



Geophysics
International

CASE HISTORY - CHANNEL SAND EXPLORATION

Petro-Sonde Survey - Oil and Gas Division

LOCATION. Cass County, East Texas; USA.

TOPOGRAPHIC CONTROL. USGS topographic maps, brunton compass and tape, RRC permit maps showing well location, and Petro-Sonde survey map (Figure 1).

OBJECTIVE OF THE PETRO-SONDE SURVEY. To establish if pay sand is present at southeast 40 acre offset to the discovery well.

GEOLOGY. Lower Cretaceous channel sands with very little predictability of sand continuity from location to location.

INFORMATION AVAILABLE. Survey plats, induction logs to key wells.

CALIBRATION STATIONS. Operator's #1 producing well and Operator's #1 southwest offset (dry hole).

PETRO-SONDE SURVEY STRATEGY. 1) Calibrate at producing well to establish Petro-Log patterns associated with Ferry Lake anhydrite (marker bed) and Rodessa pay sand. 2) Calibrate at dry hole to establish Petro-Log graph patterns associated with Ferry Lake anhydrite and wet sand beneath marker bed. 3) Traverse between producing well and southwest dry hole to determine the depositional limits of pay sand between the two wells (Figure 2). 4) Traverse between producing well and southeast offset to determine the continuity of pay sand across proposed location (Figure 3).

CONCLUSIONS AND COMMENTS.

Drilling Results

Figure #4 is the comparison between the dual induction log of the proposed location and the Petro-Log Graph. The Petro-Sonde survey accurately determined the depth and thickness of the pay sand and correctly identified the presence of hydrocarbons. The top of the anhydrite was detected to within 9 feet of its actual depth.

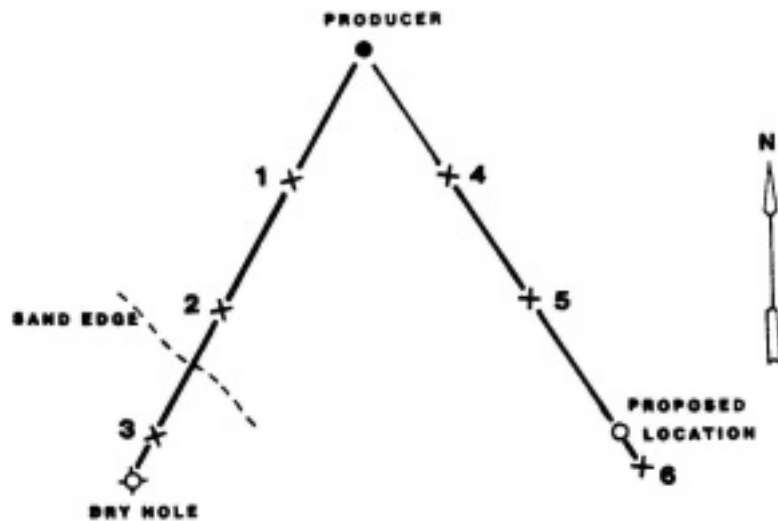
The top of the sand on the Petro-Log Graph aligns with the top of the sand on the gamma ray. The hydrocarbon signature aligns with "cross-over" on porosity tools, increased resistivity and SP development. The base of the sand on the Petro-Log Graph aligns with the base of the sand on the gamma ray.

CONCLUSIONS AND COMMENTS CONT.

