SPE-199644-MS New Version of IADC Daily Drilling Report Increases Granularity, Provides Opportunity to Automate & Collaborate Using a Common Digital Format

David Shackleton, Independent Data Services; Robert van Kuilenburg, Noble Corporation; Nathan Moralez, BP America Inc.; Robin Macmillan, National Oilwell Varco; John de Wardt, De Ward & Company; Linda Hsieh, IADC
Outline

• What is the IADC DDR, and what is it used for?
• Why did it need updating?
• What was the process?
• Two main demands from IADC Members
• How were these demands fulfilled?
• How is the DDR Plus being used now?
• What is the future?

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What is the IADC DDR?

• Used on most drilling rigs
• Record of:
  • Daily rig activity
  • Crew for payroll
  • Equipment – surface & downhole
  • Well & Wellbore
  • Bit, BHA, muds, etc.

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Why did the IADC DDR Need Updating?

- Had not been meaningfully updated in decades
- Opportunities lost to integrate the report into the modern well construction process

What was the first step?

- Industry survey with over 100 responses.
  - How is the DDR being used?
  - What needs improving?
## Who Responded?

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<thead>
<tr>
<th>Category</th>
<th>No. Responses</th>
<th>Unique Companies</th>
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<tbody>
<tr>
<td>Drilling Contractors</td>
<td>78</td>
<td>29</td>
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<tr>
<td>Operators</td>
<td>21</td>
<td>17</td>
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<tr>
<td>Service companies</td>
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<td>12</td>
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<tr>
<td>OEM</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Data Acquisition Companies</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Other</td>
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<td>11</td>
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</table>

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Q1. How do you use the IADC DDR form?

<table>
<thead>
<tr>
<th>Reason</th>
<th>% of Respondees</th>
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<tbody>
<tr>
<td>End of Well Report/Ops status</td>
<td>50%</td>
</tr>
<tr>
<td>Performance Analysis</td>
<td>50%</td>
</tr>
<tr>
<td>Contractual Requirements</td>
<td>50%</td>
</tr>
<tr>
<td>Satisfy Internal Policy</td>
<td>50%</td>
</tr>
<tr>
<td>Invoice Providers</td>
<td>50%</td>
</tr>
<tr>
<td>Government Reporting</td>
<td>50%</td>
</tr>
<tr>
<td>Audit Providers</td>
<td>50%</td>
</tr>
<tr>
<td>Performance Payments</td>
<td>50%</td>
</tr>
<tr>
<td>None of these reasons</td>
<td>50%</td>
</tr>
</tbody>
</table>

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Q 11. Standard way to import data, automated reporting?

- **YES** 86%
- **NO** 14%

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Q 12. ‘Rig State Engines’ to complete automatically?

YES 78%

NO 22%

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Q 15a. What needs to be changed for your company?

- More Codes: 25% of respondees
- Nothing: 50% of respondees
- Improve Data Structure: 75% of respondees
- Automate Data: 75% of respondees
- More Fields: 75% of respondees
- KPIs / Analysis: 75% of respondees
- Rig States: 75% of respondees

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Change with the Times

Digitalize and Automate
- Easy data flow in and out
- Automatic data input using rig states

Update Codes
- More codes
- Update Activity descriptions
- Add sub-codes

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There is no text content available for this page.
### The New DDR Plus – updates to paper format

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#### Daily Drilling Report

- **Operator**
- **Contractor**
- **Rig No.**

#### Report Section

- **Date and Time**
- **Spud**
- **Rig Release**
- **Pause**
- **Resume**
- **TD**

#### Drilling Assembly/BHA

- **No. Item**
- **D.D.**
- **Length**

#### Bit Record

- **No.**
- **Item**
- **D.D.**
- **Length**
- **Bit No.**
- **Time**
- **Weight**
- **IADC Code**
- **Manufacturer**
- **Type**
- **Serial No.**
- **Gel Strength**
- **Pumps**
- **TFV**
- **Jets**
- **PH**
- **SLID**

#### Mud Record

- **Mud Pump Stroke Length**
- **MP1**
- **MP2**
- **MP3**
- **MP4**

#### Depth Interval

- **Formation (Show Core Recovery)**
- **RPM**
- **WT. On Bit**

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## The New DDR Plus - Main Codes

