



Current E&P Data Management and Reporting in ONGC-A Step Towards Right Time Data Availability & Future Consolidation

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Summary

A pilot project for current well data management and daily reporting, covering the exploratory wells of eastern and western coast of Oil and Natural Gas Corporation Limited (ONGC) to begin with, was initiated at Mumbai Region. With the advent of sample data loading environment with respect to all E & P data classes in the Finder Data Model in EPINET (Exploration and Production Information Network) Phase-II project, the task of initiating and building current well data management framework looked clearly feasible. A system based on Own, Populate and Use (OPU) model was implemented for management of current well data from drill site to operational base, i.e., Assets / Forward Base to Finder data model. In the new system, the data is authenticated and loaded into Finder by the data owners in the specialist group / forward base on daily basis using the spreadsheet loaders, developed primarily by EPINET, Mumbai. XML based spreadsheet loaders have been used to migrate the data to Finder.

The system not only saves valuable time of E & P specialists by having single point data entry but also ensures near real time data availability to users. It empowers them to have detailed activity wise daily reporting at their desktop using web based Finder environment.

This paper deals with the planning, execution and experiences of current E & P data management and reporting system.

Introduction

The key business function of ONGC is to explore and exploit hydrocarbons in an efficient, repeatable and sustainable manner. The behavior of E & P data model and current data management solution must respond to these business needs. In these lines ONGC had decided to migrate and manage the full spectrum of E & P data into a single homogeneous data model under EPINET project. The EPINET has SeisDB & LogDB for voluminous seismic and log data management respectively while the entire well data, drilling and production data is managed in 'Finder' databank. With the experience of sample E & P data and subsequent loading of all data classes in the Finder Data Model at all ONGC sites under EPINET, the task of initiating and building current E & P data management framework looked feasible and achievable. A pilot covering the exploratory wells of eastern and western offshore was planned and executed. Following the successful completion of pilot, it was implemented in exploratory locations of onshore.

Methodology for current data management

There are two ways in which the data can be loaded into Finder E & P databank of ONGC. Finder has a number

of forms for different activities, which can be used for data loading and viewing. Alternatively, if data is in well-structured format like Spreadsheet, an xml based spreadsheet loader (SSL) can be developed and can be used for bulk data loading. XML based Spreadsheet loaders are very convenient tool for data loading using a spreadsheet interface.

The pre-defined business objects are xml files which maps the spreadsheet columns to database attributes using write able views. Then triggers are fired on these views to load the values to the database. A pre-defined business object enables to make equivalence between a spreadsheet column and a database attribute. The business object will then manage the actual distribution of the data inside the data model. Data loading through SSL does not require the knowledge of underlying data model from users' point of view.

The following methodology was adopted for current well data management from drill sites to base to Finder:

- The data to be captured activity wise at source, i.e., drill site in Spreadsheets by geology, drilling, logging and chemistry personnel. Microsoft Excel was chosen as Spreadsheet.

- Data to be communicated to Base Office through existing network, means and practices.
- Data to be validated and authenticated at base office by data owners.
- Data to be loaded into EPINET through spreadsheet loaders / scripts by data owners.

The importance of methodology lies in the fact that existing workflows / practices are not affected. Only data is captured in standardized formats avoiding multiple data entry.

Pilot implementation at Mumbai, Kolkata and Rajahmundry

Mumbai was chosen the center for pilot implementation. A first person responsible (FPR) team was formed to facilitate current data management. Data flows and workflows were finalized in consultation with Specialist Group. Generalized dataflow for current data from drill site to Corporate Server is shown in Fig. 1. Dataflow diagram for well data and log data, in particular, are shown in Fig. 2 & Fig. 3 respectively. Since the final log data is submitted in 7-10 days after the logging activity, the rush log data is loaded to Finder as TEMP (temporary) source. After final logging, this data is replaced by validated and spliced data. This ensures near real time availability of log data to users.

