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”

(HSE Report RR509)
AGEING: INCIDENTS & COSTS

- In EU hazardous industries ~60% of incidents are integrity failures, for ~50% of these ageing is significant factor. HSE report RR823
- The EU MAHB estimates 28% of all reported major accident loss of containment events are due to ageing. HSE report RR823
- 2002 NACE Cost Of Corrosion study est. cost to USA ~3.1% of GDP. www.nace.org
- UK est. corrosion costs ~4%GDP (~$96 Billion pa on $2.4 Trillion pa). www.icorr.org
- Est. value of North Sea oil to UK ~$18 Billion pa. Office for Budget Responsibility, 29th October 2012
- Est. cost of corrosion to North Sea oil & gas industry ~$720 Million pa
- Worldwide corrosion cost est. ~$2 Trillion pa. www.efc.org
WHAT IS KP4/ALEP?

- Looking forward/anticipating long term asset integrity management issues
- Raise awareness of consequences of ALE
- HSE working with Duty Holders, Consultants, Suppliers, ICPs for a common goal
- Understanding & anticipating long term degradation mechanisms & rates of SCEs
- Understanding & anticipating SCE obsolescence management
- Continuous health & safety improvement
- Reducing HCRs
- Regulatory compliance
- Sharing ALE knowledge for the benefit of all
KP4 INTERIM REPORT

Background

What is Ageing & Life Extension?

Interim Topic Specialists findings:
Process Safety  Structures
Fire&Explosion  Corrosion
Mechanical  Pipelines
Human Factors
EC&I  Marine

What next for KP4/ALE?
NATURE OF KP4 REPORT

- Industry strengths
- Industry good practices
- Additional focus required
KP4 STATUS OVERVIEW

• 18 KP4 inspections have been undertaken
• 6 still to do 2012 Q3/2013 Q1
• 8 to do 2013. Project ends December 2013
• Phase 2 inspections are underway
• Industry has reacted well to KP4/ALE initiative
• Positive engagement of ALE concepts
• DHs undertaken independent reviews of their IM practices wrt life extension of mature assets
• DHs developing long term ALE IM plans
• Good evidence that DH senior management recognise ALE importance
• Good evidence of industry ALE knowledge sharing
• OGUK providing forum for the development of ALE guidance documents
• Workforce involvement through Step Change in Safety
• Much still to do
OIL & GAS UK

• O&GUK leading development of ALE technical guidance documents
• HS073 - Guidance on the Management of Ageing and Life Extension for UKCS Oil and Gas Installations
• Two technical work groups underway:
  • Marine
  • Electrical, Control & Instrumentation
ORGANISATION AND HUMAN FACTORS

- AIM high priority for snr mgt
- Good response to KP4
- Sophisticated leading & lagging KPI dashboards
- Independent ALE audits
- Reviewing contracts to consider obsolescence mgt
- Good succession planning
- High AIM workloads
- Suggest dedicated ALE focal points
- Suggest ALE embedded into existing AIM policies & procedures

**Key Events from graph**

- Maintenance backlog increased from zero to 6 tasks (48 Hrs)
- Temporary repairs reduced from 18 to 14 repairs. Permanent repairs carried out.

**Corporate Tolerance Levels exceeded are:**

- Approved Temporary repairs reduced from 18 to 14 repairs
- 8 are on Hydrocarbon / Process Systems [CTL=6]
- Deviations and ORAs increased from 7 to 8 [CTL=6]

**Leading Indicators**

- MAHE system inhibits
- Static at 2 inhibits

**Lagging Indicators**

- No barrier breaches during June 2012
PROCESS SAFETY

- Existing O&M systems identify most PS ALE issues,
- Good protocols for documentation, roles & responsibilities, authority, consultation,
- Developing tools to outline SCEs which act collectively as barriers to prevent loss of HC containment

- Need extra focus:
  - Need clearer mapping of SCEs and SIL assessments,
  - Insulation removal must be PS driven to avoid risk of hydrate blockage of PRVs,
  - Need freer inter-departmental comms to facilitate identification and management of hazards,
  - Maintenance of red-line mark-ups of offshore docs,
  - Hardware and software obsolescence,
  - Plant simplification,
  - Changes to codes, standards, guidance
FIRE & EXPLOSION

