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Mud Gas Acquisition - Alignment to the Engineering Rig Design that Impact Equipment and Methods

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SUMMARY

Mud log gas acquisition techniques remained fairly constant for a long period. Modern gas acquisition techniques have improved from technical innovation, resulting in truly digital mud log gas data. Modern rig design has evolved at a greater pace than mud log gas acquisition techniques. The type of gas data acquisition equipment chosen is now more important to assure quality data is obtained. Wells examined that were expected to have similar gas readings actually had highly variable measurements. Investigation showed this variation was due to mud levels changing dramatically over short periods of time. There is a direct relation between gas acquisition equipment and rig circulation system design. A review should be done of the planned rig design and efficiencies prior to determining the gas acquisition system to be used on the rig.

If a modern gas acquisition system is chosen for the first time in an area, added efforts to recalibrate these data to traditional gas acquisition should be considered to assure results.

Mud Gas Acquisition – Alignment to the Engineering Changes in Rig Design that Impact Equipment and Methods

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SCOPE

Mud log gas acquisition techniques remained fairly constant for a long period and were considered a basic, simple and inexpensive service to provide valuable data. These qualitative data were presented digitally with the advent of computers. Modern gas acquisition techniques have improved from technical innovation, resulting in truly digital mud log gas data. Modern rig design has evolved at a greater pace than mud log gas acquisition techniques. Now, the type of gas data acquisition equipment chosen is more important to assure quality data is obtained.

OBJECTIVES

Raise awareness of the Geoscience and Operations Industry to the impact of modern rig design on traditional gas data acquisition techniques and the potential impact on data quality and efficiency.

METHODOLOGY

A “root-cause” investigation into gas acquisition data quality and equipment performance was triggered by several field observations. Wells that were expected to have similar gas readings actually had highly variable measurements. Investigation showed this variation was due to circulation system design. Mudloggers noticed that gas readings would fluctuate and sometimes stop. Investigation showed this variation was due to mud levels in the possum belly changing dramatically over short periods of time. The mudloggers would manually adjust the field equipment to maintain gas readings, introducing downtime and additional variation in the meaning of the gas data.

A product of this study was the observation that differences and evolution in rig design has impacted the ability of conventional gas agitator equipment to obtain quality data without excessive adjustment or maintenance.

Further examination of rig design produced a correlation between gas data quality and gas acquisition equipment choices.

RESULTS

There is a direct relation between gas acquisition equipment and rig circulation system design. Simple shallow hole drilling systems can continue to acquire quality gas data with traditional gas traps and agitators.

Modern rig systems for intermediate complexity wells onshore or offshore should address the desired use of the gas data more closely.

Modern rig cuttings handling systems that have eliminated a central possum belly will acquire poor to unusable gas data, require frequent maintenance, and experience high equipment failure rates when using conventional traditional agitator gas systems. These modern rig systems include those for high capacity circulation, extended reach drilling, high pressure wells, offshore deep water wells, and rigs with environmental recirculation cleaning systems.

Change over from traditional agitator gas acquisition systems to recent in-line gas acquisition systems significantly reduces the maintenance and improves data quality in modern rig designs.

Results of the change in gas equipment can cause the need to re-calibrate between the traditional gas technologies results and the new technologies in order to compare the data sets. Differences can be significant enough to appear not to correlate at all without close review.

CONCLUSION

A review should be done of the planned rig design and efficiencies prior to determining the gas acquisition system to be used on the rig.

Choosing the traditional gas acquisition technology for a well with planned high capacity and high efficiency mud systems can result in an increase in maintenance that may lead to inadequate gas data.

When using rigs with high capacity circulation, extended reach drilling, high pressure wells, offshore deep water wells, and rigs with environmental recirculation cleaning systems, consider the use of modern in-line gas detection systems. Rig modification in advance of drilling can assure proper installation of these systems.

Alignment of gas data acquisition equipment and rig circulation design will assure sufficient technology for high-quality digital gas data acquisition for these highly technical wells.

If a modern gas acquisition system is chosen for the first time in an area, added efforts to recalibrate these data to traditional gas acquisition should be considered to assure results.

Figure 1 Chart is a compilation of data from wells in a variety of locations, all drilled with a specific type of shaker and agitator combination. Maintenance record for these wells show when personnel were required or to correct errors serviced Gas sampling system.

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