Cooperation Between Authorities and Industry

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Digitalization of the oil and gas industry

Think GLOBAL, act LOCAL

Reference Data

Theorem 1
50% of the problems in the world result from people using the same words with different meanings

Theorem 2
The other 50% of the problems result from people using different words with the same meaning

Stan Kaplan (1925 - )

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Content

- Background
- EPIM
- Reference Data
The Norwegian Triangle

Ministry of Petroleum and Energy
✓ Norwegian Petroleum Directorate

Ministry of Labour and Social Affairs
✓ Norwegian Petroleum Safety Agency
✓ The Norwegian Labour Inspection Authority

Ministry of Climate and Environment
✓ Norwegian Environment Agency

Ministry of Health and Care Services
✓ Norwegian Radiation Protection Authority
✓ Norwegian Health Directorate
The Competitive Standing of the Norwegian Continental Offshore Sector (NORSOK)

NORSOK was initiated by MPE and some of the standards is now part of the HSE regulation framework for the NCS

NORSOK Steering Group

- Cost analysis and benchmarking
- Standardization
- Operator and supplier relations
- IT and Documentation
- Base and transport activities
- Health, the environment and safety
- Petroleum Policy issues

400+ STS → 87 NORSOK standards on Internet, but not machine-readable

Efficient information sharing will improve work processes with 20-25%.

Today’s activity: NOK 50 billion reduced cost
POSC Caesar Association (PCA)

- Founded in 1997
  - Reference Data Organization

- ISO 15926 “Integration of lifecycle data”
  - Documentation for Operations (DFO/NORSOK)
  - Integrated Operations (IO)
  - Asset Management

- W3C Recommendations
  - Semantic Web Technology

- Generic Information Modeling (GIM)
  - Modeling any type of data

- Competence in management, engineering, modeling, information management and IT
Reference data

The triangle of meaning

Thoughts or Reference (Concept)

Symbolises

Referent (Thing)

Symbol (Term)

Reference data is a concept with reference to a thing in the real world

Metadata is “data about data” and was traditionally in the card catalogs of libraries and has later been extended to include digital data.

Master data represents the business objects which are agreed on and shared within an enterprise.

Reference data ought to be a large part of the master data within an enterprise.

Ogden & Richards (1923).
Generic Information Modeling (GIM*) Process

1. Describe domain in business terms
   - Understanding the problem

2. Represent domain in standard terms
   - Solving the problem

3. Implement data systems
   - Implementing the solution

4. Verify & validate implementation
   - Checking the solution

5. Enhance GIM and use!
   - Update the standard

*GIM is based on ISO 15926 and Semantic Web Technology (SWT)
Integrated Operations (IO)

The IO project in Norwegian Oil and Gas consist of 30+ subprojects over 5 years and NPD, PSA and the unions were invites to participate in all of them.
IO and HSE

Recommendations:

HSE have to be one of the drivers for implementing IO

Improve change processes by:

- Secure trust on individual and group level
- Increase investments in change management
- Secure involvement by employees and users
- Improve HSE and organizational culture
Integrated Operations reduce risks

The Norwegian Snorre Field had an uncontrolled leakage of gas from a well in 2004

- Maintenance of a well
- A kick occurs and huge amount of gas leaks into the ground close to the sea bottom
- The gas is also filling up the water below floating platform
- Quite a few decisions were not according to regulations and good practices
- It serious event that could have been a new Piper Alpha accident

“The Snorre event would not have happened if Integrated Operations had been implemented”

Terje Overvik
Senior Executive Vice President, Statoil
(2006)
IO and Information Security

➢ To manage identified risks satisfactorily, common security requirements and guidelines are needed

✓ Control of ICT equipment brought offshore
✓ Security requirements for ICT solutions on production networks
✓ Criticality analysis and classification of ICT systems
✓ Reporting of ICT incidents

➢ OLF has now defined these requirements in guidelines

➢ Three guidelines have been developed (No.104, 110, 123) (http://www.norskoljeoggass.no/en/Publica/Guidelines/)
EPIM is governed by the operators on the NCS

EPIM shall facilitate IT solutions and services for the oil and gas industry through standardization of requirements and processes
EPIM solutions and services

HSE
- EEH – Environmental reporting solution
- GSK – Basic safety training register

JVM
- L2S - License Administration on NCS
- GSTR - Gas Sales Tax Reporting
- RNB – Revised National Budget
- Authorities communication
- ILAP

E&P
- ERH – Reporting of drilling and production data
- SAM-X – GIS solution for seismic planning
- Reporting formats for prod & drilling (XML)

IT
- SOIL - Secure Oil Information Link
- Directory Services
- EGH – Generic GIS Hub

SCM
- EqHub – Equipment information Hub
- ELH – Logistics tracking solution
Competitive suppliers – but how?

Dagsrevyen: Statoil’s cost reduction
February 2014

Make your suppliers competitive!

Operators’ cost structure

Internal 20%
External 80%
Working Environment

Technology/Software

IBM
Microsoft
Oracle
SAP

AVEVA
Bentley
INTERGRAPH

EMERSON
Halliburton
Schlumberger

Documents

Laws & Regulations

Standards

Enterprise Governing Documents

www.epim.no
Common terminology standard for oil and gas

Software integration

Interoperability

Sharing today

Sharing tomorrow

ISO 15926: Oil and Gas Ontology
Reference data for the Oil and Gas industry

Integrating terminology from the different business domains in oil and gas

- HSSE
- Drilling
- Development
- Production
- Operation & Maintenance
- Logistics
- Transport

Integrating HSE dialects across E&P sector

- Integrating drilling dialects
- Integrating development dialects
- Integrating production dialects

Integrating O&M dialects

Integrating logistic dialects

Integrating transportation dialects

Creating a common Terminology/concepts for the E&P sector

From local domain data standards to reference data for the oil and gas industry

PCA Reference Data Library (RDL)
(www.posccaesar.org)

www.epim.no
EPIM’s solutions based on GIM

[Diagrams and images related to EPIM's solutions based on GIM]
ILAP Asset Lifecycle Model

Asset Lifecycle Activities

- Acquire
- Develop
- Operate* and maintain and renew**
- Dispose

* Incl. drilling
** Incl. Turnarounds and High Activity Periods

Governance
- Go/no go decision
- Study
- Modification project
- Greenfield development project
- Brownfield redevelopment project
- Disposal project

Governing, timing and classification of Asset Lifecycle Projects
Define one common set of concepts (reference data) from many sources

Terminology used by the ISO and operators

Terminology in planning tools

Creating on common set of concepts based on today’s practices
EPIM’s Business Model and IT architecture

Viewed as one knowledgebase!

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<th>EPIM EnvironmentHub</th>
<th>EPIM ReportingHub</th>
<th>EPIM EqHub</th>
<th>EPIM LogisticsHub</th>
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All solutions based on GIM and Semantic Web Technology (W3C) and the databases are Triplestores
Common reference data across industries in ISO

Business Problem addressed by PLCS
(ISO 10303 AP 239 Product Lifecycle Support)

Common set of reference data across industries

ISO TC184/SC4/WG22
Points of intersection
Enterprise master data

PCA Reference Data Library (RDL) (www.posccaesar.org)
Digitalization of the Oil and Gas Industry

Common set of reference data

Thank you!