Event Report - 3rd Production Data Reporting and Analytics, Stavanger, May 6, 2015

How Dong is automating production data collection

Norway’s new XML production data standard

Using production data to optimise the asset

Automating production data archiving to DISKOS

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Special report
3rd Production Data Reporting and Analytics
Wednesday, May 6, 2015, Stavanger

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3rd Production Data Reporting and Analytics

It is easy to see where Norway would like to get to with its production data – a system where all data is gathered automatically from wells, you can track each company’s flow through the system, and finally you can see who should get paid what as a tanker full of Norwegian oil leaves a port and everybody gets paid.

All of the data should be exchanged using data standards, so the system is not beholden to any one software supplier.

Norway is moving in this direction, but there are plenty of challenges with it, as our speakers explained.

Magnus Svensson - Lead System Consultant with Dong Energy, talked about his work to get such a system working in Dong. The system has not proven as popular as you might expect with staff, since their data is how more freely shared around the company and you can see if it doesn’t match up (so production is ‘lost’ somewhere between a processing platform and receiving terminal). The data also still needs to be secure, with restrictions on who can see what data when, to make sure company secrets don’t get revealed.

Olav Revheim, Project Manager with EPIM (the E&P Information Management Association) talked about EPIM’s ongoing efforts to develop data standards for production data, so all the various IT systems can communicate freely together (even if the freedom then needs to be restricted for security reasons).

Henri Blondelle - VP Global Business Development with CGG Data Management Services talked about his company’s work running ‘DISKOS’, the Norwegian National Data Repository (which includes production data) – with new XML standards to make it easier to send the data and check it, and monthly production data being available to the public for download.

Hector Escalona - Production Technical Consultant with Schlumberger, gave his vision of what can be possible if you had wide access to production data, in that you could actually optimise the field. So perhaps “full lifecycle asset optimisation” is a 3rd step in the system development process, with ‘digital oilfield’ as step 1 and ‘integrated operations’ as step 2.

You can read our summary of each talk in this Events Report – and if you would like more, you can view the original talks in video on the Digital Energy Journal website, and download some of the original presentations.
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Dong – automating production data management

Oil company Dong has spent 2 years developing an automated system for managing production data from the well to financial systems in Norway. Lead system consultant Magnus Svensson explained how it works.

“We have been doing this project for two years, with the goal to track production data from the well to where we book it in SAP, with a financial value,” said Magnus Svensson, Lead System Consultant with Dong Energy.

“The goal is to track hydrocarbons from the well to the bank, with a high degree of automation.”

“This is the first time someone is doing this, being able to track everything within the same system and instance.”

He was speaking at the Digital Energy Journal forum on May 6, “Production Data Reporting and Analytics.”

“It has been a long journey, we have learned a lot, we have had some challenges.”

“My role in Dong is, I work in IT, but I work with the whole value chain, from production up to finance,” he said.

Value

The biggest challenge has been getting people to recognise the value this system brings to the company, to justify the effort individuals are asked to make.

The main benefit is that “we are ensuring our reservoir engineers and production engineers are always working on the latest data,” he said.

This leads to more accurate forecasts of production and cash flow.

Having the data available on one system also saves a lot of time. “Picking [data] from different domains and units within the company is extremely time consuming and error prone.”

Having the data available can stimulate a lot of improvement ideas. “A lot of people are starting thinking in about new business process. That's a big win. I expect we will find a lot of new processes invented.”

Also with production data fully mapped, it means you can see if the flows from the well to the customer are the same for the entire route, and spot problems.

“If you start combining production volumes with sales volume and pipeline volumes, you might see that you have deviations at an earlier stage than previously,” he said.

“When you have done this exercise, you notice all of the ugly things,” he said. “You have a better tool of explaining them.”

Connecting the company

The project also means that people in the company start connecting together in new ways, for example reservoir engineers and finance staff, who don’t usually talk to each other, come together to discuss volumes.

“You see how the data you work with is going between business units and assets,” he said.

The finance side uses a lot of different tools to the reservoir side,” he said. “But it is the same system, we don’t duplicate numbers. That has been one of the goals.”

“It is good to have an understanding of how things work in the bigger picture.”

Sometimes you discover that people from some areas of the company, or some disciplines, are not so aware of what people in the rest of the company does. “We work in very dedicated business units and don't share a lot of the information.”

Some people in the company have not been very keen on other people being able to see what they are doing. “All your different business processes are now exposed,” he says.

“We are opening up things, making everything much more visible,” he said. “A lot of people are scared.”

Two well example

As an example, Dong in Norway is operating two wells in partnership with other companies in Norway, which connect to the Ula processing facility, where the flow is comimgled with other flows.

“We are tracking hydrocarbons up to Ula and leaving Ula going into the Ekofisk processing facility and finally ending up at the terminal in Teesside,” he said.

