Drilling Support Center (DSC) in Its True Sense – A Russian Operator Experience

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What is Drilling Support Center (DSC)?

- A supervision system for drilling that allows experts to monitor, review, and analyze real-time data in a collaborative manner to provide real-time solutions to problems.
- A data management system, which can receive, process, and visualize real-time data from several locations to facilitate decisions from a centralized team of experts.
- A communications system to relay information from the wellsite, and decision back to wellsite.

Through better practices, DSC’s can reduce unplanned costs.
**Why is it needed?**

**Drivers:**
To meet the challenge of increasing well complexity by improving the quality and speed of well planning and well delivery decision-making through expert support with real-time data,
To efficiently utilize resources and quality experts in remote operations
- Improve remote operations for better personnel utilization
- Reduce “Idle-Time” and associated cost
- Improve drilling efficiency / reduce lost time
- Identify causes of Invisible Lost Time (ILT)
- Potentially improve production through better well placement
- Capture knowledge and best practices

**In Traditional Operations:**
- Rotating experts work on one rig
- Separated technical disciplines
- Planning – mostly 3rd party prepared
- Operations drill according to the “Plan”
- Reaction to problems slow

**In Real-Time Operations:**
- Expert group supports multiple rigs
- Collaboration of technical disciplines in asset teams
- Continuously improved planning
- Dynamic planning to mitigate risk
- Proactive ID and prevention of problems

**Reported NPT approximately 8%.
BUT detailed study indicated actual NPT (incl. ILT) more than 15%**
Goals and Objectives of DSC

**Goal**

*Increase of drilling efficiency by the following parameters:*
- Increase drilling performance: day/1000m;
- Decrease drilling cost: $/bbl;
- Improve cycle-time: days/well

**Objectives:**

1. Engineering and technological support to drilling complex wells (CW);
2. Support of pilot drilling projects;
3. Support of new technology projects;
4. Implementation of drilling “Information System”

DSC provides engineering and technological support to drilling together with geological support group, including monitoring of the drilling process in real-time mode for 12 hours 7 days per week (plan is to upscale monitoring to 24/7).
Distribution of Roles depending on Well classification

**WELL CLASSIFICATION**

**ROUTINE:** Development wells, and standard Operations

**CHALLENGING:**
- New Fields Development, Horizontal and Geosteering applications, Exploration and Remote Locations

**COMPLEX:**
- New Technology application (for subsidiaries), Fields that are geologically challenging and International projects

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**Central (Moscow) Drilling Dept.**

- Technical support to TS as required and requested
- Performance Reporting, DDR, EoWR, + Lessons Learnt, Near miss, incident/Accident reporting

**Subsidiary Drilling Dept..**

- Challenging operations are managed by the Subsidiary with DSC/Central Drilling Dept.. contracted support (CONSULTATIVE ADVICE)
- Subsidiary drilling Dept.. manages routine operations

**DSC**

- DSC manages and executes Complex wells with Subsidiary for operational support

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**Routine**
- Approx. 90% of wells drilled

**Challenging**
- Approx. 8% of wells drilled

**Complex**
- <2% of wells drilled

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**Increasing Well Complexity**

To implement this type of framework, a detailed contract system is set up to allow DSC to operate under contract with Subsidiaries.
Integration of DSC within the Company

- Strategies
- Reporting/benchmarking
- Sector Team
- Org. capability implementation
- Coordination of new technologies

HQ Drilling Department

COORDINATION of drilling activities

TNNC
Designing and FDP development (DESIGNING)

- Field development plan
- FDP coordination,
- Supervision,
- R&D, New Technology

TS Drilling Departments
Responsibility for operations (PERFORMANCE)

- Current planning, budgeting
- Designing (TOR, Design & cost estimates, work programs)
- Contracting,
- Program delivery

Drilling Support Center
(ASSESSMENT, ANALYSIS, LESSONS LEARNED)

- Designing (Assessment of TOR, drilling plans)
- Planning (support)
- Coordination in maintenance of drilling DB and engineering software;
- Organizational capability
- Support:
  - Exploration wells
  - Geosteering
  - New technology
  - Pilot projects

Geosteering
Geological support of horizontal wells, Implementation of shared projects for NT, Pilot projects.