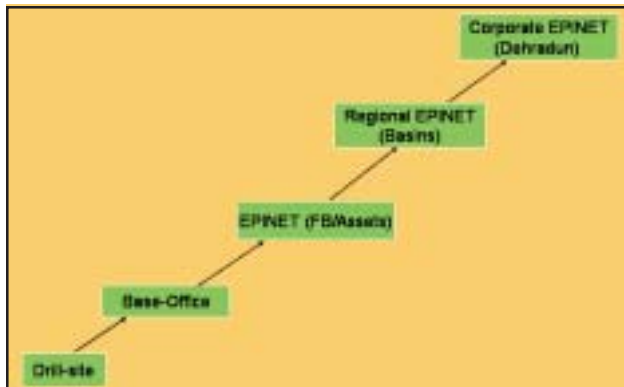


Fig. 1 : Generalized data flow under current data management

Activity wise Spreadsheets were created and finalized in association with specialist group, drilling and logging services. A sample Spreadsheet is shown in Fig. 4. Data was mapped to Finder and xml based spreadsheet loaders were created for each activity. The activities covered in spread sheet and a sample xml loader are included in Table-1 & 2 respectively. The entire job of creation of loaders was carried out in-house. Appraisal and hands on training was provided to identified manpower. A program for generation



Fig.2 : Data flow for well data under current data management



Fig.3 : Data flow for log data under current data management

for Daily Geological Report from same Spreadsheet was also developed and implemented. A web based program for management reporting was developed and implemented at all sites.

Similar implementation was carried out in Rajahmundry in Southern Region and in Kolkata in Central Region of ONGC.

The current data from exploratory wells of eastern and western coast has begun to flow from drill sites to EPINET systems from 25th June 2005. This data is getting aggregated to regional servers and corporate server at Dehradun.

Implementation at onshore exploratory wells at other basin sites

After the successful implementation of the pilot, the same system was extended to exploratory wells of other



FORMATION TESTER (MDT) PRE TEST DATA										
UWI	WELL NAME	TEST NO	MD (M)	START DATE (DD-MM-YYYY)	MUD HYDROSTATIC PRESSURE BEFORE (PSI)	MUD HYDROSTATIC PRESSURE AFTER (PSI)	FORMATION PRESSURE (PSI)	TEMP (°C)	DRADOWN MOBILITY (MD/CP)	REMARKS
C-ABHY-DUMMY-1	DUMMY-1	1	3439.5	1-Feb-2002	5860.24	1600	1200	36	41.78	Tight

Fig. 4: Sample spread sheet for data capture at drill site

Table-1: Activities covered under current well data management

S. N.	Activity	Remarks
1.	Hdr Spud	Header for spudding
2.	CC	Conventional Core
3.	SWC	Side Wall Core
4.	Cuttings	
5.	Casing	
6.	Dev Data	Deviation Data
7.	Drill Para	Drilling Parameters
8.	Mud Para	Mud Parameters
9.	DGR	Daily Geological Report
10.	LOT	Leak Off Test
11.	MDT	Formation Tester - Pretest
12.	MDT-Sample	Formation Tester - Sample
13.	TOTCO	
14.	Logs	Logs Recorded
15.	BHT	Bottom Hole Temperature
16.	VSP	Vertical Seismic Profile
17.	ACT Details	Activation Details
18.	IPT	Initial Production Testing
19.	Flow Mesr	Flow Measurements
20.	Gas Anyls	Gas Analysis
21.	HC Shows	Hydrocarbon Shows
22.	Strati	Stratigraphy
23.	MLU Status	Mud Logging Unit Status
24.	Hdr Completion	Header Completion

regions of ONGC in association with EPINET nodal center, Dehradun. Necessary changes in Spreadsheets and loaders to suit the on land requirement were incorporated and implemented at all onshore sites.

