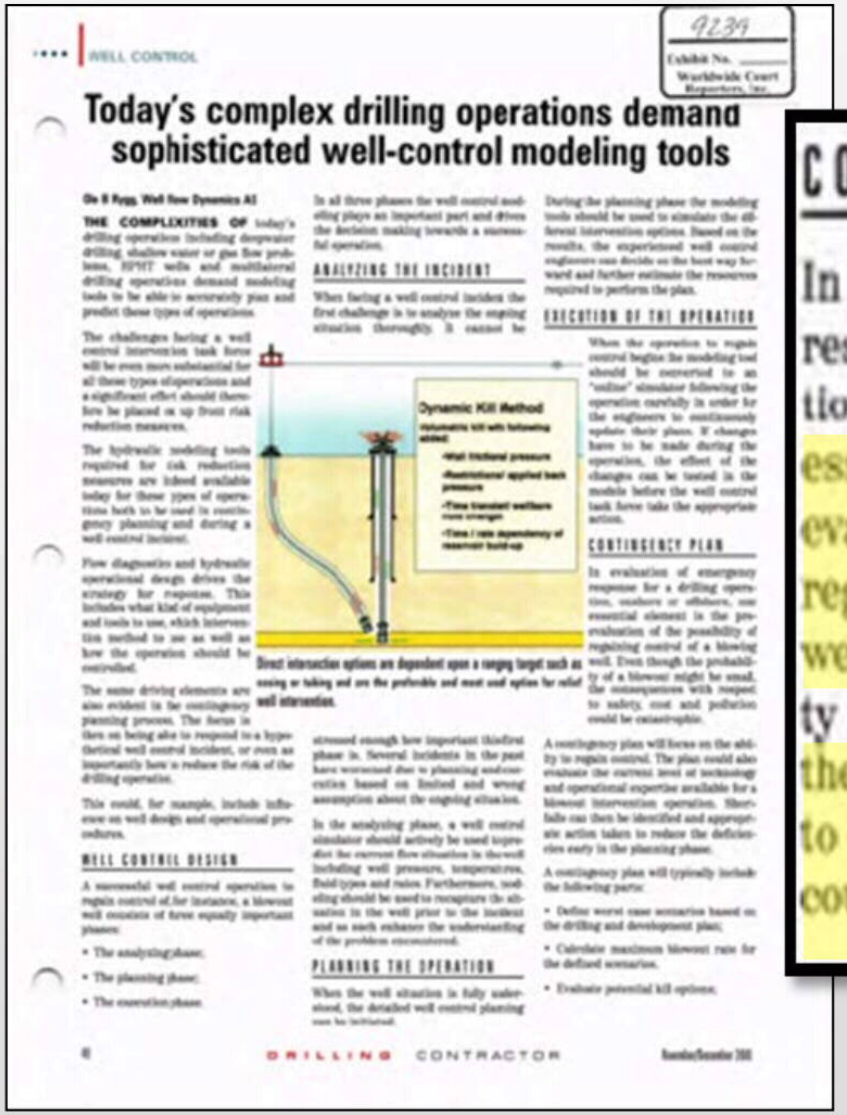
Drilling Contractor (2005)



WELL CONTROL

9239
Exhibit No. _____
Worldwide Court Reporters, Inc.

Today's complex drilling operations demand sophisticated well-control modeling tools

On 8 Rygg, Well flow Dynamics AS

THE COMPLEXITIES OF today's drilling operations including deepwater drilling, shallow water or gas flow problems, HPHT wells and multilateral drilling operations demand modeling tools to be able to accurately plan and predict these types of operations.

The challenges facing a well control intervention task force will be even more substantial for all these types of operations and a significant effort should therefore be placed on up front risk reduction measures.

The hydraulic modeling tools required for risk reduction measures are indeed available today for these types of operations both to be used in contingency planning and during a well control incident.

Flow diagnostics and hydraulic operational design drives the strategy for response. This includes what kind of equipment and tools to use, which intervention method to use as well as how the operation should be controlled.

The same driving elements are also evident in the contingency planning process. The focus is then on being able to respond to a hypothetical well control incident, or even as importantly how to reduce the risk of the drilling operation.

