Petroleum Resource Data Management in Norway

Workshop on CCOP metadata standard & requirement analysis for the CCOP Natural Gas Metadata Database

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Topics given in invitation (will be covered)

- Data & information management
- Legal framework
- Data bank organization: history of development
- Quality control and Quality assurance
- Data types & standards
- Data reporting & data access
- Lessons learned & best practices
- Questions & Answers (Q & A)
Data & information management

- Importance
- Norw. Authority bodies and their mother ministry
- Co-operations
  - Between agencies (especially NPD and PSA)
  - With oil companies
Authorities Functions

- Manage the resources to the best of the people
  - Be aware of the potential to establish the optimal petroleum strategy
  - Promote the potential to attract capital and skilled capacity
  - Increase the national content (people, revenues, related activities)

- Establish regulations to guide the activity towards the national goals
  - Health & Safety
  - Resource Management
  - Environment

- Monitor/Supervise that the companies comply with regulations
  - Inspections, Revisions, Status reports, etc

- Give advice to the politicians (Ministry/Parliament)
  - Forecast production, investment, operation cost, labour, income (tax)

- Keep administrative records of obligations and rights
  - Activities, Licenses, Production, Export, Taxation
Data management is important for

- Making The Nations Policies
- Deciding the Exploration Strategy
- Levelling the Frame Condition (Tax, License period….)
- Achieve a high Recovery Factor
- Good governance
Legal framework

- Petroleum Act
- Regulations by Ministry
- Regulations by NPD

Hierarchy of legislation

- The petroleum Act
- Regulations to the petroleum Act
- Guidelines to the petroleum Act and associated regulations

http://www.npd.no/regelverk/r2002/frame_e.htm
§10-4 Material and information concerning the petroleum activities

- Outlines the framework for reporting to the authorities
- Legislation apply to anyone generating information regarding petroleum activity
- Licence operators have a special responsibility for data
- Material and information shall be submitted to the Ministry or to anyone designated by the Ministry.
Data Reporting to the NPD

- NPD is entitled to all information the oil companies have regarding their activity in Norway.
- The Petroleum Act allows NPD to formulate detailed routines for reporting.
- NPD holds a seat in all licence committees as an observer.
- NPD gives drilling permission.
- NPD gives permission to perform all seismic surveys.
- If received information is not sufficient, additional reporting can be requested by NPD.
“Data bank” organization: history of development

- NPD internal databases
- NPD Internet
  - Web site
  - Fact Pages
  - Fact Map
- Co-operations for digital reporting from oil comp
- DISKOS- project
Data flow to and from NPD
NPD internal databases

Data is stored in several databases

- Reference data
- Interpreted data
- Raw data

- Petra
- Samba
- SISU
- MS Access
- Excel
- CDRS
- Ephorte
- Petrobank
- ILGI
National Data Repository Concept

Reference information
and/or
Data Catalogue

GIS

Professional digital databases

NDR-2

NDR-1

archive

Core samples

Fluid samples

Physical storage/warehouses

Oil company databases
Databases inside and outside firewall
Information Carriers

......... and relations between them.

Diagram of information carriers and their relations.
External Window to information

http://www.npd.no/English/

Fragments from another Norwegian oil history
Two documents are frequently quoted when recounting Norway’s early oil history – Erik Pontoppidan’s Natural History of Norway of 1752 and a letter from the Norwegian Geological Survey to the Ministry of Foreign Affairs in 1958. Little worth noting by the oil historian seems to have happened between these two dates. But appearances can be deceptive. 30.05.2006  
Read more

Slim pickings can yield big rewards
The oil in thin zones beneath the Frigg gas field was lost as the gas was produced. Similar resources beneath Troll have become a gold mine, while a decision is pending on the Snøhvit case. Such formations have been and remain a challenge. 14.05.2006  
Read more

Facts 2006
The Norwegian Petroleum Directorate and the Ministry of Petroleum and Energy hereby launch “Facts 2006 - The Norwegian petroleum sector”. The publication provides a general overview of all relevant information regarding the Norwegian continental shelf.
The NPD Fact Pages and Fact Maps

Total production from the Norwegian Continental Shelf per year. Charts.

