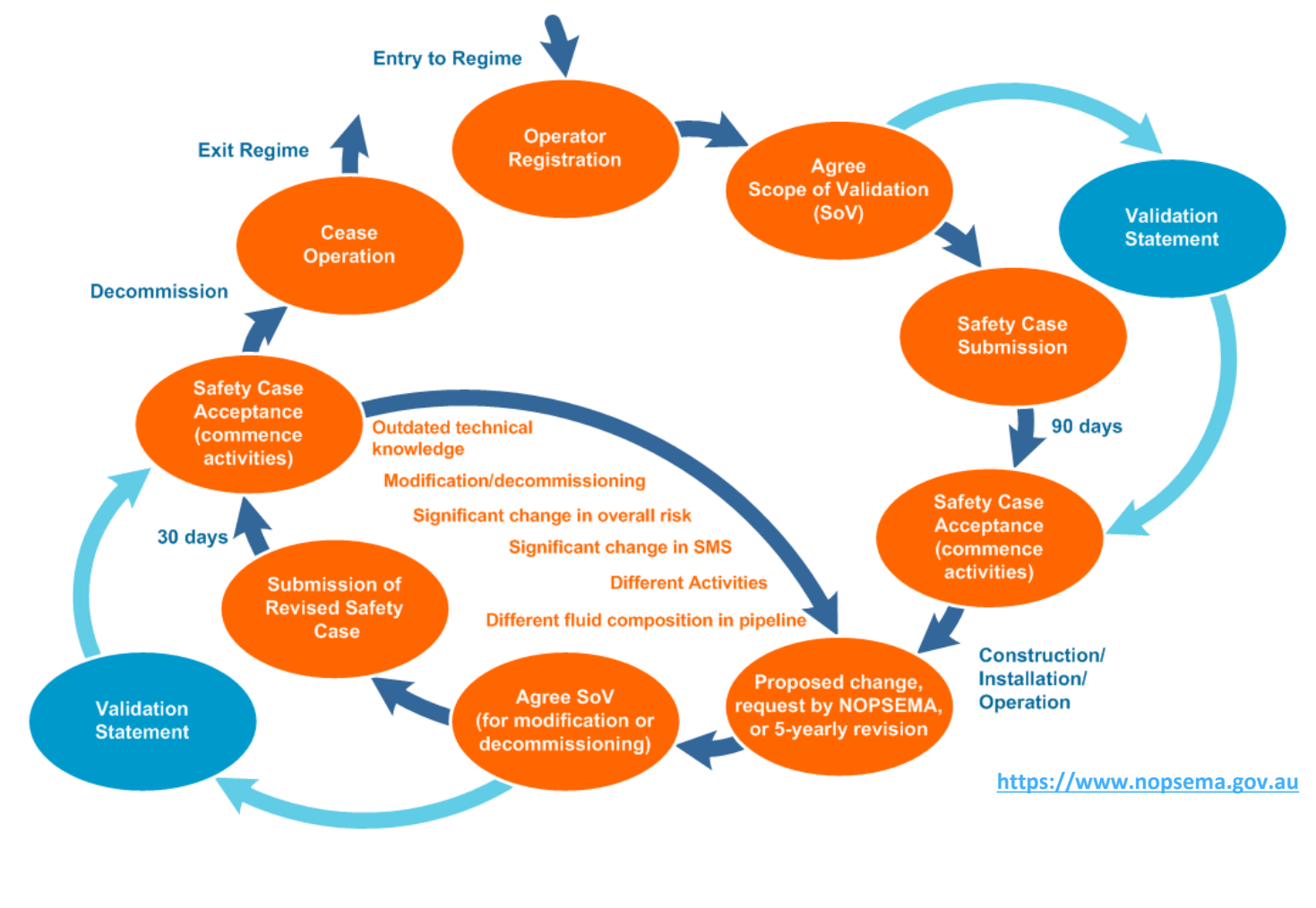
- **57 overseen by Health and Safety Executive**
- **40 executed by Operators**
- **8 for the entire industry to progress**
- **1 for Standby Ship Owner's Association**