Well Works Dpt.
Well completion/stimulation, Implementation of shared projects for NT, Pilot projects.

Drilling optimization:
- Footage control
- Pressure control
- Damage and collapse control
- Wellbore stability modeling

Internal cooperation pattern

External cooperation pattern

THK-BP
DSC Influence and Functions

**Coordination**
- Drilling Database and Engineering Software implementation
- Transfer of data from the rigs in real-time
- Emergency situation prevention and issue of recommendations

**Support**
- Geosteering (engineering-geological support of horizontal drilling and sidetracking)
- Engineering support to new technology implementation and pilot projects
- Engineering support exploration drilling

**Consulting**
- Drilling data visualization
- Risk evaluation of complicated wells in planning stage
- Young Specialists training & development
- DSC experts’ consulting services

**DSC Functions**

**DSC Influence**
DSC influences technical and technological parts of drilling efficiency. Additional KPIs established for DSC, in addition to company-wide KPIs are:
- Number of monitored wells;
- Time for drilling complicated wells;
- Number of new technology pilot projects implemented.
DSC Influence on Drilling Efficiency

DSC influences operational and technological parts of drilling efficiency. With increased number of complex and problematic wells, DSC influence on drilling efficiency is expected. The following KPI's are applied, in addition to the corporate ones:
- The number of wells supported;
- Complex wells drilling time;
- Number of new technologies/pilot projects implemented.
### DSC Predicted Benefit vs. Time

#### 3+1 Year Program

**Investment Schedule:**
- IT & Communications
- Software Support/Year
- Facility Maintenance/year
- Consultancy

**Performance Goals:**
- Identification of ILT and reduction
- 10% reduction in real NPT
- 10% Improvement in Drilling performance (Typical of DSC utilization)
- Enhanced production, earlier oil, etc.

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#### Performance Improvement

<table>
<thead>
<tr>
<th>No. of Wells Drilled</th>
<th>Performance Improvement</th>
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<tbody>
<tr>
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<td>5</td>
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<tr>
<td>7</td>
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<td>45</td>
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<td>55</td>
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#### NPT Reduction

<table>
<thead>
<tr>
<th>No. of Wells Drilled</th>
<th>NPT Reduction</th>
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<tbody>
<tr>
<td>1</td>
<td>5</td>
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<td>45</td>
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<td>55</td>
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#### Reduction of Re-Drills

<table>
<thead>
<tr>
<th>Months</th>
<th>%age Reduction</th>
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<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td>36</td>
<td>15</td>
</tr>
</tbody>
</table>

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#### Costs, Savings, Return

<table>
<thead>
<tr>
<th>KUSD</th>
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<tbody>
<tr>
<td>Costs</td>
</tr>
<tr>
<td>Savings</td>
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<tr>
<td>Return</td>
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</tbody>
</table>

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#### Cumulative Return

- Increasing Savings
- Cumulative Return
## Pros, Cons & Risks

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
<th>Risks</th>
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<tbody>
<tr>
<td>Expert Knowledge, immediately available to all</td>
<td>Difficulty in locating &amp; retaining the skilled personnel required</td>
<td>If right personnel not utilized may result in reduced performance of DSC</td>
</tr>
<tr>
<td>Faster Learning Curve for all personnel involved</td>
<td>New methods of working need to be adopted</td>
<td>Attitudes of existing personnel may not accept new practices, and may obstruct implementation. Correct Roll-out ESSENTIAL</td>
</tr>
<tr>
<td>Improved Data</td>
<td>Change of attitudes and training required to ensure data integrity</td>
<td>Needs new data architecture and data handling services, and potential obstruction/resentment from operations teams.</td>
</tr>
<tr>
<td>Potential to Reduce Costs, through NPT reduction, and increased drilling efficiency</td>
<td>Potential for no improvement in performance, high initial investment</td>
<td>Change management needs to be accepted from senior management through to operational teams. New processes and behaviors need to be adopted</td>
</tr>
<tr>
<td>Faster Planning and execution Time</td>
<td>High maintenance cost of softwares</td>
<td>Interactive and interrogatable databases, together with engineering software required and must be maintained with effective data architecture</td>
</tr>
<tr>
<td>Collaborative environment for optimized well design/placement</td>
<td>Cost of Data management and collaborative software</td>
<td>Requires adoption of new working practices. Requires a new attitude and business process and significant investment in Data architecture and software</td>
</tr>
<tr>
<td>Improved Supervision, risk identification/mitigation and intervention in real time</td>
<td>Skilled experienced personnel required</td>
<td>Requires Subsidiary support of operating process and full support of management. Structured contract framework must be in place</td>
</tr>
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DSC Organization

