

Data Flow Management: Wellsite to Corporate Database - Case Study from ONGC WOB, Mumbai

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Abstract

In today's competitive exploration and production (E&P) atmosphere, the ability to exploit E&P data is the key to make informed, actionable decisions that support the vision and business strategy. How a company uses its E&P data can be the difference between average performance and competitive advantage. Companies tend to segregate their content into different data worlds that do not necessarily interact with one another and therefore fail to achieve integrity and maximum business value.

Oil & Natural Gas Corporation (ONGC), a leading innovative, continually learning and improving corporate in the E&P world has always been acquiring and assimilating contemporary technologies to operate at global efficiency and has in the process developed a rich knowledge database across the organization. In its continued pursuit of excellence, ONGC has achieved a high level of data integrity and time saving automated smoothed operation through a streamlined workflow of aggregating wellsite/ operations data in a single compact output database file (ODF) and automatically connecting the output to the EPINET corporate database. Thus a continuous flow of quality checked wellsite data (sensor data as well as observed data) to central data repository i.e. EPINET is maintained, enhancing the data availability to cross-disciplinary teams and operational efficiency.

Introduction

Data is at the heart of all exploration and production workflows and is always a pivotal factor in any business outcome (be it good or bad). The E&P business customer consistently acknowledges that data availability, integrity, and readiness are crucial to the success of their business (Balough et al., 1994). E&P companies are now adopting new ways of managing and processing their operational

information. Achieving this end can be challenging. The sheer volume of data produced by instrumented systems may be overwhelming, and the slightest delay in routing all these data to the right departments, computer models and personnel may prevent operators from realizing the full value of their data (Brown et al., 2000). The effectiveness of the information management within an Exploration and Production environment has an enormous impact on business success.

With the rise of the digital well field, the oil and gas industry is gathering more data, more often, at every stage of the business lifecycle. Companies are investing millions of dollars to gather, analyze, and interpret that data - without any assurance that the data is complete, correct, and contextual (Brulé et al., 2008). The lack of a single view of well data leads to:

- Delayed projects
- Underutilized production capacity
- Missed revenue opportunities
- Runaway costs
- Regulatory noncompliance

ONGC has been pioneering in contemporary E&P technologies to achieve operational excellence meeting global standard. With the need of long term preservation of data assets, ONGC has set up EPINET - Exploration and Production Information Network (Kumar and Rao, 2013). Being a centralized corporate dataset, the idea of EPINET is to aggregate and store all the well data from different segments that includes drilling, geology and geophysics, production etc. (Mittal et al., 2006).

In this paper, we will discuss how the integration of wellsite data through output database file i.e., ODF (GEO Suite of software) into EPINET have smoothed operations and increased operational efficiency in Western Offshore basin, ONGC.

Operational data regime

The E&P industry probably has the most widespread range of data acquisition technologies and domains of

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calculation etc. With the help of such computations and derived interpretations, understanding of the reservoir increases as well as the subsurface knowledge. Several calculations helps in identifying bottom hole behavior formation wise with respect to different input drilling/mud parameters etc.

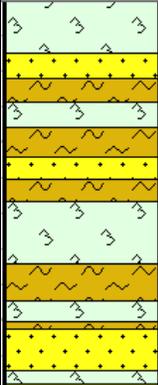
FINAL LITHOLOGY	LITHOLOGICAL DESCRIPTION
	<p>SANDSTONE: white to light grey, firm to friable, very fine to fine grained, rare medium grained in part, subangular to subrounded, subspherical to subelongate, well to moderately well sorted, common white argillaceous matrix, weak siliceous cement, slight calcareous cement, trace carbonaceous partings and flecks, micromicaceous, trace lithics, poor visible porosity, show</p> <p>FLUORECENCE in very fine sst between 4370-4460 ft MDBRT:10-20% dull to bright yellowish green, patchy, streaming solvent cut, thin white residual ring</p>

Figure 3. Interpreted lithology along with the lithological descriptions in Output Database File, taken from GEO Suite of software

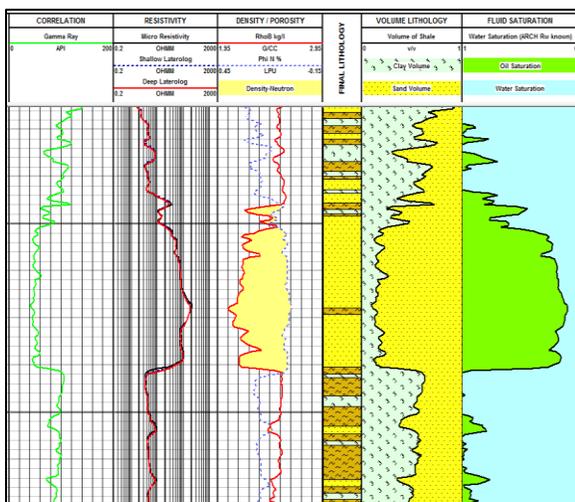


Figure 4. Quick look petrophysical interpretations in Output Database File, taken from GEO Suite of software

Apart from quick look geological interpretation, prognosed vs. actual analyses (e.g. prognosed vs. actual formation tops, days vs. depth etc.) are also being done within the output database file.