All accepted in the UK

[1] Allen, Becky. Piper Alpha: condolences are not enough https://www.healthandsafetyatwork.com/piper-alpha-lessons

The Safety Case
- A Key Finding from Lord Cullen

Identifies the hazards and risks, how they are controlled and SMS

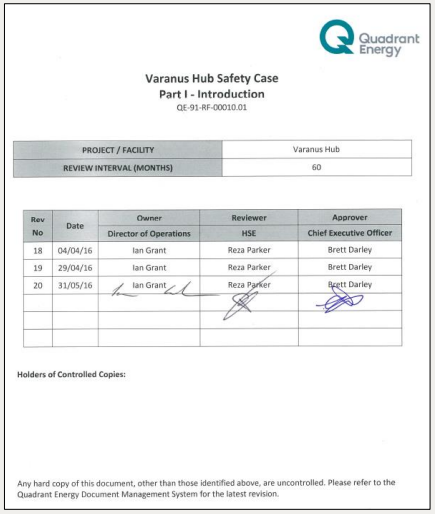


Question - Non Prescriptive, why important?

The Safety Case
- Asset Integrity Management in a Safety Case Regime

- Safety Case is accepted (or not) & compliance routinely audited by regulator
- Identification of Major Accident Events* (MAE)
- Identification of Safety Critical Elements (SCE i.e. barriers)
- Setting of associated SCE Performance Standards (PS i.e. testing & inspection requirements)

Safety Case



Varanus Hub Safety Case
Part I - Introduction
QE-91-RF-00010.01

PROJECT / FACILITY	Varanus Hub
REVIEW INTERVAL (MONTHS)	60

Rev No	Date	Owner	Reviewer	Approver
		Director of Operations	HSE	Chief Executive Officer
18	04/04/16	Ian Grant	Reza Parker	Brett Darley
19	29/04/16	Ian Grant	Reza Parker	Brett Darley
20	31/05/16	Ian Grant	Reza Parker	Brett Darley

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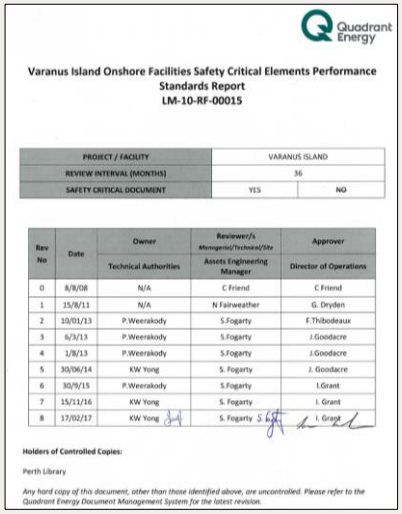
SCE Performance Standards



Varanus Island Onshore Facilities Safety Critical Elements Performance Standards Report
LM-10-RF-00015

PROJECT / FACILITY	VARANUS ISLAND	
REVIEW INTERVAL (MONTHS)	36	
SAFETY CRITICAL DOCUMENT	YES	NO

Rev No	Date	Owner	Reviewer/s Manager(s)/Technical/Site	Approver
		Technical Authorities	Assets Engineering Manager	Director of Operations
0	8/8/08	N/A	C Friend	C Friend
1	15/8/11	N/A	N Fairweather	G. Dryden
2	10/01/13	P.Weerakody	S.Fogarty	F.Thibodeaux
3	6/3/13	P.Weerakody	S.Fogarty	J.Goodacre
4	1/8/13	P.Weerakody	S.Fogarty	J.Goodacre
5	30/06/14	KW Yong	S. Fogarty	J. Goodacre
6	30/9/15	P.Weerakody	S.Fogarty	I.Grant
7	15/11/16	KW Yong	S. Fogarty	I. Grant
8	17/02/17	KW Yong	S. Fogarty	I. Grant

