

Managing Ageing and Thorough Reviews of Ageing Installations

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Introduction

The purpose of this presentation is to:

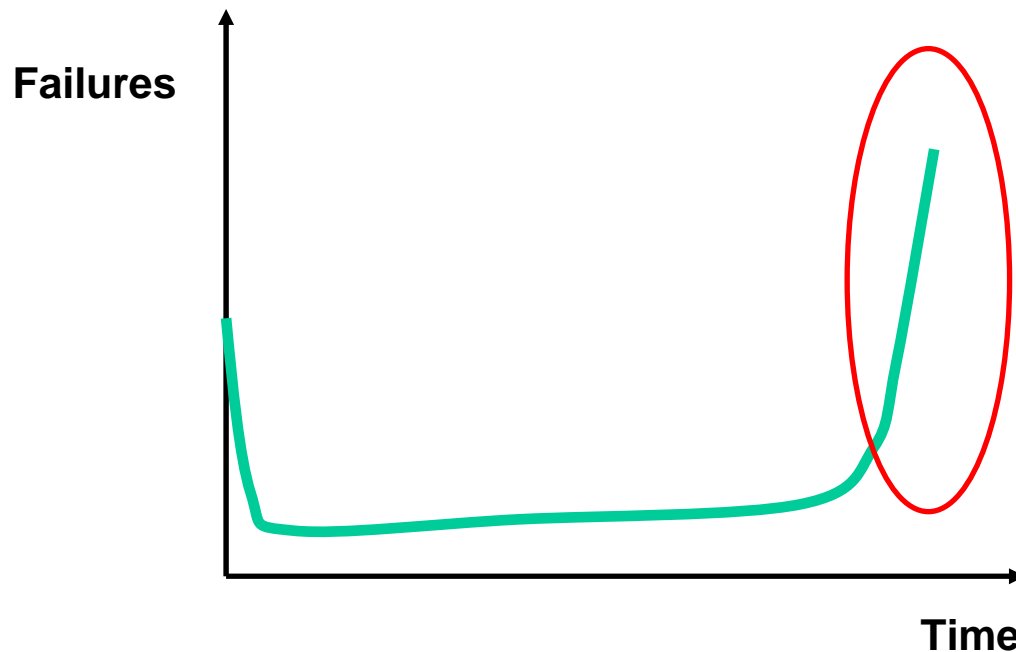
- Introduce HSE guidance on ‘management of ageing and thorough reviews of ageing installations’
- Examine the implications of this guidance on current operations offshore
- Detail the regulatory issues associated with this guidance
- Outline the expectations of the HSE

Background

- SCR05 requires the dutyholder to carry out a 5 yearly thorough review of the safety case
- Ageing is a key issue for the UK offshore industry at present with 108 installations over 25 years old.
- Ageing issues must be incorporated within the thorough review so as to ensure that the safety case demonstrates that the installation can continue to be safely operated.
- Offshore Information Sheet No. 4/2009 provides guidance on how this should be implemented on both an operational and technical level

What is Ageing?

Ageing is not about how old your equipment is; it's about what you know about its condition, and how that's changing over time"