• ALE management tools in place/being developed
• F&E asset reviews (HAZOPS etc) aligned to 5 yearly TRS
• Performance trending of SCEs
• Meeting agendas addressing issues of: “yesterday, today, and tomorrow”
• Spreadsheets identifying relationships between SCE failure and MAH risks
• RCAs TR integrity, smoke & fume ingress, survivability demonstration

• More focus on:
  – Long term TR integrity management; including trend analysis and maintenance
  – Reliability of obsolete gas detection systems
  – Full life costing of active fire protection and mitigation systems – not just capital costings
  – Review ORAs in line with 5 yearly TRS – and reduce ALARP
  – Review ORMs to ensure suitability
STRUCTURES

- Identification of ageing processes, anomaly reviews and failure trend analyses,
- “Life of Field” teams undertaking ALE structural integrity assessments
  - emphasis on LE
- New structural ALE policies, procedures, “road maps”, gap analyses, KPIs
- Re-evaluation of CP systems

- More focus needed on:
  - Ensuring structural analyses are up to date and good for ALE
  - Ensure structural analyses aligned with Codes
  - MoDU jack-up fatigue assessments
  - ALE performance standards
  - Suitability of failure and deterioration models for both A and LE
  - Reassess barriers to failure to ensure they are suitable for ageing structures, particularly for life extension
  - Risks associated with un-inspectable components
  - Review air gaps for 1,000 and 10,000 year wave
Newly refurbished helideck
MECHANICAL

- DHs taking greater control of integrity and maintenance management
- Replacing defined life repairs with permanent solutions
- Greater use of OEM maintenance recommendations
- Experts advising on ALE - gap analyses
- New ALE guidance documents
- Improving anomaly management tools
- ALE included in HAZOPS

More focus needed on:
- Understanding ALE effects and consequences
- Integrate into AIM programmes
- Fabric maintenance,
- Organisations to minimise potential conflicts of interest
- Static parts of rotating equipment
- Fatigue assessments of pressure vessels beyond design life
  - re-base lining? (esp. if there is a new DH)
- Long term maintenance strategies for cranes
Refurbished crane boom
CORROSION

• Very good cross industry knowledge sharing
  – Quality EI corrosion management docs
• Robust and mature CTA, RBI, CMS systems; consider ALE and new process streams; regularly reviewed
• Presence of an OIE significant benefit to integrity management and safety
• Support for novel NDT techniques
• Major FM improvements across the North Sea
• Novel ideas coming through for FM and CUI
• FM of MoDUs & FPSOs particularly well looked after

• More focus needed:
  – Ensuring equipment lists are up to date
  – Deeper audits on accuracy of CTAs, RBIs, CMSs
  – Audits on the implementation of CMSs
  – Audits to ensure accuracy of inspection data
  – Need for high reliability chemical injection systems
  – Accelerate FM programmes
PIPELINES

- Well established risk-based pipeline integrity management systems
- Response to the KP4 - introducing ALE considerations into AIM policies
- Introducing detailed ALE elements into specific pipeline technical policies and procedures
- New pipeline validation projects to ensure integrity to CofP
- Reviewing ALE issues of flexible risers – high NDT development activity
- New ALE standards and guidelines,
- LE process becoming integrated into AIM review process

More focus needed:
  – Audit frequencies should comply with MAPD
  – As pipelines approach nominal design life, need to re-assess basis for continued safe operation
  – Cleaning pig and IP frequencies should match the designated KPIs
  – IP frequencies need regular review to match degradation threats
  – New condition monitoring technologies
WORKFORCE INVOLVEMENT

• Encourage workforce to understand importance of ALE in AIM and offshore safety

• HSE/KP4 engaging with Step Change in Safety:
  – Step Change Safety Representatives Event, KP4 theme
  – KP4 presentations to be given to:
    • Technical Authorities sub-group
    • Leadership Team 2013 planning day

• DHs - ALE awareness workshops for the workforce

• OIAC - WIG
CONCLUSIONS

• A very good start
• Industry commitment
• A lot still to do
• HSE will be undertaking more inspections and Phase 2 inspections in 2013
• Potential prizes to be had:
  – improved long term H&S performance
  – extended production
• Need to continue effort to cessation of production

New KP4 website: www.hse.gov.uk/offshore/ageing.htm