



Southwestern Drilling Mud Service, Inc.

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LOSS OF CIRCULATION PROCEDURES

Loss of circulation will be a possible drilling problem in this well from 12,000' to total depth. Offset information indicates that some of the loss problems are due to induced fracturing of weaker zones. There are several drilling and mud practices that can reduce the possibility of inducing loss of circulation. These practices are as follows:

- 1) Maintain viscosity as low as possible and still clean the hole effectively (a viscosity of 40-45 sec/qt should be adequate)
- 2) Maintain Gel strengths as low as possible and still be able to suspend barite (an initial Gel strength of 2-4 lbs/100 sq. ft. should be adequate)
- 3) Maintain a low differential between suction pit and flowline viscosity (10 sec/qt differential would be ideal)
- 4) Utilize slow trip speed going in the hole. This will minimize surge pressures.
- 5) After 13,000', break circulation before reaching bottom on trips.
- 6) Rotate pipe while breaking circulation.
- 7) After trips and when breaking circulation, circulate at reduced pump rates for a minimum of 30 minutes.

Should loss of circulation occur, we recommend pulling approximately 3-4 stands off bottom and then spotting a 50-100 bbl pill of LCM mud containing 20-25 ppb of Mica and Nut Plug. Then pull up on top of the pill and establish full circulation before going back to bottom. It would also be beneficial to stage back in hole after establishing circulation. While circulating at any time, the pipe should not be allowed to stand still for longer than 5-10 minutes. Leaving the pipe still for periods longer than this will increase the chances of getting stuck.