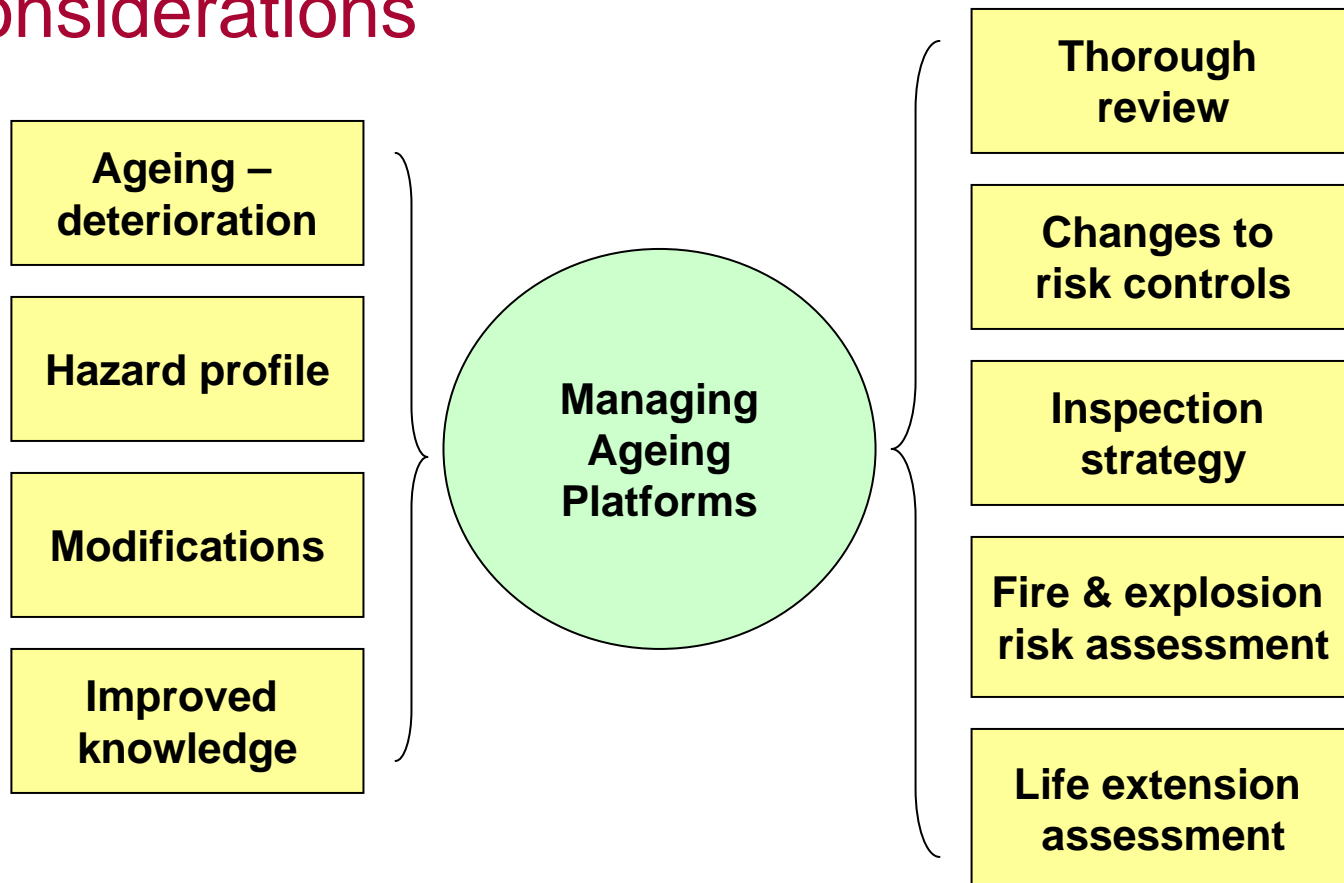


Thorough Review

- **The Thorough Review is expected to confirm that:**
 - Ageing issues have been identified
 - Ageing issues are being adequately managed
 - Reasonably practicable improvements are identified and implemented.

Thorough Review Considerations

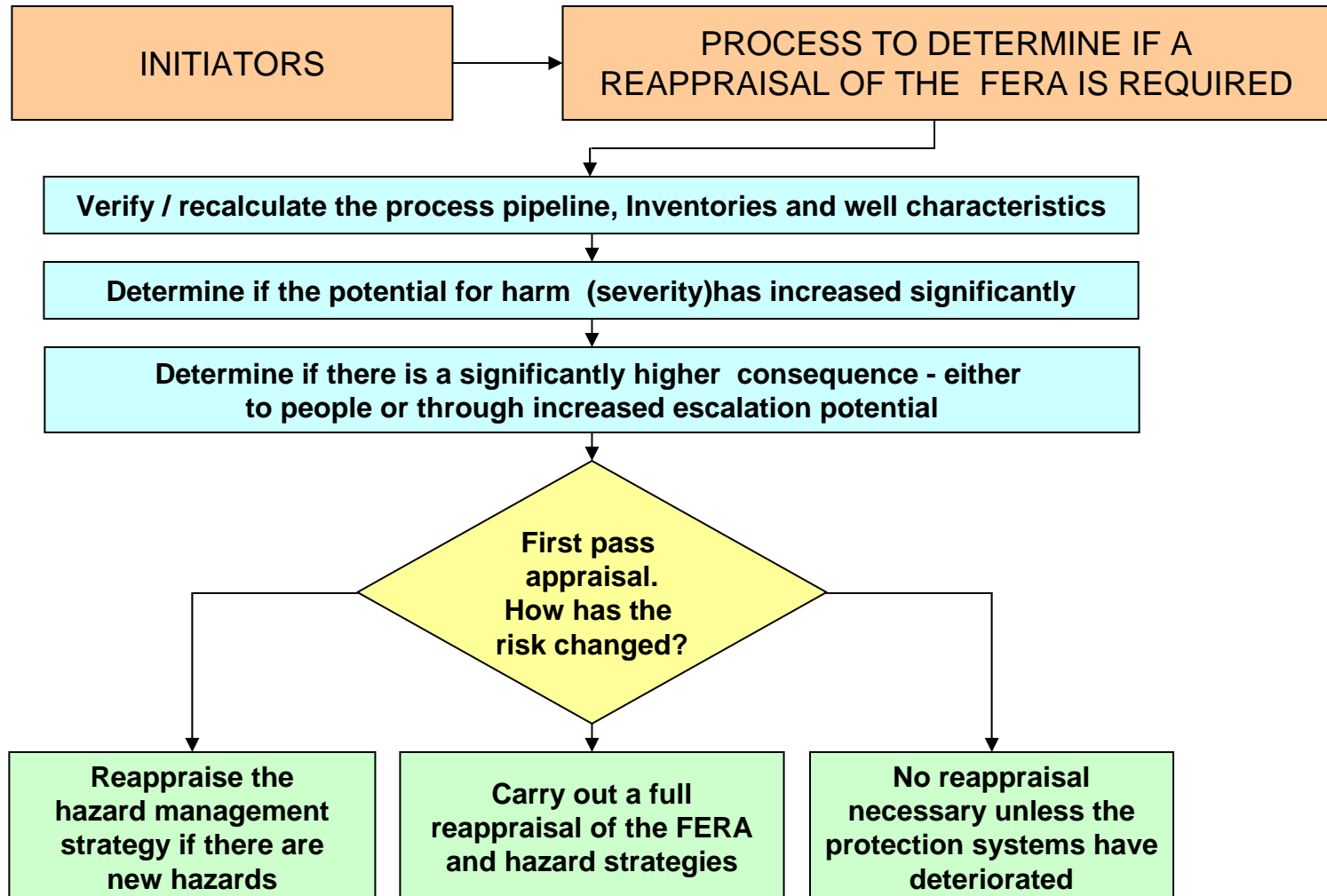
Overview of management of ageing considerations