The Ula platform itself is operated by BP, which has responsibility of sharing and reporting production data from Ula. Dong, as operator of 2 wells connected to Ula, has responsibility for the well data.

The produced oil from Ula then goes to the Ekofisk platform, operated by ConocoPhillips, which has its own wells and is also a big processing facility.

Ekofisk is connected by pipeline to Teesside on the UK side (for oil), and to Emden in Germany (for gas).

Once the oil and gas leaves the field, the production data is handled differently, Mr Svensson said. “You are leaving production domain, and going into pipeline dispatching with nominations, tariffs and so on. This is the place where you start putting value on things.”

It is very difficult to exactly match the gas you produced from the wells with the gas you sell at the end of the process due to e.g. different gas buffers along the dispatching route, he says. “That is kind of a challenge.”

After Teesside, oil leaves as cargo in a ship. The cargo management processes are in many instances managed using documents, which are scanned and sent by e-mail.

“If you look at this complete process from the field to the terminal, I don't think you can track it in volumes. So we do a lot of mass balancing.”

System

System wise, the main focus at the moment at Dong is optimising the data flow between business units so people get the data they need, he said.

“It’s a large system, it’s been a big struggle, especially on the business process side.”

All of the data is hosted in house, not on a cloud. “We don't see a value in moving it out,” he said. However, “we have a lot of responsibility with having the data in-house, if something happens.”

There are complex security challenges. There is commercial legislation governing what information can be shared freely, and sometimes a competitor could get a commercial advantage from (for example) knowing when you have a shutdown.
EPIM – developing production data reporting

Norway’s E&P Information Management Association (EPIM) is continuing to develop its systems to standardise production data reporting, between Norway oil and gas companies and the government.

“We are focused on the vertical integration of data and processes from well to finance, and information exchange between the different companies involved in the value chain,” said Olav Revheim, Project Manager with EPIM, speaking at the Digital Energy Journal Stavanger forum on May 6, “Production Data Reporting and Analytics.”

The purpose is to make it easier to do regulatory reporting (to the Norwegian Petroleum Directorate) and between the operators of production facilities, separation facilities, tie-in facilities and partners.

The work can be done using standardised interfaces, with a standardised schema for structure of the data.

Data quality

It has been a challenge determining who is responsible for the accuracy of the data, he said.

Most people are good at managing their own private data and PC, but when it comes to organisational data, they are less enthusiastic about it.

There can be different versions of production data for different people. Reservoir engineers want to know data for specific wells, management don’t care about that, they want field data.

Sometimes the system has well data regularly updated, but the field data lagging behind.

Parts which don’t fit

There are not many computer systems in the market for managing production data like this, he said.

A common problem is when you find that there are aspects to your company business processes which can’t be managed on the software you are using. Then you have to make a decision about whether to adapt the business processes to the new system, or adapt the system to the business process, he said.

“We ask, should you write a lot of custom code, for example to handle some of these very special business processes?”

“We have been squeezing [business] into some part of the system,” he said. “We don’t want to do a lot of customisation, it will raise the cost.”

“A lot of the [software] tools are very asset centric. They have been deployed on a given asset and not cross asset.”

You can watch Mr Svensson’s talk on video and download slides at www.digitalenergyjournal.com/video/1089.aspx

You need to make sure that the right data can get from one business unit to another, despite the security restrictions. “Even if you do this [data] waterproofing between business units and assets, you have a need to get some data from production to other planning departments,” he said.

“That's a big challenge with this type of setup, making sure the correct people have access to the correct data,” he said. “You have these cross plan security setups. You go in and access very specifically what you need.”

Mr Svensson was asked if he sees a contradiction between the talk of breaking people out of silos, and locking up data so people can only see the data they need. “I agree there is a contradiction. We had that discussion initially, should you have everything open, and that was what people were used to. But then the problem you have is all of these financial matters which are clearly not open, so we need to lock it down.”

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Systems

The NPD is requesting that production reports are supplied in a new XML format, MPRML, by January 1 2016, he said.

The operators can send an automated XML report to ReportingHubhosted by EPIM, with data automatically submitted on to partners as required.

EPIM has developed a ‘well defined firewall’ which is accepted by all oil companies, he said.

“So all the information exchange between the various companies is already established.”

“All of these assets and links in the chain have different operators, with different IT systems with firewalls all over the place.”

You can watch Mr Revheim’s talk on video and download slides at www.digitalenergyjournal.com/video/1666.aspx

EPIM

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The work can be done using standardised interfaces, with a standardised schema for structure of the data.

There has been work going on for 10 years to try to standardise an XML schema for sharing data related to production,” he said.

“This scheme is owned and facilitated by EPIM with a reference group.”

EPIM is a non-profit organisation formed and financed by Norwegian operating companies, with a mission to enable data sharing between companies.