Net production of saleable products (Norwegian share)

Last 24 months

Complete history
NPD fact map
NPD-map imported into GeoNorge WMS
Co-operations for digital reporting from oil comp

- NBR-Reporting
- Licence Web
- Environment Web
- DDRS
- DISKOS
The data collected by NPD in connection with the Norwegian National Budget is used in the basis for:

- Norway’s oil policy
- Norway’s economical policy
- Norway’s environmental policy

Petroleum activities in Norway account for:

- 15% of the Gross Domestic Product
- 30% of Norway’s total export

Legislation requires reporting both produced and planned volumes annually.
Types of Data

- Resources (volume)
  - In-Place volumes (Oil, Gas – both associated and free)
  - Proved reserves (Oil, NGL, Condensate, Gas)
  - Contingent resources (Oil, NGL, Condensate, Gas)
  - Undiscovered prospects within licensed areas

- Profiles (annual data - 84 data types)
  - Production sales profiles
    Oil including uncertainty ranges
    NGL
    Condensate
    Gas – also including purchased gas
  - Costs
    Investments (CAPEX)
    Operating cost (OPEX)
    Tariff expenditures

- Environmental data
  - Background data
    Water production
    Injection profiles
  - Emissions
    CO₂
    NOₓ
    nmVOC
    CH₄
The Reporting Process

- Reserves
  - Oil Production
  - Gas Production
  - Tariff Income
  - Well Cost
  - # of Wells
  - Operating Cost
- CO2-emissions
- nmVOC-emissions
- Disposal Costs
- Operating Cost

Diagram:

- Companies
  - Excel
  - LiveLink

- Authorities
  - Excel
  - MS Access
  - Petra
  - Samba

Diagram paths:

- Excel to SOIL to LiveLink
- LiveLink to SOIL
- MS Access
  - Petra
  - Samba
Licenses or business units are joint ventures

- Awarded by NPD
- Each joint venture is regulated by a License Agreement
- The joint venture is steered by Management Committee
- The operator is expected to act on behalf of the parties of the joint venture
- A joint venture may consist of more than one production license
- Owners may not be the same in all production licenses in one joint venture (business unit)
- A LicenseWeb is a collaboration room and archive for one particular joint venture
License web

LicenseWeb is the official communication and archiving tool for administrative interaction between operators, partners and authorities for all licenses on the Norwegian Continental Shelf.

The application is designed to meet the requirements for information handling as stated in the license agreements.
The “Environment Web” database

- A joint database for emission to air and discharges to sea for the Norwegian petroleum activity
- Co-operation between NPCA, NPD, OLF and the operators on NCS
Environment Web - objectives

- All data in one place and up-to-date
- Consistent reporting
- Improved data quality
- Reduced workload by avoiding double data entry by different bodies
- Automatic entry of discharge data possible
- Reduced costs
- Improved possibility for analyses
- Consistency with other databases
Environment reporting

- Production figures
  - Oil
  - Gas
  - NGL
  - Condensate

- Discharges to sea
  - Produced water
  - Chemicals
  - Drilling waste

- Emissions to air
  - CO₂
  - NOₓ
  - nmVOC
  - CH₄
  - Sox

- Waste
- Spills
Imported "Masterdata" from NPD

- List of all valid names and relations of
  - Exploration wellbores
  - Development wellbores
  - Fixed Facilities
  - Movable facilities (drilling rigs)
  - Fields
  - Operator oil companies
  - Partner oil companies
  - Transportation and utilization facilities
  - Land terminal owners
The DISKOS Database
Diskos, The Norwegian Data Bank for petroleum well data and seismic

- National Data Bank
  - Data of common interest for activities on the Norwegian Continental Shelf

- Raw data
  - Non-interpreted data

- Standardizing
  - Data types
  - Data formats
  - Data model (POSC)
  - Procedures
DATATYPES