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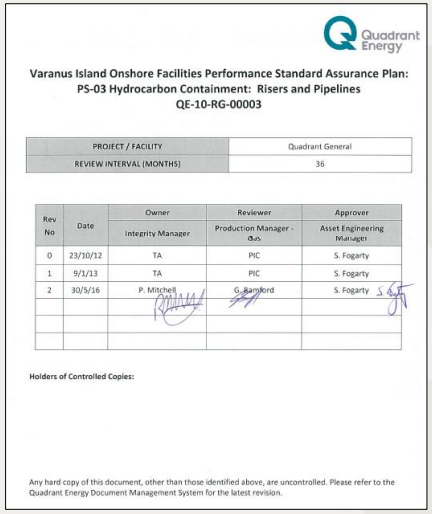
Assurance Plans



Varanus Island Onshore Facilities Performance Standard Assurance Plan:
PS-03 Hydrocarbon Containment: Risers and Pipelines
QE-10-RG-00003

PROJECT / FACILITY	Quadrant General
REVIEW INTERVAL (MONTHS)	36

Rev No	Date	Owner	Reviewer	Approver
		Integrity Manager	Production Manager - GLs	Asset Engineering Manager
0	23/10/12	TA	PIC	S. Fogarty
1	9/1/13	TA	PIC	S. Fogarty
2	30/5/16	P. Mitchell	G. Bamford	S. Fogarty

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Maintenance Management System

Feedback loop to Assurance Plans to ensure actual performance is utilised

Inherent Safety through Design

- Why is Inherent Safety design so important?

- Because we're human…..

"human factors either caused the incident or made it worse. These human factors included…. confusing procedures,…. insufficient training, ineffective coordination and communication, lack of a reporting and learning culture, confusing low personal injury rates as indicators of process safety performance,…. lack of awareness of risk factors and normalizing signs of danger"

Lord Cullen at IOGP in 2017

Inherent Safety through Design
– Building to avoid risks

"An inherently safer design is one that avoids hazards instead of controlling them, particularly by reducing the amount of hazardous material and the number of hazardous operations in the plant." [2]

[2] Heikkilä, Anna-Mari. Inherent safety in process plant design. An index-based approach. Espoo 1999, Technical Research Centre of Finland, VTT Publications 384. ISBN 951-38-5371-3

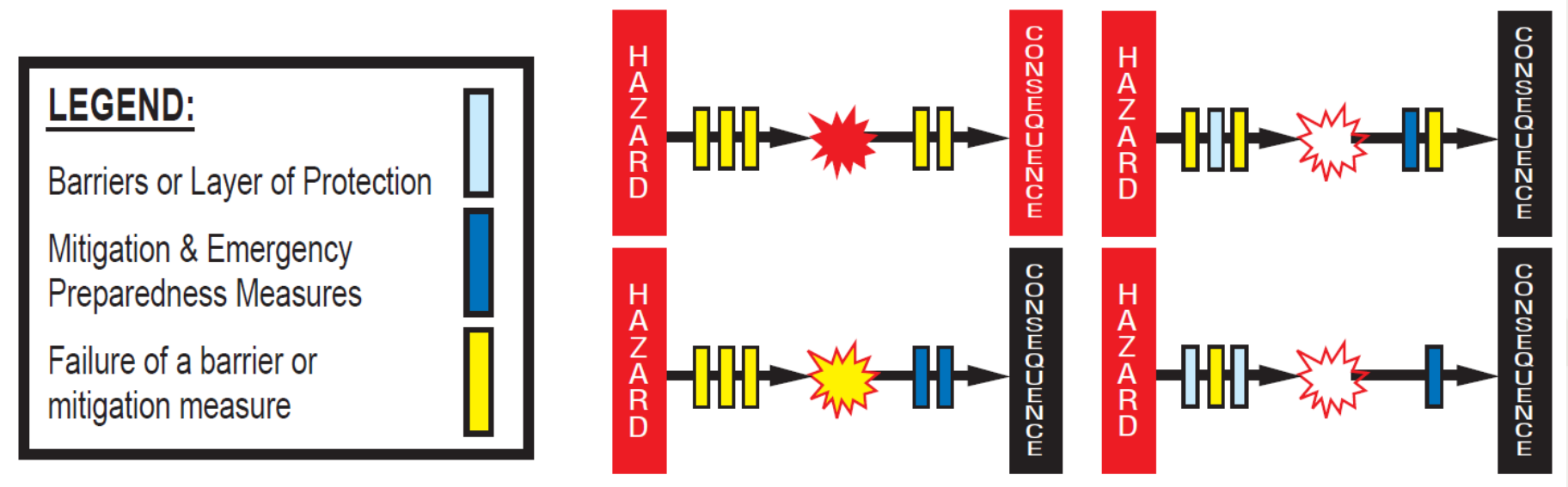
Inherent Safety through Design
– Devil Creek Gas Plant, A Case Study

"Good plant layout should provide a healthy, safe environment for operations and maintenance while ensuring commercial risk levels are acceptable."

