

FABRICATION AND DOWNHOLE  
TESTING OF MOVING  
THROUGH CASING RESISTIVITY APPARATUS

DOE GRANT NO.: DE-FG22-93BC14966

ParaMagnetic Logging, Inc.

March 23, 1993 through June 30, 1994

Anticipated Completion date: June 30, 1994

Current Year Government Award: \$ 109,000.00

Principal Investigator: W. Banning Vail, Ph.D.

DOE Project Officer: Mr. Robert E. Lemmon

Reporting Period: July 1, 1993 through September 30, 1993

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

DOE/BC/14966  
DE-FG22-93BC14966  
MAY 1994

MASTER

OBJECTIVES OF PROJECT: Our firm is dedicated to validating recently discovered technology dealing with oil well measurement instrumentation which will allow the industry to find "missed oil" and "bypassed gas". This breakthrough technology, already endorsed in principle by the oil and gas industries, will allow identification of missed oil and bypassed gas locations in currently abandoned fields as well as in existing offshore wells, and will also allow increased productivity from low production wells. There is no other proven technology today that will detect such oil behind steel casing, lower the discovery risk and improve the success rate of recovery of otherwise accessible but undetected oil and gas reserves.

It is believed that there may be more potential bypassed oil horizons around existing wells than will be found in the future by wild cat drilling in the continental United States. This new technology could substantially increase the petroleum reserves in the continental United States and obviate greatly the need to drill new wells, particularly in environmentally sensitive areas. This technology may be of particular interest initially to the independent oil companies, and will ultimately be of great economic value to the major oil companies as well. The technology will also be used to monitor enhanced oil recovery projects in the future.

This is a continuing research effort into the new field of measuring resistivity of geological formations from within cased wells. Additional data confirming the feasibility of the technology is to be taken in a test well with the existing stop-and-lock apparatus which is called the Thru Casing Resistivity Apparatus (TCRA). After that data is obtained, the already existing mechanical apparatus developed in an earlier phase of the project will then be modified and new electronic components will be fabricated to test the concept of a moving apparatus called the Moving Thru Casing Resistivity Apparatus (Moving TCRA). These steps are considered sufficient for subsequent commercial development by industry. The study by ParaMagnetic Logging, Inc. of measuring resistivity through casing with the Thru Casing Resistivity Apparatus is of great importance to the oil and gas industries. It is important to measure resistivity through casing for at least the following reasons: locating bypassed oil and gas; measuring water breakthrough during water flooding operations; reservoir evaluation; measurements through a drill string when the drilling bit is stopped; and environmental monitoring of disposal wells, water wells, etc.

SUMMARY OF TECHNICAL PROGRESS:

1. Continued Data from PML's Test Well: Data was taken during the months of July, August and September. This data showed the following:
  - a. The Apparent Resistivity data is reproducible below about 200 ohm-meters.
  - b. The Apparent Resistivity data agree quantitatively with the open-hole LLS to resistivities in excess of 70 ohm-meters.
  - c. Casing collars can be located easily as a by-product of the measurements.
2. Hydraulic Section of the Apparatus: The hydraulic sections were taken to Houston and tested in the test chamber of Atlas Wireline Services. These tests proved that the hydraulics would be able to withstand use in the deep well.
3. Choice of Deep Test Well: The well has been chosen for the first deep tests of the 4 1/4 inch O.D. Apparatus. It is the "MWX" site near Grand Junction, Colorado. The first logs at the test well are to provide an initial blind test of the apparatus. Therefore, interested parties wishing additional information concerning the chosen test are encouraged to contact Mr. Harvey Haines of the Gas Research Institute or Dr. Kurt-Martin Strack of Atlas Wireline Services.

REFERENCES/PUBLICATIONS:

No Publications this quarter

**END**

---

**DATE  
FILMED**

3 / 28 / 94