Vega field

As an example of how it works, consider, the Vega field, a subsea development operated by Wintershall, producing gas condensate and oil.

The unprocessed flow goes to the Gjøa facility, where the flow is mixed with Gjøa’s own production.

From there oil comes ashore in Mongstad, near Bergen, and gas goes to St Fergus, near Aberdeen.

“FOr Wintershall there is a need to follow the value from wells to the bank,” he said.

“There are not many computer systems in the market for managing production data like this, he said.

“A lot of the [software] tools are very asset centric. They have been deployed on a given asset and not cross asset.”

You can watch Mr Svensson’s talk on video and download slides at www.digitalenergyjournal.com/video/1089.aspx
Norway’s DISKOS – converted to PPDM

CGG has taken over operations of Norway’s National Data Repository DISKOS since the beginning of this year. One of the first moves was to migrate more than 1Pb of data to the PPDM open and standard data model.

One of the first moves by CGG was to convert the data into the PPDM data model. By using an open data standard, it should be easier for other applications to work with the data.

Migrating the Diskos data set “was a very large task, the first time it has been done in Norway,” said Henri Blondelle, VP Global Business Development with CGG, speaking at Digital Energy Journal’s Stavanger forum on May 6, “Production Data Reporting and Analytics”.

CGG has implemented changes to make it easier to submit data to the system and access it. “We are able to receive data, preserve the data and to guarantee security of the data,” he said.

Some new seismic data tools are still being developed, he said, including some to download seismic data from part of a survey. Kadme is providing its WhereOil platform for accessing DISKOS data over the internet.

The data is being hosted by Norwegian data centre company Evry, and being physically stored in Green Mountain, a deep underground storage site near Stavanger (and former NATO bunker).

DISKOS is owned by 70 oil companies active in Norway. It is designed as a cost effective way for companies to fulfil their obligations to provide data to the government, including seismic and well data,

DISKOS comprises about a petabyte (1,000 terabytes) of data, together with a set of applications to handle, submit and access the data.

Production data

Production data does not have such large file sizes, he said, since it is only reported monthly in Diskos.

However the diversity of data makes it difficult, with data covering volume, mass, energy and density, with data readings taken at different places.

There are often several data versions.

The NPD is introducing a new data format for submitting production data, called MPRML (for monthly production reporting mark-up language), a version of Energistics standard PRODML.

Currently, most companies are using an ASCII format called COPEX which was established in 2000, which can be manually edited.

MPRML includes exactly the same data as COPEX, but in a XML structure.

It has been possible to submit reports in MPRML since 2013, but it will be obligatory from January 1, 2016.

By using MPRML, it is easier to apply business rules to the data and check it, he said, and develop web services for data exchange. The data exchange is created automatically, so there is less scope for manual editing. Already Statoil and GDF Suez are reporting data using MPRML, he said.

Now, COPEX submissions are converted into MPRML as they are received at DISKOS, he said.

The data is submitted by uploading from a web interface.

The system can output data in the same format, whether it was originally submitted in XML or MPRML, ensuring a continuity in the production reporting tools available in our web interface.

Validated production data is freely available to the public in Norway. You can download data from different wells or fields in Excel format, and then do analysis with it, using tools such as Spotfire or Tableau. “With less than 10 clicks you can get access to very accurate, verified data,” he said.

View Mr Blondelle’s talk on video at www.digitalenergyjournal.com/video/1084.aspx
Using data for asset optimisation

Doing full lifecycle asset optimisation for a field is a natural step from “Integrated operations” and “Digital Oilfield”. Schlumberger’s Hector Escalona explained how to get there.

This would mean that problems could be detected faster (such as something which causes production to drop), that means less loss of revenue.

One important task is comparing the performance of different wells. By mapping KPIs you can (for example) identify regions of high gas oil ratio, low water cut, low recovery factor. It would be useful if the KPIs were generated automatically.

“We can do more advanced analysis comparing wells against each other,” he said. We can identify, “which are candidates for workover, outperforming wells, wells that need attention, over injected or under injected wells.”

You can look at the value of well interventions over the well’s lifetime, taking into account the gains (and losses) from those interventions and aggregating the data.

You can do a ‘decline curve analysis’ to forecast production.

Additionally, diagnostic tools that have been used in medicine for a long time, for example to make predictions about how likely someone is to have cancer bearing in mind various factors, such as X-ray results and whether the person smokes.

“We have information we can use to create probabilistic models and help us be more proactive,” he said.

If you have been operating ESPs for e.g. 10 years, you can use all those years of learning to get a better understanding of your current situation, or build a model which can provide an alarm at exactly the right time.

“We need some architecture to do that,” he said. “It’s not easy to do.”

