

Well Integrity Management System

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Well Integrity Management System

Agenda

- Background for establishing guideline
- Expectation to guideline
- Work process to establish guideline
- 5 main elements
 - Organisation
 - Design
 - Operational procedure
 - Data system
 - Analysis
- Discussion of main elements
- Appendix A

Background for guideline

- PSA recommended: " The operating companies should review their in-house management systems for compliance with the requirements in the regulations for barriers and how this is distributed and actively used internally in order to reduce the chances for any incidents"
- An industry guideline with minimum requirements to such a management system should be established

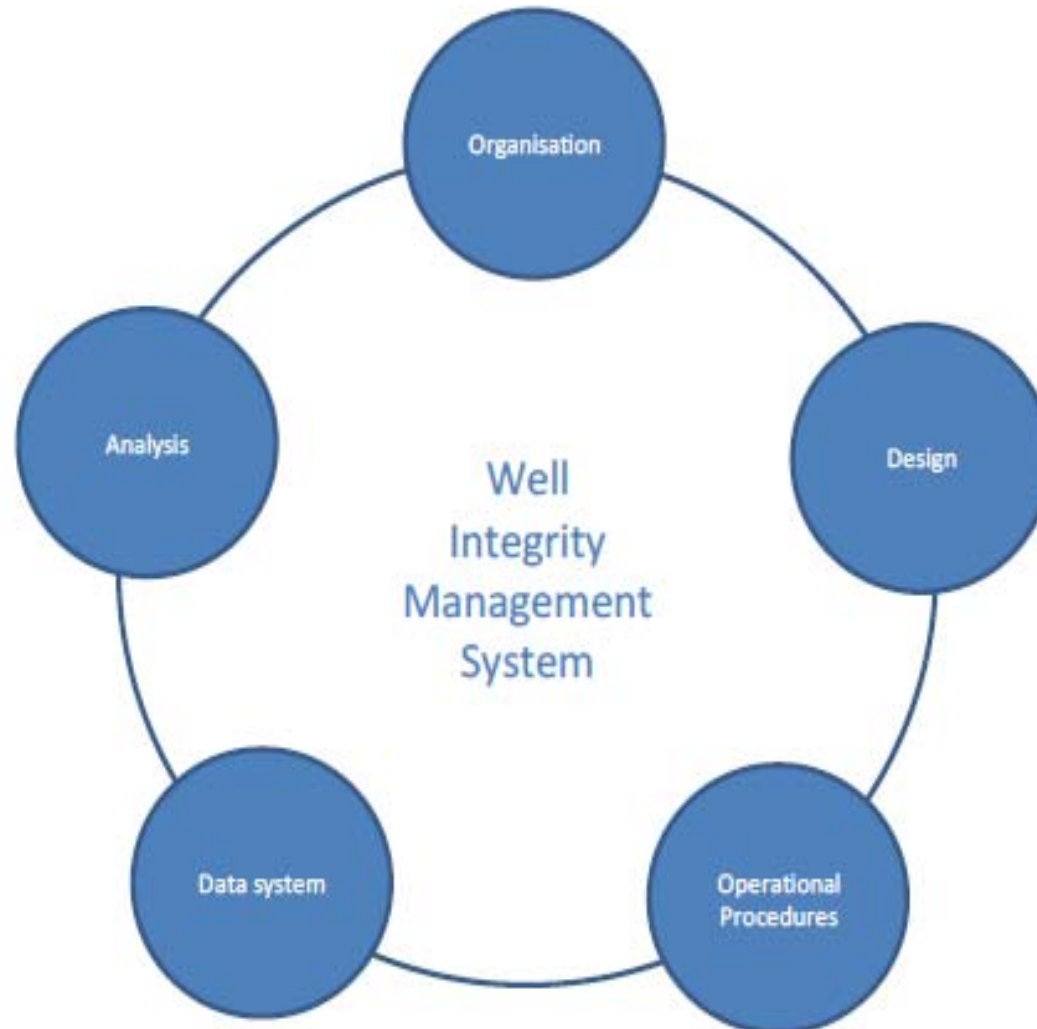
Expectation to guideline

- Compilation of regulatory requirements specifically addressing well integrity
- Quick reference to what can be found where

Work process to establish guideline

- Task force established within WIF
- A thorough review of Norwegian regulation as of 01-01-2009
- Review of NORSOK D-010 standard
- All aspects of these rules, regulations and standard were then assessed for validity and grouped

5 main elements



5 main elements

- Link between groups and regulations
 - Organisation - Framework
 - Design - Facilities
 - Operational - Activities
 - Data system - Information
 - Analysis - Framework
 - Management - All over the place!

Discussion of main elements

Organisation

- Expectation to license
- Expectation to operator
- Expectation to other involved parties
- Management system
- Competence
- Roles and responsibilities
- Well integrity monitoring program
- Emergency preparedness for well integrity related hazards and incidents

Design

- Process to establish, verify and document technical selected solution that fulfills purpose of well, and complies with requirements and has an acceptable risk against failure throughout the life cycle of the well
- Technical standards
- Barriers
- Equipment requirements
- Safety systems
- ALARP principle

Operational procedures

- Establish criteria for when procedures are to be used as a mean to prevent faults, situations of hazards and accidents
- Operating within the design load limits
- Monitoring, verification and maintenance program
- Well control and emergency preparedness
- Transfer of information

Data system

- Satisfy the need for establishment of systems and processes for acquisition, processing and dissemination of data and information
- Limitations from design and construction phase
- Critical parameters and risk level indicators monitored
- Well Barrier Schematics
- Non-conformities recorded, and HSE related information available for public sharing