Summary

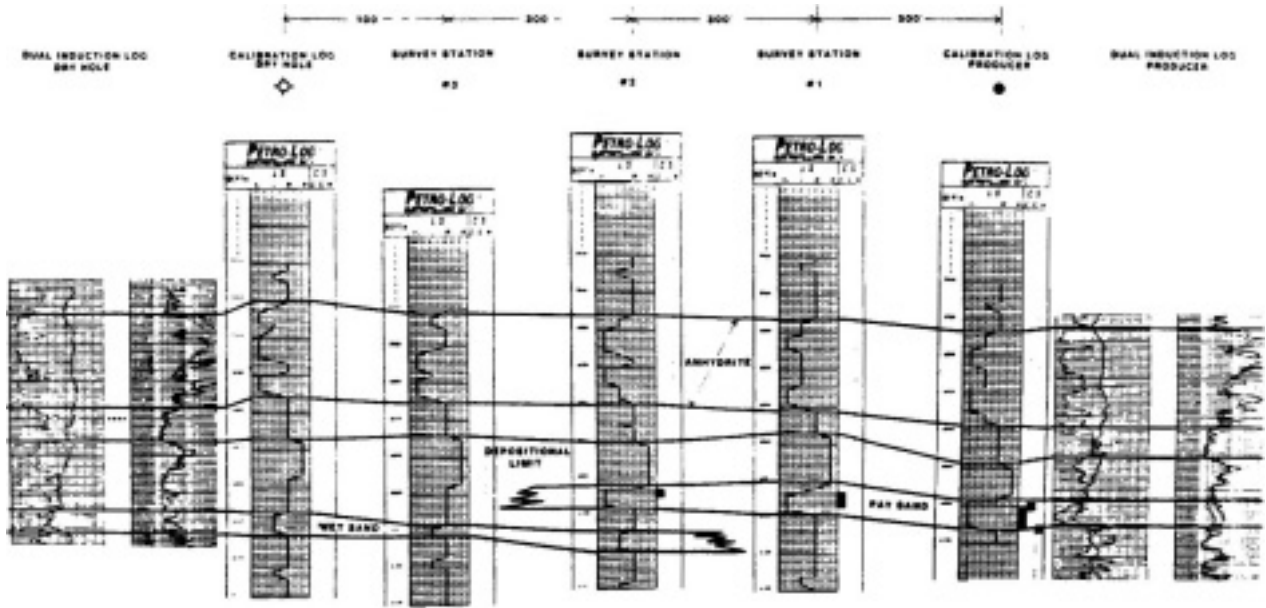
The only difference between the producing well and southwest offset was the absence of the pay sand in the southwest offset. The Petro-Sonde survey detected a stratigraphically equivalent hydrocarbon bearing sand developed to the southeast of the discovery well and its absence to the southwest. The initial production on the new well was 100 BOPD. However, on the Petro-log Graph, hydrocarbon indication is only qualitative. The value of the tool to the petroleum industry is that it enables an operator to avoid drilling "obviously dry holes."

In this example, the obviously dry hole would have been the southwest offset to the discovery well. At the southeast offset, the indicated pay zone could have been either shaley, non-commercial, or commercial. In the southwest offset, there was nothing to indicate possible production. The only sand present beneath the lime contained salt water and it was not stratigraphically equivalent to the pay sand in the discovery well.



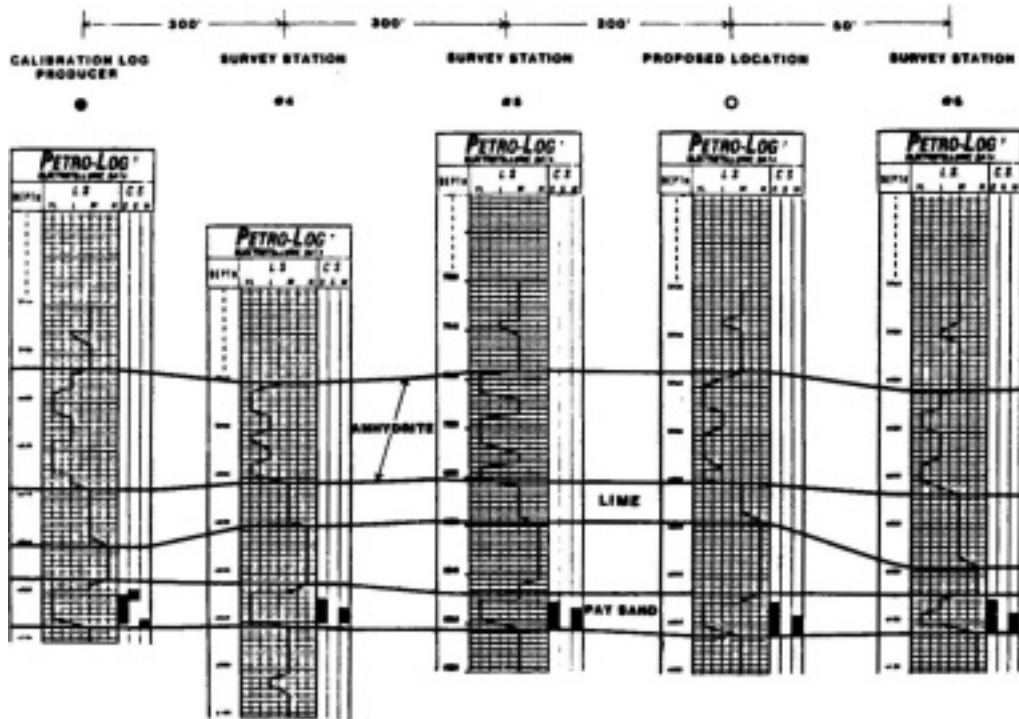
LOCATION MAP WITH SURVEY STATIONS AND WELL CONTROL.

FIGURE 1.



CROSS SECTION BETWEEN THE PRODUCING WELL AND THE DRY WELL.
NOTE THE DEPOSITIONAL LIMIT OF THE PAY SAND.

FIGURE 2.

