COMPREHENSIVE HSE AND RISK MANAGEMENT SERVICES

HELP IDENTIFY AND DEVELOP CONTROLS FOR HAZARDS ASSOCIATED WITH YOUR PROJECT

OVERVIEW

GeoBalance® Underbalanced Drilling Service includes a project management team that provides a comprehensive support system, which includes processes and techniques to help effectively plan, control resources, and manage health, safety, and environmental (HSE) risks needed to successfully complete your underbalanced drilling program incident free. HSE management and compliance have become bigger issues over the last few decades and are becoming a mandatory focus area for underbalanced drilling operations. It is critical that HSE issues and concerns are considered at project inception and that the management of these issues is embedded in the project management scheme. This approach displays to both stakeholders and regulatory authorities that risk associated with the project have been identified and eliminated or minimized. To achieve these objectives, our project management team takes on an extensive approach that works to help identify and develop controls for hazards associated with your project. In every case, the goal is to enhance HSE and risk management while reducing your overall project costs and increasing profitability.

A SAFE APPROACH TO UNDERBALANCED DRILLING

Underbalanced Drilling (UBD) is often times perceived as more dangerous than conventional drilling, because it involves more equipment, people and significantly different operations. However, that danger can be greatly reduced by proficient risk management that includes specific planning, training and the right operational procedures during execution. HSE and risk management services include:

» Safety reviews (HAZID/HAZOP studies and chairmanship)
» Safety audits of pre-existing and existing conditions
» Preparation of safety and health documents (project specific safety cases, bridging documents)
» Quantitative risk analysis
» Fire and explosion risk assessments
» Development of project specific HSE management systems
» Environmental studies and audits

A step-by-step methodology begins by identifying the customer’s needs and focusing on the full implementation of HSE and risk management tools and techniques throughout the project. Underbalanced drilling operations can be conducted safely when the planning phase includes hazards and effects management process techniques. The execution phase must also include site specific procedures, proper training and emergency preparations. Finally, the review and closeout phase must include a mechanism to capture and communicate the lessons learned for the project team for future and ongoing underbalanced drilling operations.
PLANNING – HAZARD IDENTIFICATION (HAZID) AND HAZARD OPERABILITY (HAZOP)

A qualitative review technique is used to help identify the major hazards (HAZID) and their control and mitigation is essential at an early stage of the project design phase. Our multi-discipline team also provides customized hazard and operability (HAZOP) study services to assess the influence these hazards may have on the project development strategy. Both HAZID and HAZOP are part of an overall Halliburton HSE and risk management system designed to help identify, eliminate or minimize impacts due to poor operational, quality, and HSE planning. The basic premise of the management system model is to embed HSE and risk management practices in the way work is planned and done.

PROJECT MANAGEMENT CAPABILITIES

The GeoBalance® project management team delivers great efficiency and has vast experience in developing and implementing HSE and risk management services throughout every phase of GeoBalance operations.

Our offerings include:

» Selecting and validating candidates
» Gathering performance data to include in the drilling plan
» Developing the customer’s operational experience
» Planning for the maintenance of an underbalanced condition for the life of the well, measuring reservoir characteristic while drilling
» Evaluating the well’s performance

We have been directly involved in managing and controlling a wide range of projects worldwide in all areas of oil and gas production and hydrocarbon processing.

Regardless of your project scope, turn to Halliburton’s GeoBalance project management team for a successful, effective HSE and risk management process to improve the performance of your projects. The process includes:

» Designing procedures and facilities to:
  — Protect human life
  — Help prevent pollution
  — Safeguard capital investments
» Reviewing loss prevention requirements at all stages of design to help ensure that potential hazards are identified and controlled
» Incorporating necessary preventive measures into the design

THAILAND

The customer drilled into an over-pressured fractured carbonate reservoir and encountered well control problems while trying to drill the reservoir section. The well was killed and secured until a solution to the well control problems could be found. Halliburton proposed to drill the reservoir section utilizing UBD techniques as to control the well while drilling and to eliminate any potential damage to reservoir. After substantial upfront engineering and preparation, the well was safely drilled without any well control problems and resulted in flow rates far exceeding expectations. Subsequent flow testing has confirmed a large reserve base with this accumulation. The project was an operational success and the customer was pleased with the production outcome.

MALAYSIA

Three wells drilled offshore Malaysia. The first well included many industry firsts: first offshore UBD well in the first UBD well from a tender assist drilling rig, and the first deployment of expandable sand screens underbalanced. The second and third wells were drilled and completed underbalanced from a small jackup rig. This was a world-first offshore application of crude oil and hydrocarbon gas injection as drilling fluid in jointed pipe operations and was successfully carried out without any HSE incidents. Both projects were completed as operational successes.
INDONESIA

The client’s highly productive field had a severely under-pressured carbonate formation. The reason for drilling underbalanced was the inability to drill with a full fluid column. Halliburton was contracted to design and implement a high flow rate GeoBalance process package to flow the wells while drilling with 30 psi at wellhead and 25 MMscf/d gas flow rates. The customer had initially looked at drilling ten underbalanced (UB) wells to increase their production to meet contract obligations. After drilling only six wells, they had met their production target. They realized a two-fold increase in production from previous wells drilled conventionally and drilled the wells in record time, enabling a substantial decrease in cost to their drilling operations.

UNITED ARAB EMIRATES

The customer is conducting an ongoing coiled tubing underbalanced drilling campaign in this field. Many wells have been drilled and completed with excellent production results, not only arresting previous field declines but also substantially increasing gas rates from this depleted carbonate formation. Halliburton saved the customer overall drilling cost while their production rates increased up to four-fold higher than expected. The client is planning to drill additional underbalanced wells in this field.

NORTH SEA

Oil worth about $176 million was unrecoverable with conventional drilling methods because the upper section of the cap rock in the Shetland structure of a North Sea well had fractured as a result of water injection. Drilling this rock with conventional methods would be difficult, because the difference between pore and fracture pressure was small. To meet the challenge, Halliburton recommended an underbalanced system that would enable the well to flow even if abnormally high-formation was encountered. This was the first time underbalanced drilling technology had been used on the Norwegian continental shelf. The job went as planned. The operator was very pleased with the results and more wells have been drilled by using GeoBalance techniques.

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com