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Utilizing Mud loss Zones Within Fractured Carbonate Formation for Effluent Water Disposal

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Theory / Method / Workflow

Mudloss during drilling operations imposes significant risk and cost implication to field development in Sabriyah Field, Kuwait. Ninety-five (95) wells reviewed included fifty-nine (59) with significant mud losses ranging from minor, severe and total loss condition. Mapping of these loss zones suggests the occurrence of sub seismic micro fractures may induce losses that cannot be cured with loss circulation material.

Results, Observations, Conclusions

Shuaiba formation thickness in Sabriyah Field range from 150 – 400 ft., being thinner in the SW and thicker in the central to NW direction of the field. With several NW / SE trending faults concentrated in the southern part of the field where the formation is thinnest. Connecting faults & fractures as well as lesser thickness responsible for the severity of mud losses

Novel/Additive Information

Due to significant challenges to dispose effluent water, an existing well scheduled for zone transfer and located within mud loss area identified as candidate to test Injectivity for potential use as disposal well. Injectivity test with brackish performed at rate of 10bpm at 1200-psi surface pressure that is equivalent to 14000 bwpd of water confirmed. Noise and ILT log recovered for injection profile. Approximately 40 hrs. of injection was done with stable injection and surface pressure.

Acknowledgements

Kuwait Oil Company

References

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- Volumetric curvature attributes for fault/fracture characterization by Satinder Chopra and Kurt J. Marfurt 2007
- Poster Recommended Seismic Volume Attributes 2015 by Schlumberger © SLB