Current data management at assets

In line with the current data management at Basins, the same is planned at Assets w.r.t. development wells, drilling and production data classes. Following steps are in

Table-2: A sample XML Spread Sheet Loader

```
<?xml version="1.0" ?>
<!DOCTYPE BUSINESS_OBJECT (View Source for full doctype...)>
<BUSINESS_OBJECT OBJECT_NAME="mdt">
<TABLES>
<TABLE TABLE_NAME="mdt_ssi" COLLISIONS="Y" EXEC_ORDER="1">
<COLUMNS>
<COLUMN COLUMN_NAME="UWI" DISPLAY_NAME="UWI" DATA_TYPE="VARCHAR2"
FIELD_LENGTH="20" REQUIRED="Y" HIDDEN="N" />
<COLUMN COLUMN_NAME="TEST_NO" DISPLAY_NAME="TEST_NO" DATA_TYPE="NUMBER"
REQUIRED="Y" HIDDEN="N" />
<COLUMN COLUMN_NAME="MD" DISPLAY_NAME="MD" DATA_TYPE="NUMBER" REQUIRED="Y"
HIDDEN="N" />
<COLUMN COLUMN_NAME="START_DATE" DISPLAY_NAME="START_DATE" DATA_TYPE="DATE"
HIDDEN="N" />
<COLUMN COLUMN_NAME="HYDROSTATIC_PRESSURE_BEFORE"
DISPLAY_NAME="HYDROSTATIC_PRESSURE_BEFORE" DATA_TYPE="NUMBER" HIDDEN="N" />
<COLUMN COLUMN_NAME="HYDROSTATIC_PRESSURE_AFTER"
DISPLAY_NAME="HYDROSTATIC_PRESSURE_AFTER" DATA_TYPE="NUMBER" HIDDEN="N" />
<COLUMN COLUMN_NAME="FORMATION_PRESSURE" DISPLAY_NAME="FORMATION_PRESSURE"
DATA_TYPE="NUMBER" HIDDEN="N" />
<COLUMN COLUMN_NAME="MOBILITY" DISPLAY_NAME="MOBILITY" DATA_TYPE="NUMBER"
HIDDEN="N" />
<COLUMN COLUMN_NAME="REMARKS" DISPLAY_NAME="REMARKS" DATA_TYPE="VARCHAR2"
FIELD_LENGTH="400" HIDDEN="N" />
</COLUMNS>
</TABLE>
</TABLES>
</BUSINESS_OBJECT>
```

pipeline to achieve the detailed current data management at Assets.

- Identification of data types captured through SAP.
- Defining the Spreadsheets for new data types under development wells.
- Mapping of SAP environment with Finder environment for changeover to avoid duplicity.
- Designing of dataflow and workflow.
- Development of SSLs accordingly.
- Implementation of current data management and reporting program at Mumbai Assets.
- Similar roll out in other Assets of ONGC.

Key benefits

In the pre-pilot scenario, the data from drill site was communicated to Specialist Group/ Forward Base by e-mail floppy etc. This data was being used by them for generation of Daily Geological Report (DGR) and Well Completion Report (WCR). WCR and log data was collected

by EPINET team and loaded to Finder using Forms. In this process data was not available in EPINET immediately after its acquisition. Moreover the data was being entered twice – first time for generation of WCR and second time while loading into EPINET. In the post pilot scenario, the data is communicated from drill sites to Specialist Group/ Forward Base in Finder compliant Spreadsheets through same communication channels. The same spreadsheet is used for generation of DGR, WCR and data loading to Finder. The advantages of the new system include:

- There is only single point entry of data resulting in saving of valuable time of geoscientists.
- The data is loaded to Finder by data generators, so ensures the quality of data and ownership.
- Near real time availability of data to users.
- This exercise will aid in resolving compatibility and data sharing issues and processes with SAP and SCADA systems.

Conclusions

A project for near real time current data management was started in EPINET, Mumbai. The dataflow, roles and responsibilities were formulated in consultation with specialist group. Activity wise Spreadsheets were designed and were handed over to drill sites. XML based spreadsheet loaders were developed and installed to Finder to port data from Spreadsheet to Finder. Hands on training

on data loading and visualization was provided to geoscientists at Mumbai, Rajahmundry and Kolkata. The current data from exploratory wells of eastern and western coast has begun to flow from drill sites to EPINET systems from 25th June 2005. This data is getting aggregated to corporate EPINET server at Dehradun. The system has ensured right time data availability to users by making it available in near real time.

This will pave the way for another demanding milestone of having drilling and production data into EPINET in foreseeable future in near real time environment duly integrated with ICE initiatives of ONGC under SAP.

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Views expressed in this paper are that of the author only and may not necessarily be of ONGC.