Analysis

- Use available data to identify and quantify risk and ensure continuous improvement
- Basis for improvements of management system, planning work, work processes, preventive maintenance and HSE work
- ALARP principle
- Analysis of risk level for raised alertness
- SIMOPS management
- Use of reviews/audits

Example from Appendix A

6. Appendix A – summary of the regulations relevant for a WIM system

	<i>Framework</i>	<i>Management</i>	<i>Information</i>	<i>Facilities</i>	<i>Activities</i>	<i>NORSOK D-010 (Chapter 4 & 8)</i>
Organisation	<ul style="list-style-type: none"> The operator and others participating are responsible according to these regulations The operator shall see to it that all parties involved complies with the regulations The licensees are responsible to see to it that the operator complies with the regulations The operator shall have a capable organisation in Norway Management system to be established Responsible operator shall ensure qualified contractors and suppliers 	<ul style="list-style-type: none"> Competent resources Strategy and objectives Work processes 			<ul style="list-style-type: none"> Management system, processes, resources and operational organization, steering documents, safety delegates in place Competence thru training & drills Emergency Preparedness 	<ul style="list-style-type: none"> Personnel competence and supervision

Example from Appendix A

	<i>Framework</i>	<i>Management</i>	<i>Information</i>	<i>Facilities</i>	<i>Activities</i>	<i>NORSOK D-010 (Chapter 4 & 8)</i>
	<ul style="list-style-type: none"> • Independent verifications to be carried out • Internal coordinated and external co-operated emergency preparedness • The principal enterprise is responsible for information and co-ordinating the safety and environmental work and assign a safety delegate 					
<i>Design</i>	<ul style="list-style-type: none"> • HSE assessment and ALARP principle to be followed • Design, engineering and manufacture for the whole life cycle, including removal. • Wells to be placed in 	<ul style="list-style-type: none"> • Technical standards • Barriers 		<ul style="list-style-type: none"> • Verifiable barriers • Robust well design • Independent, fail-safe safety system • Surface and sub- 		<ul style="list-style-type: none"> • Well barrier purpose • Well barrier design and construction principles • Well design process for new wells, alterations and changes to existing wells • Basis of design • Load cases scenarios and

Example from Appendix A

	<i>Framework</i>	<i>Management</i>	<i>Information</i>	<i>Facilities</i>	<i>Activities</i>	<i>NORSOK D-010 (Chapter 4 & 8)</i>
	safe distance from activities and facilities so that they will not constitute an unacceptable risk			surface ESD valves <ul style="list-style-type: none"> • Design against cyclic and changing loads (conductor and surface casing?) 		design factors <ul style="list-style-type: none"> • Annulus B design and monitoring ability for gas lift and multi-purpose wells
<i>Operational Procedures</i>	<ul style="list-style-type: none"> • Petroleum activities shall be safe and prudent. A high level of HSE shall be established and maintained. • In the early phase, description of the well integrity management system and barrier philosophy for the life cycle of the wells shall be described. • Authorities may make exemptions from the regulations 	<ul style="list-style-type: none"> • Barriers • Monitoring and verification 			<ul style="list-style-type: none"> • Operate within the design load limits • Procedures in place to prevent faults • Procedures for bypassing safety systems • Monitoring of critical parameters (barrier status, ...) • Transfer of Information (handover, ...) • Address working environment issues • Maintenance Program based on equipment 	<ul style="list-style-type: none"> • Well barrier acceptance criteria and function • Verification (leak or function testing, including documentation) • Well barrier monitoring and impairment • Well barrier re-establishment • Activity and operations shut down criteria/situations • Activity programs and procedures • Contingency plans (blow-outs and relief wells) • Production/injection

Example from Appendix A

	<i>Framework</i>	<i>Management</i>	<i>Information</i>	<i>Facilities</i>	<i>Activities</i>	<i>NORSOK D-010 (Chapter 4 & 8)</i>
					criticality • Emergency Preparedness Procedures • Well program • Well Control • Testing/maintaining well barriers	within the operational boundaries and measures if they are exceeded • Control of sand production • Scale/asphaltenes problems • Hydrate prevention
<i>Data system</i>	<ul style="list-style-type: none"> • Material and information to be available to document compliance • HSE information shall be available and public shared when requested • Representative data on natural conditions to be gathered and used. 	<ul style="list-style-type: none"> • Data gathering • Indicators showing risk level etc • Non-conformances 	<ul style="list-style-type: none"> • Data retention • Daily reports • Incidents and accidents reporting 		<ul style="list-style-type: none"> • Critical parameters easily available • Well data will be collected 	<ul style="list-style-type: none"> • Well barrier schematics • Documentation and reporting • Handover documentation

Example from Appendix A

	<i>Framework</i>	<i>Management</i>	<i>Information</i>	<i>Facilities</i>	<i>Activities</i>	<i>NORSOK D-010 (Chapter 4 & 8)</i>
<i>Analysis</i>	<ul style="list-style-type: none"> • HSE to be further developed • ALARP principle to be followed • Assessments shall be made in all phases • PSA carries out supervision and verifications • Management system to be maintained and improved 	<ul style="list-style-type: none"> • Risk • Follow up • Improvement 	<ul style="list-style-type: none"> • Reporting increased risk 		<ul style="list-style-type: none"> • SIMOPS • Pre-Planning • Continuous improvement of PM 	<ul style="list-style-type: none"> • On-site risk assessment • SIMOPS