– Devil Creek Layout Philosophy

Process Safety
- Containing the Danger

"Process safety is a disciplined framework for managing the integrity of operating systems and processes that handle hazardous substances. It relies on good design principles, engineering and operating and maintenance practices. It deals with the prevention and control of events that have the potential to release hazardous materials and energy." [4]

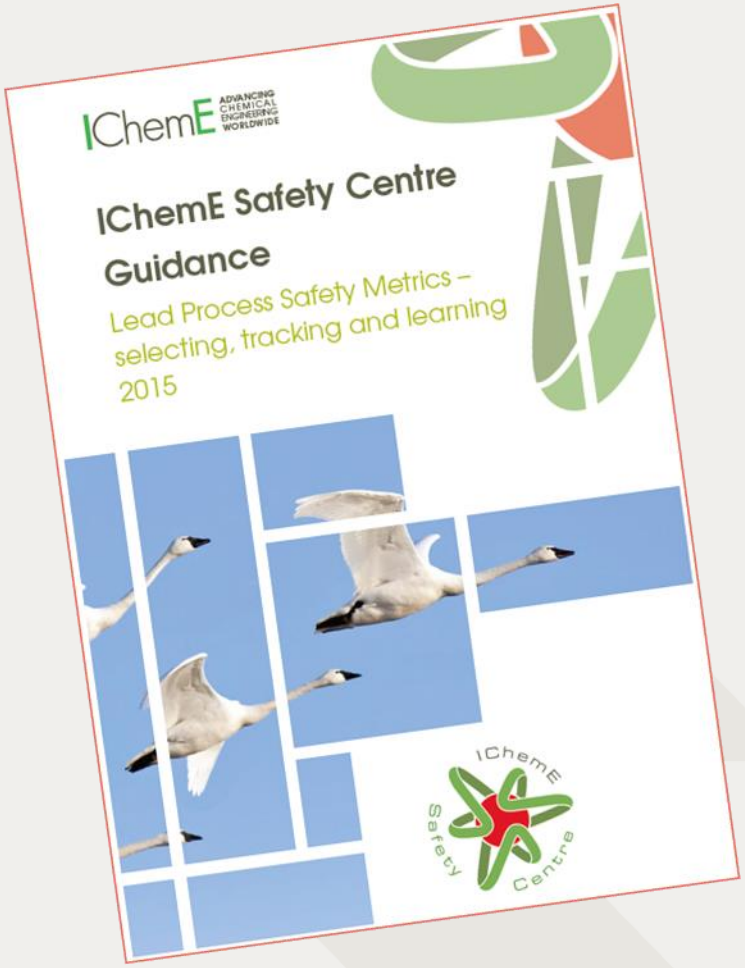


- Example barriers vs human

[4] International Association of Oil & Gas Producers (IOGP)

Process Safety
- Containing the Danger, integrity of barriers

- Leading Metrics
  - Requires identification and understanding of all barriers
    - Understand demand on the system
    - Understand level of barrier performance
  - Inspection / testing of barriers
  - Monitoring / Auditing to ensure barriers are providing required protection
  - Probing / investigating to ensure barriers aren't being compromised
- Leading Metrics require deep understanding of barriers before an incident and review post incidents
  - Review of barrier requirements so correctly specified / identified
  - Monitored / reviewed barriers have a high likelihood of being effective when called upon



