

Case Study

Ranging

APPLICATION

EverReady™ PMR

TECHNOLOGY

Ranging

LOCATION

Texas Gulf Coast

CUSTOMER CHALLENGE

A well in a salt cavern storage facility experienced a failure that rendered it (and the cavern) unusable in 1970. The operator planned to replace the inoperative wellbore through a combination of rotary and coiled tubing drilling.

GUNNAR ENERGY SOLUTION

Objective

Cudd Pressure Control was contracted to drill into the salt cavern. The objective of the project was twofold:

- Drill directionally to establish a distance $\pm 5'$ from the damaged wellbore
- Maintain well control when cavern penetration was made

Cudd mobilized a 2" coiled tubing unit with a wireline in it. This unit has a custom $3\frac{1}{8}"$ BHA that can be oriented. A $6\frac{1}{8}"$ hole was desired so that $4\frac{1}{2}"$ brine string could be run into the cavern.

Operations

Seven-inch casing was set in the well just above the cavern. The exact penetration depth of the cavern was believed to be $\pm 50'$ TVD below the casing shoe. However, this drilling distance was unknown since the cavern was abandoned 50 years earlier and there were no existing cavern surveys.

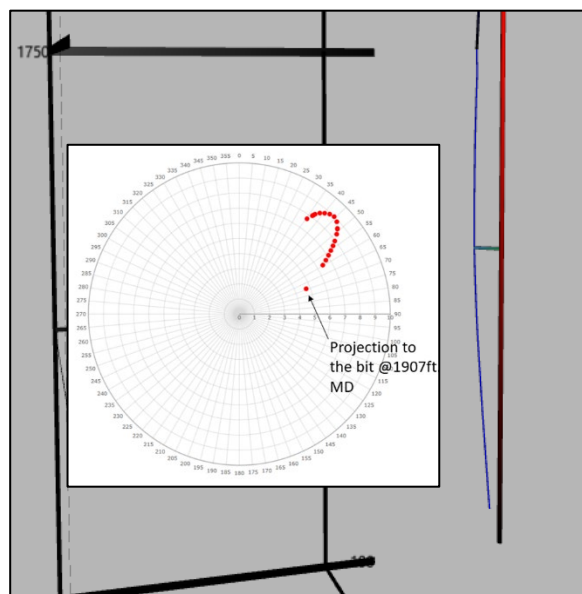
The seven-inch casing shoe track was drilled out without problems. Once the MWD cleared the casing shoe, its data was used to determine the interference effect of the pipe to determine the effective range of the MWD sensors.

The existing wellbore position when the seven-inch casing was set was such that a drop in angle and azimuth turn were required to meet the project goals. Since the depth of the top of the cavern was unknown, the drilling distance

was also unknown. This complicated the directional plan and placed added emphasis on ranging.

A ranging shot was taken as soon as reliable directional data could be obtained. The data showed a divergence from the preferred path and the BHA was pulled to "dial up" the motor. Drilling continued and high-density ranging shots were taken to determine the distance between the wells.

The wellbore path was steered according to the ranging calls and the cavern was penetrated approximately 9' TVD above the casing shoe in the damaged well. The final ranging call placed the wellbores 4.7' apart. The total drilling and ranging time was ± 36 hours.



CUSTOMER VALUE

All objectives of the project were met. This saved valuable time and ensured well control was maintained when the cavern was penetrated.