

## ABSTRACT

### **OPTIMIZATION OF RATE OF PENETRATION MECHANICAL FACTORS USING MSE AND CCI LIMITATIONS IN DIRECTIONAL DRILLING OF IR-22 WELLS IN AIM FIELD**

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*The "IR-22" well is a slant track type (J-type) directional drilling well in the AIM Field with a total depth of 1230 mMD/ 4035.4 ftMD. In drilling operations at Well "IR-22" there was a bit balling problem in five zone intervals which affected the small value of the rate of penetration. So, mechanical factor parameters were optimized to increase the value of the rate of penetration with limits on the load value of the drilling pipe circuit, mechanical specific energy, cutting carrying index, and the economics of cost per foot.*

*In the mechanical factor parameter optimization, 4 additional scenarios were carried out by increasing the weight on bit and RPM data differently for each scenario, then the penetration rate (ROP) value was calculated for each scenario. The limiting factors are the pipe circuit load (tension, drag, torque, and critical buckling), mechanical specific energy, and the cutting carrying index required in this drilling. When the rig capacity, type and number of bits used are the same, there will be a decrease in drilling costs due to a faster rate of penetration.*

*When basecase Well "IR-22" with an average rate of penetration value on the 9,625" traject was 34.3 ft/hr and on the 7" traject it was 89.2 ft/hr. With a drilling pipe series tension load of 63,755 lbs and a critical buckling load of 7,248 lbs. After evaluating the base case, several additional scenarios were carried out in optimizing mechanical factor parameters with various constraints for each scenario so that an average rate of penetration value was obtained on the 9,625" traject of 69 ft/hr and on the 7" traject of 183.1 ft/hr. And cost per foot can be optimized from US\$ 5,007,622 to US\$ 4,365,601.*

*Keywords: rate of penetration, weight on bit, RPM, load of drilling pipe, cost per feet*