Process Safety
Insights

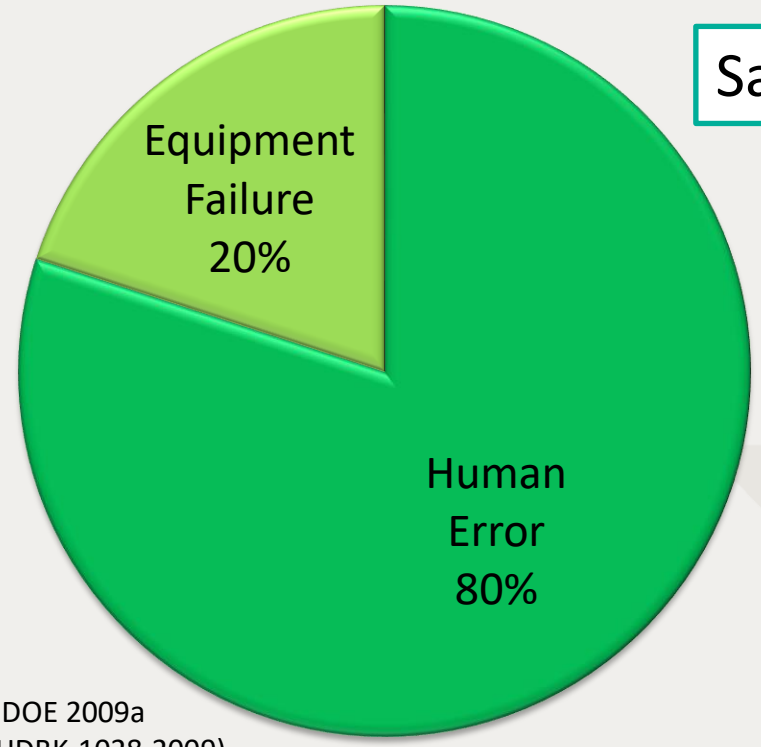
- "You don't improve what you don't measure". [5]
- "A key to prevention is effective Process Safety Management" [A]

My View:

- Industry needs a common language to improve process safety understanding
- Process Safety methodology has yet to fully penetrate the workforce
- We need to stay current with the way we communicate and educate

[5] CCPS (An AIChE Industry Technology Alliance), Process Safety Leading and Lagging Metrics, January 2011
[A] Chris Flint, HSE UK's Director of Energy Division at Safer30 Conference, June 2018

Safety Literature Tells Us…



Source: U.S. DOE 2009a
(Vol 1; DOE-HDBK-1028-2009)

"We all make errors irrespective of how much training and experience we possess or how motivated we are to do it right."

(Source: HSE HSG48 pg10)

