Offshore Major Hazard Written Schemes of Examination

(With Focus on Well Examination)

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EUOAG Meeting 3rd – 4th July 2014

Agenda

Key messages on Major Hazard Written Schemes;

Key components of Major Hazard Written Schemes;

Key aspects of Well Examination in detail;

Key findings from Inspections of Well Examination Schemes on the UKCS.
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Key Messages on Major Accident Written Schemes

Major Hazard Written Schemes

“Success depends on the competence & independence of the person over your shoulder – the Independent Competent Person”
UK Legislation – Major Hazard
Written Schemes of Examination

Independent Competent Person

Safety Critical Elements (SCE)
Parts of an installation and plant including computer software
The failure of which could cause or contribute substantially to a major accident or prevent or limit the effect of a major accident

Specified Plant
Plant, procedures & systems for the detection of incidents that may Require emergency response. Communication of emergencies, alarms etc Control of emergencies with a view to limiting the emergency. Mitigation of Fire & explosion. Evacuation arrangements. Means of Escape

Any part of a Well
Any part of a well, information, or Work in progress. (Equipment that falls within the Pressure boundary of the well) so that there is so far as is reasonably practicable, there can be no unplanned escape of fluids from the well or that the risks to Persons from anything in it are as low as reasonably practicable

Major Hazard Written Schemes of Examination (Verification)
Reg 13: No unplanned escape of fluids throughout the lifecycle of the well
Reg 14: Assessment of conditions below ground
Reg 15: Design with a view to suspension and abandonment
Reg 16: Suitability of Materials
Reg 17: Well control equipment to protect against blowouts

Well Examination Scheme must cover the full well life cycle

- Geology
- Prognosis
- Design
- Construction (Drilling the Well)
- Handover to Production
- Operation/Production
- Maintenance & Workover Interventions
- Suspension
- Abandonment

Reg 18: Well examination by independent competent person
Life Cycle Bow Tie Model

Initiating Events

Legal Prevention & Control Barriers

Building & Commissioning

ICP & Written Schemes

Operation, Maint’ e & Mod, Abandon

Design

Consequences

Legal Mitigation Barriers

Building & Commissioning

ICP & Written Schemes

Operation, Maint’ e & Mod, Abandon

Design

Hazardous Top Event

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Key Components of Major Accident Written Schemes
Competence of the Examiner

Knowledge
- Regulations, & Industry standards
- Subsurface hazard identification
- Well, casing & cement design
- Materials
- Well integrity & Wells SMS
- Specialist Areas: HP/HT, deepwater, underbalanced drilling, snubbing, interventions with a vessel, DP rigs, corrosive environments, high angle/horizontal wells

Experience
- Well design including completions
- Well construction including drill, testing & completing
- Well operations including integrity management
- Well abandonment

Skills
- Risk assessment
- Auditing
- Communications
- Other interpersonal skills

Independence of the Examiner

2nd Party

3rd Party

Least Common

Most Common
Industry Guidance & Standards

Company Guidance & Standards

Some Examples of Company Standards & Procedures

1. Well Examination Scheme
2. Directional Design & Surveying
3. Drill String Design
4. Casing design & Kick Tolerance
5. Drilling Operations
6. Casing & Cementing Operations
7. Completion Design
8. Barrier Policy & Standards
9. Well Control & BOPs
10. Well Testing Operations & Equipment
11. Well servicing Operations
12. H2S Operations
13. Production Well Operations
14. Temporary Well Control Equipment
15. Risk Assessments & ALARP
16. Management of Change
17. Dispensation to Standards
18. Regulatory Notifications
19. Wells Personnel Competence Assurance/Training
20. Audit and Review Arrangements
21. Interface with Verification Scheme
Simplified Well Blowout Bow Tie Model

Initiating Events

Barriers for Preventing Loss of Well Control

Blowout Prevention

Kick Detection

Well Kill Operations

Well Exam. & Verification

Barrier for Regaining Well Control

Probability of ignition 0.1

Ignition of subsea blowout likely not to occur wind >3m/s, wave >2.5m

Consequences

Failure of blowout:
- HPHT 1.86 E-3
- Exp. 3.0E-4
- Dev. 7.9E-5

Shallow gas:
- HP/HT 2.08E-3
- Dev. 1.59E-3

No effect if water depth >300m

Probability of ignition: 0.1

Ignition of subsea blowout likely not to occur wind >3m/s, wave >2.5m

Environmental Mitigation:
- Capping / Relief well / clean up

ICP Examines

Drilling Operations

Daily reports

Well proposal

Drilling the well on paper

Well basis of design

Drilling Programme

Casing design / Kick tolerance

Testing programme

Suspension & abandonment programme

Government Notifications
ICP Examines

- Conductor condition reports
- Production well annulus integrity reports
- Corrosion monitoring reports
- Tree & wellhead test reports
- DHSV test results
- Tree & wellhead test maintenance reports

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Key Findings from Inspections of Well Examination Schemes
Key Findings from Inspections

- Ownership & responsibility for the Scheme
- Inclusion of all wells
- Life cycle of well
- Interface with the installation Verification Scheme
- All modifications including minor ones
- Inclusion of mobile equipment
- Independence & competence of examiner
- Information, instruction training & supervision of staff
- Guidance on ALARP
- Resolution of disputes
- Audit

The Regulator’s Challenge

Reality Offshore?

What the law requires!
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Thank you for listening