The systems to understand what is going on can be built on top of an ‘enabling Engineering framework’, he said. For example, with the core data management tools, data exchange standards, security systems, surveillance systems and software development kits and modular ‘building blocks’, each based on best practises, to create a solution for a specific need.

The planning can happen at different time scales, equipment and slug monitoring going in a fast loop, gas lift and pump optimisation in a medium loop, and field management in a slow loop.

“And still, getting people to collaborate and change is “the toughest part,” he said, particularly when it involves people working together who have not worked together in the past, such as reservoir and facilities people.”

Mr Escalona sees that there has been a gradual evolution in upstream digital technology, from talking about the ‘digital oilfield’ (mainly acquiring and communicating sensor data in his view), to ‘integrated operations’ (adding in collaboration and managing KPIs), and finally to ‘asset optimisation’, which means all of that plus a full lifecycle perspective on the asset, with an increased engineering focus.

There are several challenges that are tied to this evolution: new data sources, types and time frequency, the need to manage simulation models, integration between applications and improved visualization techniques.

As part of a full lifecycle perspective, typical questions staff might want to answer would be, what happens when production starts-up or is shut-in? Are the compressors, meters and pumps working optimally? Is the gas lift or ESP optimized? Does the flowline need to be pigged – and if so can it be delayed? Is there a hydrates risk - if yes – when and where? What will the potential volume of a slug be? Can facilities cope? Is the floodwater or EOR effective? What is the production forecast? How much are we producing, where is it coming from, what are the causes of shortfalls?

“80 per cent of the time we are in reactive mode. It would be better if “we have enough time to look at what we can do before something happens,” he said. “What if we can see what we need, in time to respond?”

The typical production performance control workflow is to capture the necessary data, check it, display it, analyse it, produce results and recommend actions, he said. Only the last few steps add any value. It would be better if the first steps were done automatically.

“Depending on the field, one aspect will be more important than others. For a particular asset, we need to focus maybe on flow assurance or well integrity.”

Schlumberger’s “Avocet software platform” can help make it easier to manage production data and engineering workflows, including the EPIM’s new format MPRL. It can be used for both daily and monthly data reporting. There is a new MPRLM exporting tool as an extension to the software.

The exporting tool has been tested with a Norwegian operator.

The Avocet system can be used to hold all of your production data. You can make daily and monthly reports for partners, and monthly reports for government.

You can let it submit reports automatically to (EPIM’s) ReportingHub automatically from the Avocet system.

You can view Mr Escalona’s talk on video and download slides at www.digitalenergyjournal.com/video/1664.aspx
Attendee list – 3rd Production Data Reporting and Analytics, Norwegian Petroleum Museum in Stavanger May 6, 2015

Harald Vetrhus, SW Business Imp Manager, Accenture
Scott Ingram, Baker Hughes
Yoseph Ghezai, Reservoir Application Manager, Baker Hughes
Bodil Sømme, Sr. Production Engineer, Centrica
Henri Blondelle, VP - Global Business Development, CGG Data Management
Kenneth Vaersland, Business Development Manager, CGI
Paul Mathias Fiskaen, Director, CGI Norway AS
Magnus Svensson, Lead System Consultant, DONG E&P Norge
Grethe Lønø, Principal Production Engineer, DONG E&P Norge
Eileen Quale, Principal Production Technologist, DONG E&P Norge
Karl Henry Steen, Senior Reservoir Engineer, DONG E&P Norge
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Lars Kittiang, Instrument Engineer, Weatherford Norge AS
Suzana Westaway, Lead Well Integrity Engineer, Wood Group Kenny - WG Intetech

What did you enjoy most about the event?

I enjoyed the presentations
Dler Mirza, Logtek AS

Good discussion about production data management and standardization, along with the importance of the organization buy-in and process improvement.
Hector Escalona, Schlumberger

I liked the format, with half a day focus on a specific subject.
Gianluca Monachese, KADME

The half day format is very convenient. Thank you for an interesting session.
Facilitating collaboration, sharing information
By the industry, for the industry

About EPIM

EPIM is a non-profit membership organization established in November 2007, and governed by the operators on the NCS. Norsk olje & gass approved the establishment of EPIM, an organization that would provide the industry with effective management of common information and communication technology (ICT) solutions.

EPIM’s main objective is to facilitate the best possible flow of information between operators, partners, authorities and other stakeholders. Over 250 companies use the 13 services EPIM have in their portfolio today. Through innovative and cost efficient IT solutions, based on open standards and semantic technology, EPIM is the industry collaboration facilitator. Sharing information in a standardized and secure manner, while supporting business and compliance requirements is EPIM’s main focus. EPIM’s services affects the Information Management Processes in the Oil&Gas industry by:

- Reducing the effort for collecting and retrieving of information
- Achieving efficient access to multiple sources of information
- Improving decision making processes with access to updated and correct information at any given time

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