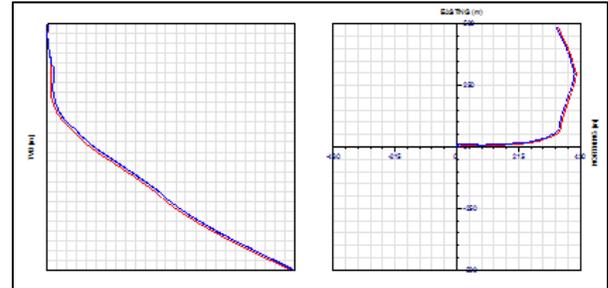


Figure 5. Prognosed vs actual well profile and trajectory analysis in Output Database File, taken from GEO Suite of software

Dataflow to EPINET

Over the past few years E&P information technology has made significant advancement in workflows of dynamic upstream activities or processes. There is an increasing need for long term preservation of data assets by building corporate E&P data storage and information network which can enable better, cross discipline, concurrent usage of data. Therefore EPINET was set up. The strategic planning of EPINET project was initiated with the following key technical objectives (Kumar and Rao, 2013):

- Develop a corporate level data store for company's E&P data.
- Implement a project-level database/integration platform at all Assets, Basins, Forward Bases and Corporate centers.
- Standardize new procedures, standards and nomenclatures for subsurface and surface data management and quality assurance associated with all database systems.

Data from wellsite in various formats are communicated to base office through existing network, means and practices. Data are validated and authenticated (QC) at base office by data owners/stakeholders and migrated into output database files.

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EPINET intakes data in a particular standard format. A plugin within output database file enables exporting necessary/required data in EPINET compatible format, which is then uploaded to EPINET database. It as well has the ability to do the unit conversion (e.g. for mud weight PPG to SG etc.), which adds extra flexibility by minimizing manual intervention. Thus a full spectrum of operations data are uploaded into a single homogenous data model in EPINET.

Automatic Report generation

Once various sensor and observed data from wellsite are aggregated in the ODF, the final logs prepared, tables filled, along with the EPINET compatible output, reports are also generated simultaneously as per company standard formats from ODF, e.g. WCR. Thus, with a single input of data in the output database file, multiple reports are generated without any chances of error due to data duplicity.

Sharing of logs via free viewer

The logs prepared at wellsite, and finalized by the operations team can then be shared with the management as PDFs or can be seen through a free viewer if someone does not have a GEO suite dongle. Using this free viewer, the log can be toggled between MD-TVD modes, and can be used to take continuous prints as well

Discussion and Conclusion

Data brings a significant value, often more value than one might have initially guessed. This value can be increased by effectively managing the data, or conversely, the potential of data can be eroded significantly if it is not available to those who need it when they need or it is of a quality that is unacceptable (Lowe, 1995). The way subsurface data is handled can have a significant impact on the overall performance of exploration and production (E&P) organizations, all oil companies understand that data is crucial to their operations.

In the present order of E&P world, storage and retrieval of information have become critical for

business workflow and access to the right information at the right time is a key to competitive edge. With the acquisition of ever-increasing volumes of G&G data, the result has been an explosion in the size of data that underlies the information, the industry needs for rapid, accurate decision making.

The key benefits we had because of the mentioned automated workflow are as follows –

- The entire procedure ensures seamless flow of flawless data. In information management and decision making, the “data commute” emerges repeatedly as a big problem in achieving more efficient workflows.
- It maintains high level of data integrity by reducing the chances of data duplication and manual intervention. When data is available from multiple locations and each copy is liable to be “fixed” by different sets of users data quality issues are almost guaranteed to arise. Data integrity can enhance the value of E&P data to gain efficiencies, reduce cost and make better decisions.
- It increases time efficiency due to automatic report generation upon one time data import.
- It increases the value of data through unified system and reduce data complexity.
- It increases work productivity as well as smoothens operations by making desired data available in a quickest possible manner.
- It ensures secure information sharing with intra and interdisciplinary teams.
- Drilling, reservoir, and production engineering would all benefit from being able to combine historical (accumulated over years), tactical (weeks to months), and high-frequency data from historians (days).

Integration improves exposure, and by extension, the value and quality of information to facilitate workflow and reduce business risk. It is an important element of the way that the E&P business process operates. But the personal Microsoft Excel spreadsheet is the greatest competitor that any

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commercial E&P tool faces. In addition, the lack of auditability of Excel “micro-databases” is a growing liability concern among E&P companies.

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