Human Factors

- The Workforce Equation

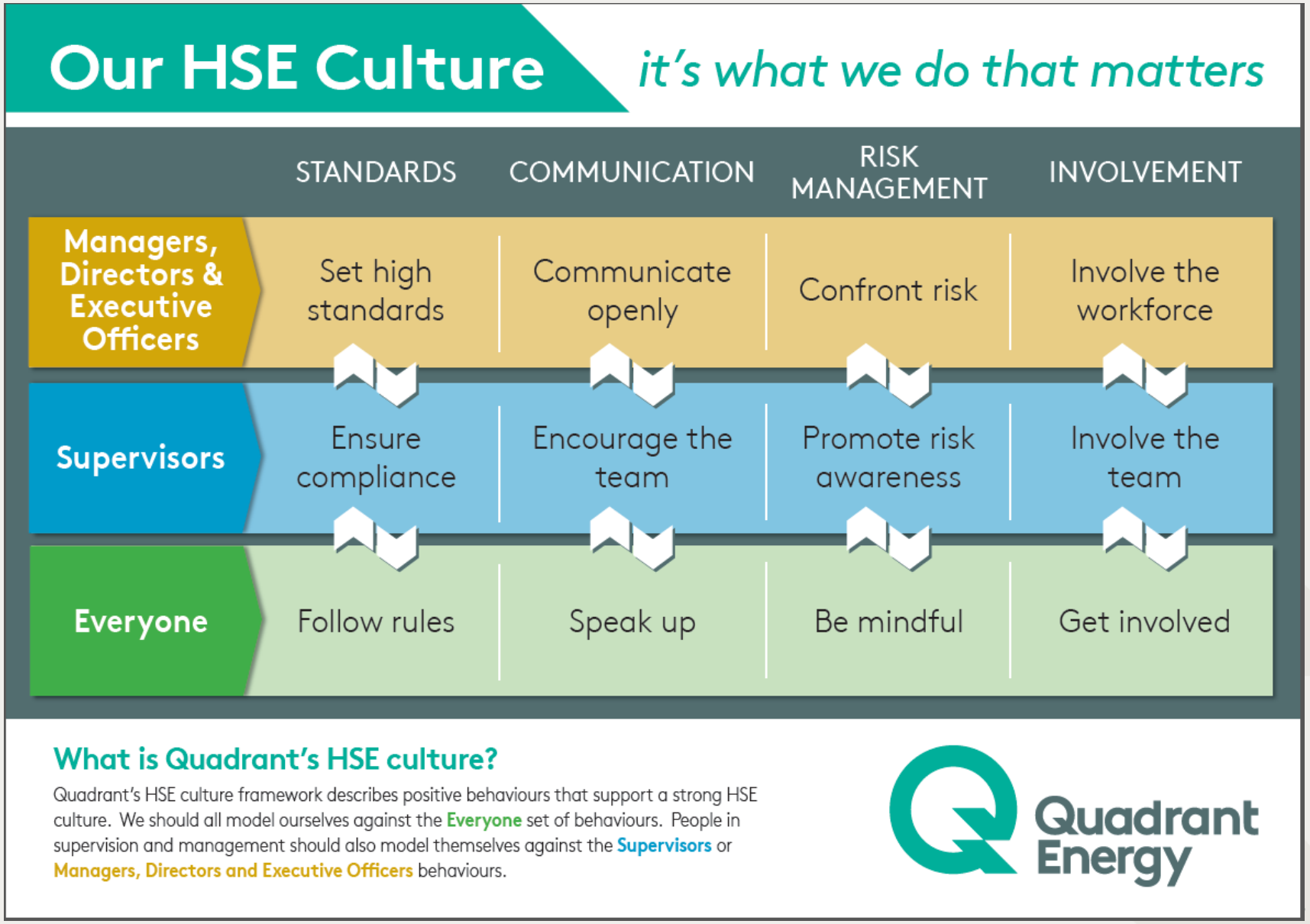
"Human factors refer to environmental, organisational and job factors, and human and individual characteristics, which influence behaviour at work in a way which can affect health and safety ." [7]

Five Golden Principles of Human Performance: [8]	
1	People are fallible, and even the best people make mistakes
2	Error-likely situations are predictable, manageable and preventable
3	Individual behaviour is influenced by organisational processes and values
4	People achieve high level of performance because of the encouragement and reinforcement received from leaders, peers and subordinates
5	Events can be avoided through an understanding of the reasons mistakes occur, and the application of the lessons learned from past events

Human factors **API RP75** designed to remove the need for human intervention (simplification message) both during operations and when things go wrong.

[7] Definition – http://www.hse.gov.uk/humanfactors/introduction.htm, UK Health and Safety Executive
[8] www.dmp.wa.gov.au/ResourcesSafety

Embedding the Culture



Safety30
- Securing a Safer Future

- Conference held in Aberdeen 6th to 8th June 2018, organised by OGUK in association with International Regulators Forum

- Learn from the Past
- Consider the Present
- Commit to the Future

#Safety30

The Case for Change
– a New Model of Safety Collaboration

https://vimeo.com/259587886

Closing Points
- Securing a Safer Future

Please,

- Keep things simple! (procedures, systems etc.)
- Promote Effective Process Safety Management
- Increase mitigation of Human Factors by:
  - Inherent Safety in design
  - Transfer lessons learned and educate the workforce (linking events to current procedures and systems)
  - Consider the audience and how they learn
- Sharing Best Practice (overseas, other industries, Safer Together etc.)

Someone else's wisdom to finish

"…. individuals will only learn the lessons of previous incidents if the organisations that they belong to understand the need for such individual learning and create the conditions under which the learning can occur. It is organisations that need to foster the kinds of storytelling from which everyone can learn."

Andrew Hopkins, **Disastrous Decisions Book 2012, pp. 121**

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