This could, for example, include influence on well design and operational procedures.

WELL CONTROL DESIGN

A successful well control operation to regain control of, for instance, a blowout well consists of three equally important phases:

- The analyzing phase;
- The planning phase;
- The execution phase.

In all three phases the well control modeling plays an important part and drives the decision making towards a successful operation.

ANALYZING THE INCIDENT

When facing a well control incident the first challenge is to analyze the ongoing situation thoroughly. It cannot be stressed enough how important this first phase is. Several incidents in the past have worsened due to planning and execution based on limited and wrong assumption about the ongoing situation.

In the analyzing phase, a well control simulator should actively be used to predict the current flow situation in the well including well pressure, temperatures, fluid types and rates. Furthermore, modeling should be used to recapture the situation in the well prior to the incident and as such enhance the understanding of the problem encountered.

PLANNING THE OPERATION

When the well situation is fully understood, the detailed well control planning can be initiated.

During the planning phase the modeling tools should be used to simulate the different intervention options. Based on the results, the experienced well control engineers can decide on the best way forward and further estimate the resources required to perform the plan.

EXECUTION OF THE OPERATION

When the operation to regain control begins the modeling tool should be converted to an "online" simulator following the operation carefully in order for the engineers to continuously update their plans. If changes have to be made during the operation, the effect of the changes can be tested in the models before the well control task force take the appropriate action.

CONTINGENCY PLAN

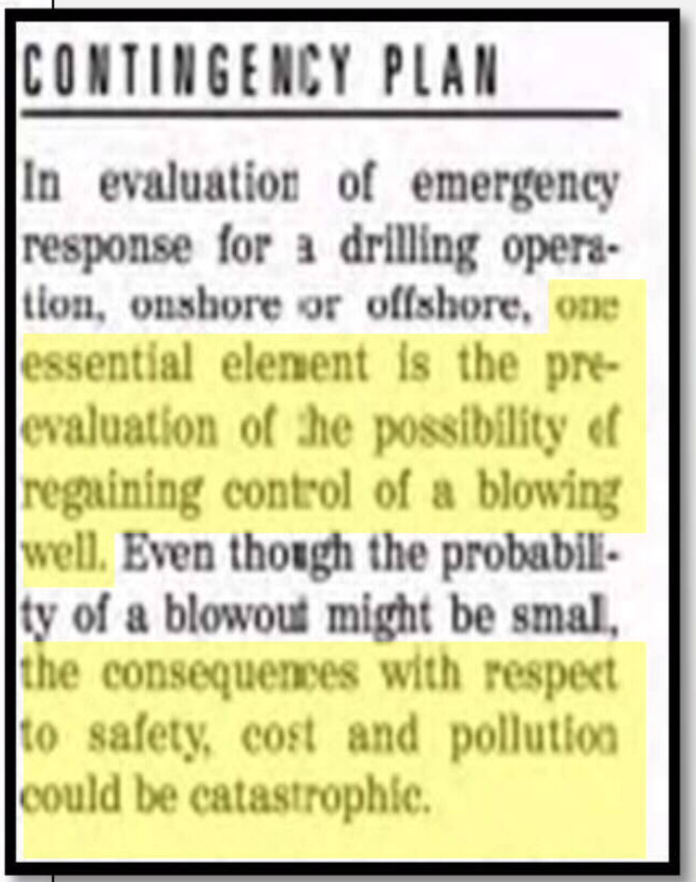
In evaluation of emergency response for a drilling operation, onshore or offshore, one essential element is the pre-evaluation of the possibility of regaining control of a blowing well. Even though the probability of a blowout might be small, the consequences with respect to safety, cost and pollution could be catastrophic.

A contingency plan will focus on the ability to regain control. The plan could also evaluate the current level of technology and operational expertise available for a blowout intervention operation. Shortfalls can then be identified and appropriate action taken to reduce the deficiencies early in the planning phase.

A contingency plan will typically include the following parts:

- Define worst case scenarios based on the drilling and development plans;
- Calculate maximum blowout rate for the defined scenarios.
- Evaluate potential kill options.

Direct intersection options are dependent upon a ranging target such as casing or tubing and are the preferable and most used option for relief well intervention.



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Source: TREX-9239.1