Real Time Drilling Problems Diagnostics

A Practical Course for Hole Problems Detection, Diagnostics, and Proactive Resolution Designed for RTOC Personnel and Office Drilling Engineers

Course Perspective

Real time operation centers (RTOC) are sprung all over, and the RTOC engineer is charged with the duty to monitor wells, make early detection and root cause analysis, and then make swift recommendation to the drilling operation personnel. The office drilling engineer evaluates the timely recommendation for action by the drilling operation department. In order to do this job, the RTOC engineer must be fully versed on real time drilling software and analysis tools. This course offers a unique overview on real time data, its analysis in real time, how to detect, diagnose causes, and resolve abnormal well behavior. Topics that will be covered include analysis of wellbore stability, pore pressure, drill string dynamics, downhole pressure management, torque and drag, and equipment failure.

Well signature for different cases of erratic behavior or equipment failure will be reviewed, best drilling practices to deal with these issues will be outlined. Some software tools will be utilized to show how to establish theoretical normal behavior (well finger printing) and overlay real time data to detect deviation from normal trends. Root cause analysis is then followed.

Objective

This course is designed to address preventive measures to prevent the occurrence of stuck pipe, hole problems, equipment failure or at least minimize its frequency.

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Real time drilling problems diagnostics is a key to prevent costly interventions and remediation. Proactive decision making followed by a swift action is always better than cure. This course will show you how with real life examples.

Operators should be mindful of the fact that they need to invest in the development of their own RTOC Engineers. RTOC engineers' development requires specialized training which is not typically found from the conventional training resources

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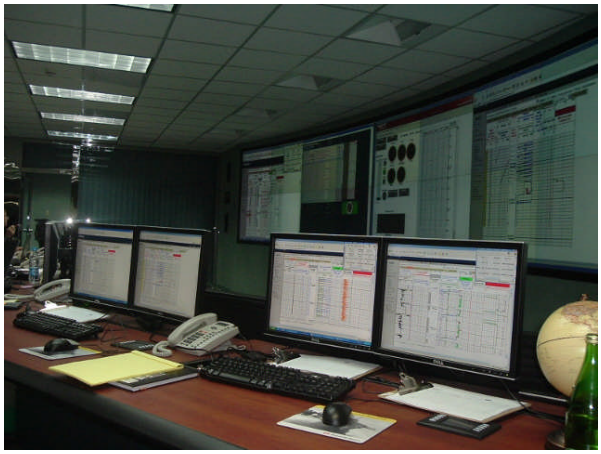

Real time data streams are becoming common place and the amount of data are becoming overwhelming. Today, many software tools are being developed to view and analyze the data. Ultimately, it is the drilling engineer (or the RTOC engineer) who must make the vital timely decision to raise an alarm about an impending problems and quickly design an action plan to be considered by operation personnel

Who should attend?

Anyone who is connected with well construction from the planning phase to post mortem including drillers, toolpushers, drilling engineers, geologists, crew members, and service personnel.

Course Materials

The course will be delivered using a mixture of power point presentation, a course manual, and some use of software tools

Instructor:

Dr. Saad Saleh, Drill-Sense International (Vita Attached)

Course Content:

1. **Day 1: Real Time Center/Data**
    a. Review of RTOC functions from pre drill to post mortem
    b. Review of real time data
    c. Lessons learned capture
    d. Reporting and simulation tools

2. **Day 2: Drill String Dynamics**
    a. Recognizing drilling vibration
    b. Resolution of drilling vibration
    c. Field/rig surface indications
    d. Modeling vibration
    e. Case studies

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3. **Day 3: Stuck pipe Detection**
    a. Hole pack off
    b. Hole cleaning
    c. PWD analysis
    d. Differential sticking
    e. Wellbore geometry
    f. Ledges
    g. Resolution of diagnosed problem
    h. Drilling type curve analysis
    i. Case studies

4. **Day 4: Wellbore Stability and Pore Pressure**
    a. Real time recognition of pore pressure
    b. Real time recognition of wellbore instability
    c. Caving analysis
    d. Case studies
    e. Analysis of pore pressure and wellbore stability using software tools

5. **Day 5: Technical Limit and Optimization**
    a. Drill string strength limit
    b. Downhole equipment operating limits
    c. Hole cleaning capacity of a drilling circulating system
    d. Solids control
    e. Bit performance and drillability
    f. ROP optimization
    g. Real time detection of fractures

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The Instructors: Dr. Saad Saleh

Dr. Saleh holds a Ph.D. and MS degrees in Petroleum Engineering from the Colorado School of Mines. He has over 20 years of professional drilling experience in industry and 6 years in academia. Dr. Saleh is a specialist in real time geopressure, wellbore stability, and drilling analysis. Dr. Saleh is highly experienced in drilling technology frontiers (HPHT deepwater, sub salt drilling to name few) in many parts of the world including Latin America, Gulf Coast, North Sea, Canadian Shelf, and the Far East. Dr. Saleh has been involved in training and mentoring drilling engineers and drilling operation personnel on geopressures prediction, wellbore stability analysis, drilling fluid solids control, and drilling fluids optimization.

Currently, Dr. Saleh is the President of Drill-Sense International, a consulting firm which specializes in advancing real time drilling technologies, training in all aspects of Petroleum Engineering with emphasis on drilling training, as well as providing expert advice to the global drilling industry on drilling diagnostics, optimization, well planning, and real time drilling surveillance.

Dr. Saleh was a Senior Drilling Fluid Specialist with Saudi Aramco (from 2005 to 2007), a Principal Geopressure advisor for Knowledge Systems (6 years from 2000 to 2005) in Houston, Texas, a Drilling Advisor for PDVSA-Intevep (3.5 years from 1997 to 2000), Assistant Professor at the Colorado School of Mines (4 years from 1994 to 1997) and the University of Alaska (2 years from 1988 to 1990), and a Drilling Engineer for BP Exploration in Alaska (4 years from 1990 to 1994) and Northern Petroleum (2 years from 1977 to 1979).

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