Reappraisal Process

- OIS 4/2009 sets out a minimum standard of issues to be considered in the reappraisal process
- The process considers the effective control of hazards on ageing installations
 - Fire and explosion
 - Structural integrity
 - Organisational and other ageing issues

Reappraisal Process Model



Safety Critical Elements (SCE)

Examples of the arrangements expected to be considered in the thorough review could include:

- Findings of the Key Programmes, including KP3 – Asset Integrity Programme
- Maintenance, inspection and testing experience of SCEs
- Modifications to the installation including SCEs to ensure that the installation hazard profile remains tolerable
- Changes to, and to the current role and behaviour of, SCEs and their associated performance standards
- How structural degradation affects the performance of SCEs

Ageing Issues for Example SCEs

Example SCE	Ageing/deterioration issues	Relevant changes in process conditions and modifications	Advances in knowledge, technology and good practice
Passive Fire Protection	<ul style="list-style-type: none"> • Weathering • Corrosion substrate 	<ul style="list-style-type: none"> • Changes in process conditions may reduce severity of fires • Modification to PFP requires matching materials and suitable Procedures 	<ul style="list-style-type: none"> • Better understanding of fire resistance of damaged and weathered PFP • Better procedures for repair of PFP
HVAC	<ul style="list-style-type: none"> • HVAC damper shutdown deterioration • Deterioration of TR sealing: doors, penetrations, panel joints, etc 	<ul style="list-style-type: none"> • Modifications will affect air flow patterns • Modifications to ductwork may leave it out of balance 	<ul style="list-style-type: none"> • New guidance on fire damper testing regime • Improved understanding of location of air intakes (in non-hazardous Areas)
Installation Structure	<ul style="list-style-type: none"> • Fatigue cracking underwater • Accumulated accidental damage. 	<ul style="list-style-type: none"> • Life extension increases time for events such as dropped objects to impact structure • Modifications will change loading 	<ul style="list-style-type: none"> • ISO standards require specific demonstration of fitness for purpose beyond the original design life. • Technology developments in: <ul style="list-style-type: none"> - metocean data - materials performance, etc