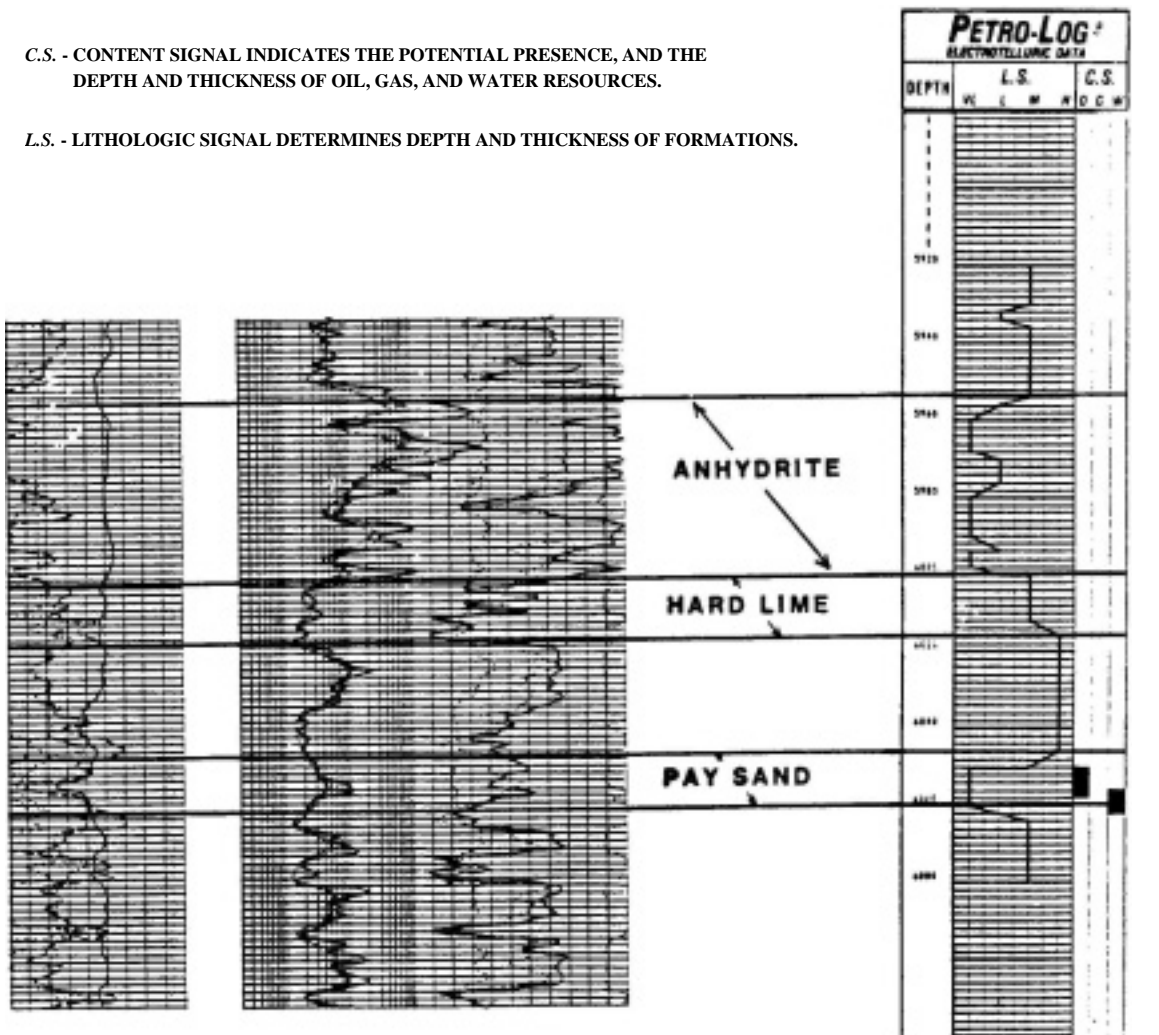


CROSS SECTION BETWEEN THE PRODUCING WELL AND THE PROPOSED LOCATION.
NOTE THE CONTINUITY OF THE PAY SAND.

FIGURE 3.

C.S. - CONTENT SIGNAL INDICATES THE POTENTIAL PRESENCE, AND THE DEPTH AND THICKNESS OF OIL, GAS, AND WATER RESOURCES.

L.S. - LITHOLOGIC SIGNAL DETERMINES DEPTH AND THICKNESS OF FORMATIONS.



ACTUAL LOG

DRILLED 7/7/85

PROPOSED LOCATION

SURVEYED 5/23/85

COMPARISON OF DUAL INDUCTION LOG AND PETRO-LOG GRAPH OF PROPOSED LOCATION.

FIGURE 4.