<table>
<thead>
<tr>
<th>OLD</th>
<th>NEW DDR Plus</th>
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<tbody>
<tr>
<td>1. RIG UP AND TEAR DOWN</td>
<td>1. RIG UP / TEAR DOWN / MOVE</td>
</tr>
<tr>
<td>2. DRILL ACTUAL</td>
<td>2. DRILLING</td>
</tr>
<tr>
<td>3. REAMING</td>
<td>3. REAMING</td>
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<tr>
<td>4. CORING</td>
<td>4. CORING</td>
</tr>
<tr>
<td>5. CONDITION MUD &amp; CIRCULATE</td>
<td>5. CIRCULATE &amp; CONDITION MUD</td>
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<tr>
<td>6. TRIPS</td>
<td>6. TRIPS</td>
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<tr>
<td>7. LUBRICATE RIG</td>
<td>7. SERVICE/MAINTAIN RIG</td>
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<tr>
<td>8. REPAIR RIG</td>
<td>8. REPAIR RIG</td>
</tr>
<tr>
<td>9. CUT OFF DRILLING LINE</td>
<td>9. REPLACING DRILL LINE</td>
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<tr>
<td>10. DEVIATION SURVEY</td>
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<td>11. WIRE LINE LOGS</td>
<td>11. WIRELINE LOGS</td>
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<tr>
<td>12. RUN CASING &amp; CEMENT</td>
<td>12. RUN CASING &amp; CEMENT</td>
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</table>
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<table>
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<td>13 WAIT ON CEMENT</td>
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<td>14 NIPPLE UP B.O.P.</td>
<td>14 RIG UP/DOWN BOP</td>
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<tr>
<td>15 TEST B.O.P.</td>
<td>15 TEST BOP</td>
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<td>16 DRILL STEM TEST</td>
<td>16 DRILL STEM TEST</td>
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<tr>
<td>17 PLUG BACK</td>
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<tr>
<td>18 SQUEEZE CEMENT</td>
<td>18 SQUEEZE CEMENT</td>
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<tr>
<td>19 FISHING</td>
<td>19 FISHING</td>
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<tr>
<td>20 DIR. WORK</td>
<td>20 SPECIALIZED DIRECTIONAL WORK</td>
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<tr>
<td>21 RUN/RETRIEVE RISER EQUIP.</td>
<td>[UNDEFINED - INTERNAL USE ONLY]</td>
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<tr>
<td>22 SURFACE TESTING</td>
<td>22 SURFACE TESTING</td>
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<td>23 OTHER</td>
<td>23 OTHER</td>
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<td>[UNDEFINED - INTERNAL USE ONLY]</td>
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</table>

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<td>B TUBING TRIPS</td>
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</table>
The New DDR Plus – updates to paper format

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The New DDR Plus - Granular Code-set

Aim: To fully describe Drilling and Completion operations

Operation (28 codes)
  Activity (169)
    Sub-activity (40)
    Equipment (120)
    Sub-equipment (75)

E.g.,

DRILLING
  Ahead
  Rotating
  Land Drilling Rig
  Drill Pipe

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The New DDR Plus - Granular Code-set – Automated

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The New DDR Plus - Common Digital Description

Leaning heavily on established

*Well-Site Information Transfer Standard Markup Language (WITSML) XML Schema*

Paper report with digital copy → truly, fundamentally digital report
The New DDR Plus - Common Digital Description

WITSML 1.4

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<thead>
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<td>target</td>
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<td>mudLog</td>
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<tr>
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<td>objectGroup</td>
<td>toolErrorTermSet</td>
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<td>opsReport</td>
<td>trajectory</td>
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<td>tubular</td>
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<td>risk</td>
<td>wbGeometry</td>
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<tr>
<td>fluidsReport</td>
<td>sidewallCore</td>
<td>well</td>
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<td>formationMarker</td>
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</table>

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The New DDR Plus - Common Digital Description

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Current Development Status

• v1.0 introduced early 2019
• Power users provided significant feedback
• Feedback incorporated into v2.0 released December 2019
• As v2.0 is adopted, new optimized versions will be released.
• Eye on the future of full automation

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Current Use Case

Rig Systems
- Real-time data
- Service co. data
- BHAs, muds, etc.

Office Systems
- ERP/databases
- pdf, spreadsheets

Automated Time Log / Activities
+ Rig State Detection
Manual entry
Doc. parsing
Data bridges

Performance Management

QC

DDR Plus™
Schema

DDR Plus™

Operator DDR

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Value & Benefits of Common Digital Description

• Easy flow of data between & within organizations:
  • Service companies provide BHA, Tubular, Mud, etc. data in standard format
  • Data companies can provide standardized services for data collection & storage
  • Drilling Contractors can provide the data from their DDR Plus to analyze

• Standardized services can be developed for the DDR Plus

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Summary

IADC DDR Plus

• Designed for modern drilling, completions & interventions
• Industry-driven, designed, developed & delivered
• Granular code-set ready for detailed reporting, analysis & automated rig state
• Standard digital format for easier collaboration & economy of scale for driving innovation

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The New DDR Plus - Website

https://www.iadc.org/ddrplus/

Advanced Rig Technology (ART) subcommittee: DATA, CONTROLS AND SENSORS (DCS)
Acknowledgments:
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Nathan Moralez, BP America Inc.
Robin Macmillan, National Oilwell Varco
John de Wardt, DE WARDT & COMPANY
Linda Hsieh, IADC

Thank you!

Questions?