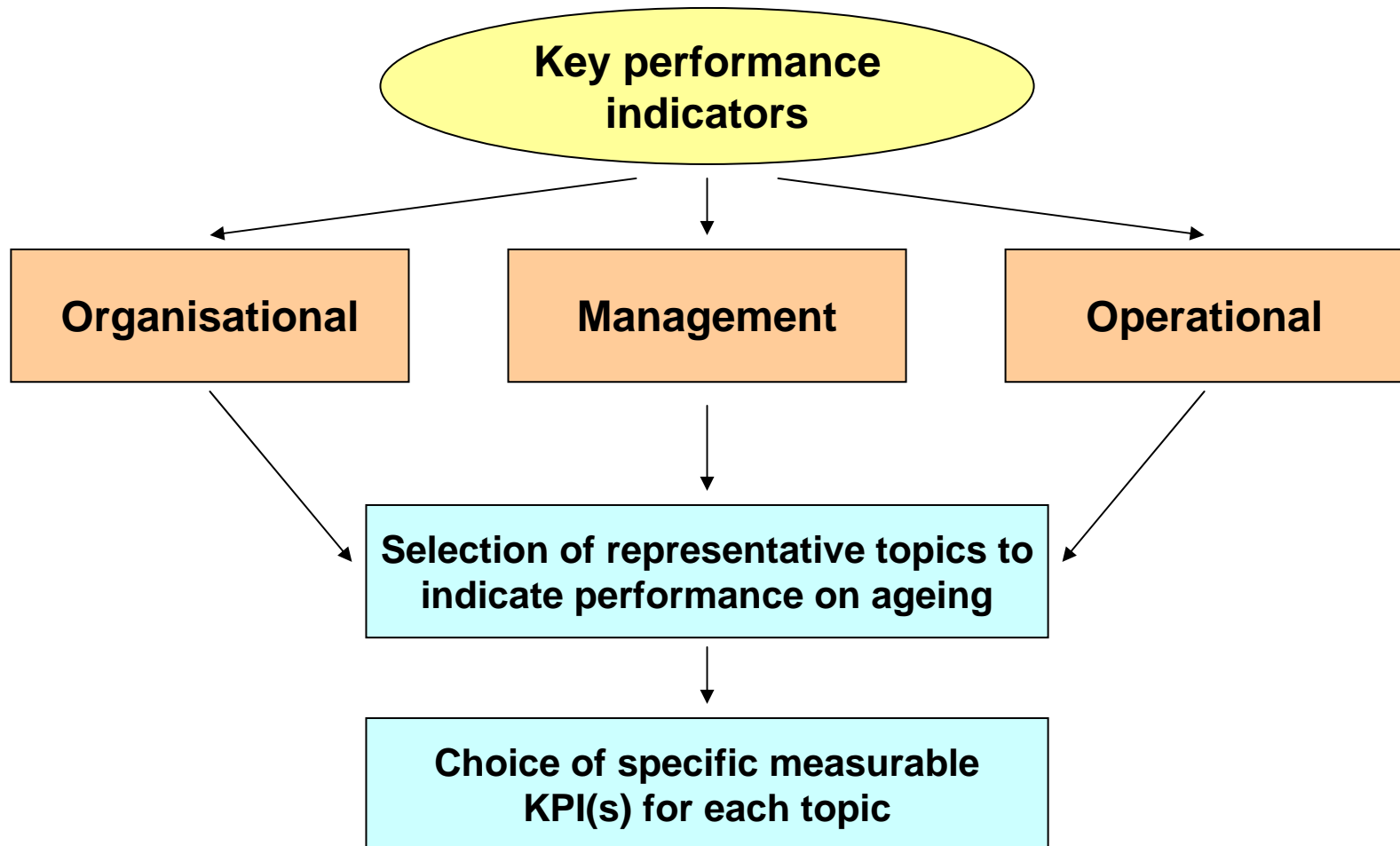
Key Performance Indicators (KPIs)



Measurable key performance indicators are required to ensure that ageing of the offshore installation is being adequately managed:

High Level	<ul style="list-style-type: none">• Investment and long-term planning: a commitment to proactive investment• Planning for success: providing competent staff and sufficient resource• A role for technical engineering
Mid Level	<ul style="list-style-type: none">• Trend analysis of safety critical elements• Reviews of maintenance strategy• Root cause analysis for ongoing maintenance problems
Lower Level	<ul style="list-style-type: none">• Number of temporary repairs in place• ESD valve closure times• Deluge systems (KPI measure might be number of nozzle blockages per test or time taken for water to flow out of remote nozzles)

Selection of KPIs



Asset Life Extension

- DHs should prepare for the onset of accumulating and accelerating damage to the structures that might be expected to occur in the life extension phase.
- Life extension must be considered in the Thorough Review
- Requirements for Asset Life Extension include:
 - Measure of the **original design life**
 - Understanding of the **main technical issues** affecting asset life extension
 - Understanding of **new** technology/developments

Summary

- The Thorough Review needs to take account of all of the issues outlined in Offshore Information Sheet No. 4/2009
- The key technical issues which need to be considered when managing ageing include:
 - Ageing/deterioration
 - Changes of well and/or process conditions
 - Modifications
 - Obsolescence
 - Advances in knowledge and technology
 - Improvements in good practice

Conclusions

- Introduced the Offshore Information Sheet No. 4/2009
- Set out the issues which need to be included in the 5 year Thorough Review
- Outlined the issues which need to be addressed when preparing for Asset Life Extension
- Outlined examples of ageing on SCEs and how they should be dealt with in the Thorough Review
- HSE are introducing 2 new initiatives, one of which deals with ageing and how the process is managed
- HSE will be dealing with ageing issues during future interventions