- Administrative data
  - License, block, quadrant, coastlines, national borders
  - Field, platform, pipeline, water depth
- Well data
  - Position, name, category
- Post stack seismic data
  - All processed 2D and 3D data, velocity data
- Well Data
  - Historical and future reporting
- Production Data
  - Historical and future reporting
SOIL network
- High-speed secure closed networks
Lan2Lan connection

The Diskos Database
- Central storage of company data
- Run by PetroData from 1995
- By Schlumberger from 2004
- By Landmark from 2009

PetroBank Software
- Multi-client petroleum data repository
- Developed by Landmark
SINAS’s storage capacity

- Oracle Database – ~ 150 GB
- Netapp Disc storage systems – ~ Total 150 TB.

- StorageTek Tape robotics system - 1800 TB of storage capability
- IBM 3590H and IBM 3592 Tape technology
- Tivoli Storage Manager (TSM) to manage Post Stack data.
Access to seismic data - Diskos

- 2D coverage – surveys from 2002-date on NCS
  - Area of interest generated in PowerExplorer (PetroBank)

Users zoom in and can download specific data sets
Making a select list
NPD Reporting Requirements – Seismic Data

- Processed seismic data in the following versions is to be reported:
  - Raw Stack
  - Raw Migration
  - Filtered Migration
  - The naming of seismic lines must be in accordance with guidelines (established by Diskos Seismic Work Group)
  - Velocity Data

- Digital Navigation data
  - In accordance with "Specifications and Information for Reporting Navigation Data to PetroData – see also NPD web site
Objectives

Overall
To build a National Digital Library for well data
To serve the needs of the NPD and allow access to entitled oil companies

The Reporting Procedures
Reported data should be structured and named to be compatible with the National Database
The activity of reporting should be aligned as closely as possible with the oil companies’ normal business

The Reporting Standards
These are set by the database structure.
Now HIGHER than previous industry practice
NPD reporting requirements for well data

http://www.npd.no/regelverk/r2002/frame_e.htm
Production Data

- Monthly reported data available in one database.
  - Information can be shared within a licence and reported easily to third parties
  - Central Bureau of Statistics, Ministry of Petroleum and Energy
Production and Sales Information

- Monthly allocated production data is reported to the Diskos database
- The following data is reported:
  - Production per well
  - Injection per well, installation and field
  - Flared gas consumption
  - Fuel and diesel used per installation
  - Stored quantities per company
  - Sales of oil, condensate and NGL products per ship cargo
  - Gas sales by sales company and buyer

Gullfaks B - Statoil
DISKOS-portal

- to real data for selected data carriers (wells, seismic surveys and field production data)
- confidential and public data
- metadata only for non-members
Norwegian Portals for geographic information

- GeoNorge
  - Portal for "everybody" to use on internet.
  - All information providers can register their metadata
    By filling out a form or provide XLM-file according to ISO 19115)
  - Online (Web Map Services, and downloads) and offline
    information register
  - Search on categories, themes, etc
  - Direct access to WMS and map file downloads

- Norge Digitalt
  - Portal for selected partners in Norway (Kommuner, fylker og statlige organ)
NPD-map imported into Geonorge WMS
NorgeDigitalt portal:

General access:

Users

Use data in own application:

Thematic applications:

Dataset downloading:

Internet-services (WMS, WFS)

KOMM

DN

NGU

NIJOS

SVV

SK

SFT

FYLKE

ANDRE

Nye parter

434 pcs

19 x 2 pcs.

Users use data in own application:

Thematic applications:

Dataset downloading:

Internet-services (WMS, WFS)
Bruk av geografisk informasjon over landegrensene
Hva kan Inspire bety for prosjektet

- Steinkjer 29. mai 2008
- Kåre Kyrkjeeide
  Statens kartverk
Inspire web site
http://www.ec-gis.org/inspire/

Inspire document archive:
http://www.ec-gis.org/inspire/reports.cfm

Inspire overview theme specifications
- End of presentation