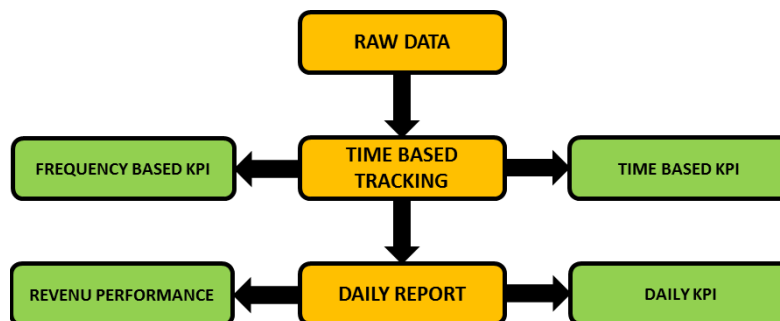IADC **D**aily **D**rilling **R**eport

Background

The IADC Daily Drilling Report (DDR) has been the standard in reporting activities on drilling rigs around the world for decades. Available both in paper form directly from IADC or licensed electronic formats (available through numerous commercial parties), the IADC DDR is the standard for reporting drilling performance. The IADC DDR functions in the majority of the drilling contracts as the legal standard for reporting performance, and consequently for any financial decisions.

However there are numerous developments that necessitate a rethinking of the function, form and usage of the IADC DDR. An increased number of drilling KPI (Key Performance Indicators) are being used to assess the drilling performance often with very short time intervals. The recent advantages in measuring, processing and presenting sensor data present exciting possibilities to optimize and control the drilling process.

The IADC executive committee tasked the ART (Advanced Rig Technology) group to upgrade the IADC DDR to reflect the current state of technology. Within the ART group the DCS (Drilling Control Systems) committee is acting as a lead for this project.

The first question that needs to be answered: what is the final purpose of the IADC DDR? Is the DDR the final document that acts as proof for any financial obligations, tracking performance to improve efficiency, logging drilling data, logging equipment use, a combination of all, etc. Each purpose requires specific fields, logging frequency and accuracy that might be interchangeable but often only in one direction.

Since the IADC DDR has to fulfill multiple purposes it should be possible to transition from the format of one purpose (efficiency tracking) to another purpose format (financial obligations) in a standardized manner.

Daily Drilling Report based on Sensor Data

Based on the definition of the final purpose the optimal format can be chosen, including what fields need to be part of the IADC DDR.

Since the IADC DDR is used worldwide and has decades of usage backward compatibility will be an important feature. This will ensure a seamless transition from the old to the new format, limiting the necessary changes in client systems.

Role of IADC

By its very nature the IADC is an impartial body, representing the whole drilling industry. As such it is ideally suited to maintain and verify a minimum standard for reporting performance. Especially when it comes to performance linked to revenue and cost a validated method is essential.

The minimum standards can be divided into three sections:

1. **Base sensor data standards**
   a. Manually filled in reports (not relevant)
   b. Automatically filled in reports

2. **Drilling report fields and transitional calculations**
   a. Manually filled in reports
   b. Automatically filled in reports

3. **Static Data**
   a. Manually filled in reports
   b. Automatically filled in reports

Base Sensor Data Standards concerns mainly the automatically filled in reports, although certain standards on the sensors can be determined even in the manual case.

For the automatically filled in reports the standards could describe the following:

- Sensor location (preferred)
- Recalibration period
- Accuracy of the sensor (digits), preferred range of the sensor
- Significant digits to be maintained when sending data across networks
- Sensor sample frequency
- Calculation method to transform measured data into daily data
- Data formats