DSC

Real-time Operations
- Operations Managers:
  - OM-Yamal
  - OM-West Siberia
  - OM-East & South
  - OM-Leave Relief
- Lead Specialist:
  - Information Systems

Engineering Support
- Discipline Managers:
  - Directional Drilling and Drill Bits
  - Drilling Fluids
  - Cementing
  - Well completion
  - Special Projects

Geosteering Support
- Lead Specialists:
  - Gas Project
  - Sidetracks
- Geosteering Specialists
  - GS-West Siberia
  - GS-East & South

Project Milestones

<table>
<thead>
<tr>
<th>Event</th>
<th>Timeframe</th>
</tr>
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<tbody>
<tr>
<td>Management go-ahead to start the Project</td>
<td>Q1 2010</td>
</tr>
<tr>
<td>Assignment of personnel, commence operations</td>
<td>Q1 2011</td>
</tr>
<tr>
<td>DSC in full operation mode</td>
<td>Q1 2012</td>
</tr>
</tbody>
</table>
## Daily Joint Operations Review Meetings

### Supported Well Types:
- New Technology Pilot Projects
- Large step-out Directional or Horizontal wells
- Exploration, HPHT or Complex Geology
- High Risk Incident well

### Review Format:
- Past 24 Hrs summary
- Current Operation
- Forward Plan
- Potential Risks
- Requirements from DSC
- Remarks
DSC Support Results

Drilling efficiency of «TNK-BP» for 12 months 2011:

<table>
<thead>
<tr>
<th>Efficiency</th>
<th>Drilling cycle reduction, % by 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target for 2011</td>
</tr>
<tr>
<td>Production drilling</td>
<td>9.0%</td>
</tr>
<tr>
<td>Sidetracking</td>
<td>9.0%</td>
</tr>
<tr>
<td>DSC influence on drilling efficiency</td>
<td>0.5%</td>
</tr>
</tbody>
</table>

Total efficiency of drilling and sidetracking in «TNK-BP» 12.40%
Key Achievements

- Recruiting expert specialists for directional drilling, drill bits, drilling fluids, cementing and well completion;
- Establishing interaction with all company Subsidiaries for complex well drilling support and pilot projects, including Geosteering;
- Realization of drilling “Information systems” project: Corporate drilling database, Engineering SW and Real-time data transfer including live Video;
- Provision of extended services outside the Company (Gazpromneft Messoyakha project) and International project (TNK-Vietnam project);
- Active participation in training of drilling personnel (around 400 specialists) and Young Specialists, including evaluation/recommendations on their development plans, and participation in examinations;
- Organization of internal trainings by DSC specialists and external consultants;
- Incorporating Geosteering support team.
**Goal**

Increase efficiency and reduce well drilling cycle using up-to-date geological models and by real-time data.

**Objectives:**

1. Assessment of geological-technological risks related to drilling;
2. Assessment of reservoir characteristics;
3. Using “sector” model and “offset” data for analysis at well planning stage and drilling monitoring.

**Business Value**

- Optimization of planned well position based on analysis of geological model;
- Optimization of well placement process;
- Well “life expectancy” increase.
Assessment and Prediction of Drilling Risks

- Expert review of source data
- Assessment of structural specifics and abnormal pressures
- Evaluation of stratigraphy
- Assessment of formation damage model - Geomechanics
- Assessment of vertical rock minerology and max stresses,
- Assessment of well trajectories, well flow rates
Thank you for your attention

Questions ?