There are many systems on the market nowadays that can track sensor data and/or generic drilling data. Many programs exists that present drilling data. It would be very cumbersome to mandate/specify exactly how data is transferred and presented. Focusing on the quality of the data is a more efficient way.
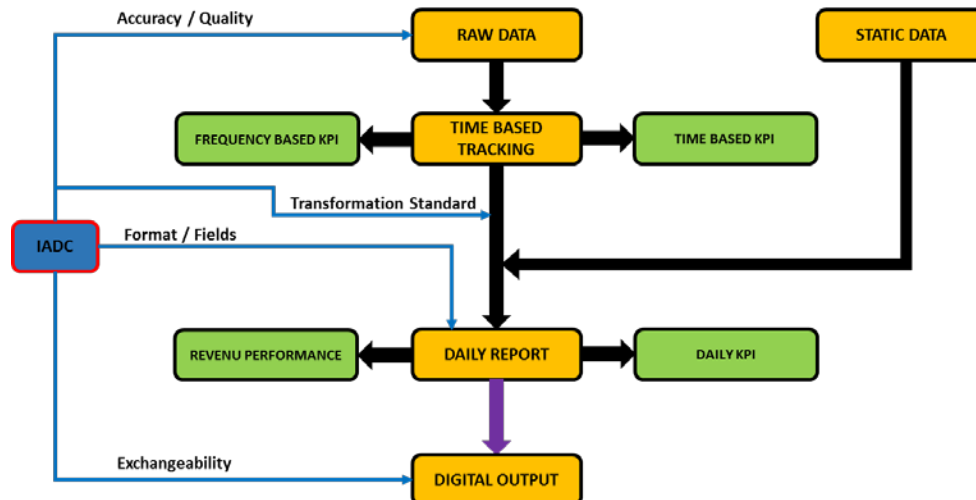
However IADC can mandate the format (or sequence/schema) once the data is in the daily drilling format. That will ensure that IADC DDR data can be freely exchanged from one party to another. It also opens the door for 3rd parties to present the data on a number of devices such as tablets, phones, etc.

So in short the IADC can play a role in 4 different areas:

- Accuracy / Quality of measured data
- Transformation Standards to go from time based to daily data
- Format / Fields of the Report
- Digital IADC DDR format (schema or otherwise)

Rig States

Currently the IADC DDR recognizes 23 different rig states not counting the "downtime" state. One of the activities that need to take place is to identify the minimum sensors needed to be able to ascertain a state. A state diagram then needs to be developed to map those sensors to states or vice versa.

It must be noted that in some instances it might not even be possible to uniquely map states to sensors. Also the question must be asked if all states must be kept – or different states must be introduced such as drilling with MPD, fracking, etc.

The advice is to approach the states from top down to create a logical framework also including the new technologies now commonly used in drilling operations. A small example is presented below.
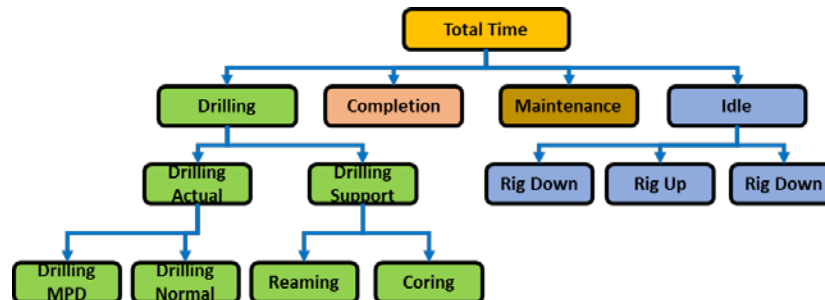
IADC Daily Drilling Report Format / Digitization

An in depth review of all sections and fields is recommended. An industry survey to determine which fields are used and which field are not used could serve as a basis for the renewed layout.
An example is the Mud & Chemicals added field – which seems to be overlapping with the daily mud report and, based on some report samples, is never filled in.

Fields must also contribute to the defined goal of the IADC Daily Drilling Report.

It is recommended to avoid using KPI's as part of the standard IADC Daily Drilling Report since it is very situation dependent if a certain KPI is "good" or even relevant. The only exception that could be made is the safety indicators (incidents/xx hours worked) since those are standardized across industries.

Proposed Actions Gate 1

1. Survey Industry for sample IADC Daily Drilling Reports. All regions both land and offshore, create a "heat" map of usage of different fields.
2. Create a "logical" rig states model
3. Define minimum number of sensors
4. Define a transformation standard to transform time based signals to daily field values.
5. Based on 1,2 & 3 propose a new layout, sections and fields