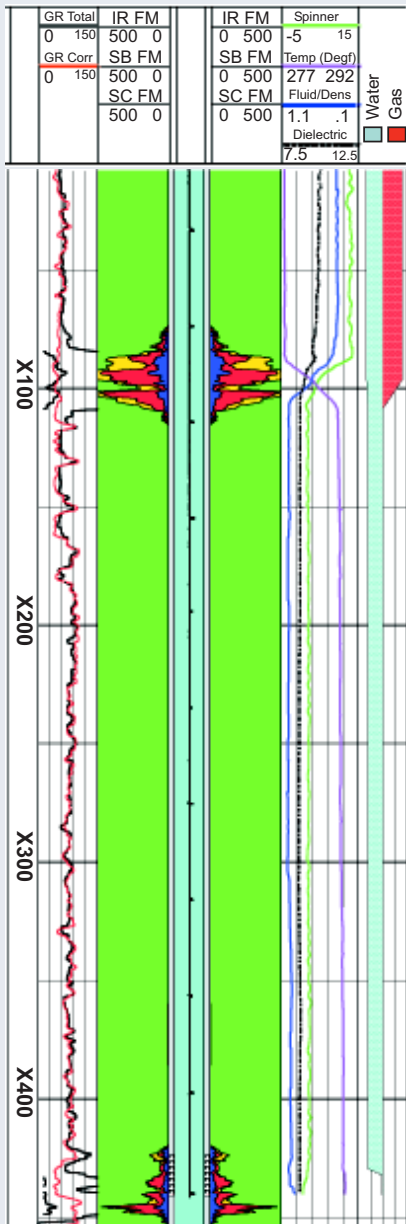


ProTechnology

April 1999

**You can't always get what you want, but
you just might find you get what you need.**

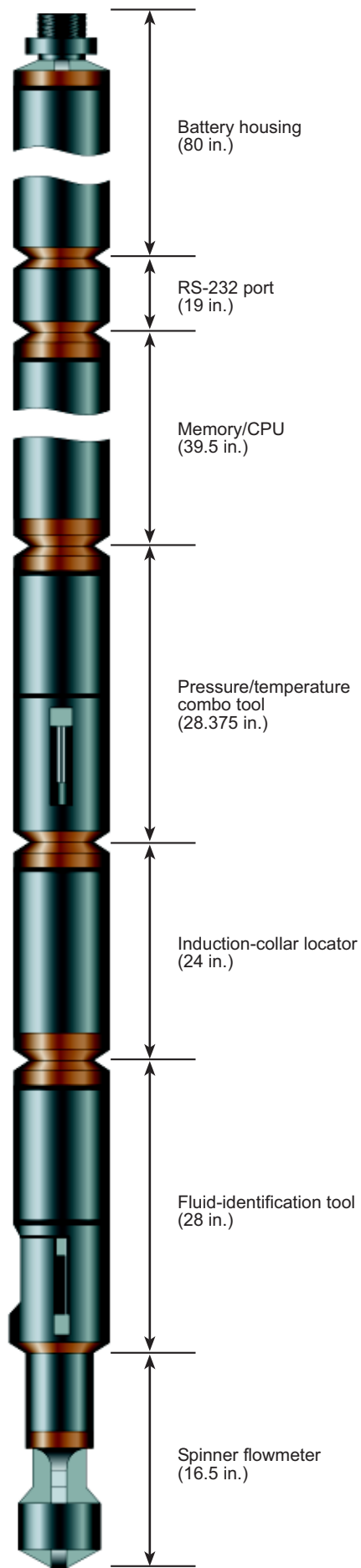


The adjacent SpectraScan Completion Image is from a south Texas Vicksburg completion. The fracture treatment, which consisted of 300,000 lb of bauxite proppant pumped at 25 bbl/min, was pumped to conclusion (no screenout). The pad (yellow) and Zero Wash[®] proppant tracers (red is 2-7 lb/gal and blue is 8 lb/gal) showed moderate concentrations in the perforated interval at X425 ft to X440 ft and substantially higher concentrations in an unperforated sand more than 300 ft up the wellbore (X080 ft to X110 ft). After the initial treatment, the well produced at the anticipated rates of 2 MMcf/D and 400 BWPD.

According to the tracer interpretation, the casing failed

in the upper interval, allowing most of the fracture treatment to be placed in this zone. This sand and several others just above it had been targeted for a later stimulation treatment.

A production log revealed that the casing had indeed failed and that the upper interval was inadvertently fractured. The log indicated significant water entry from the perforated interval so the bottom zone was plugged to shut off water production. Because the uphole sand was accidentally stimulated, a second fracture procedure was designed, in which much less bauxite proppant was needed for the remaining uphole sands. This design led to considerable cost savings, which paid for the completion diagnostics many-fold.



The Completion Profiler™

ProTechnics develops a new generation of production-profiling instruments capable of measuring completion effectiveness.

To properly evaluate a completion, whether fracture stimulation, acidizing, or breakdown, operators must assess the placement of the completion fluids and slurries. The following questions should be asked:

- Did the treatment enter into the entire perforated interval?
- Did the fluid treat all formation layers in concentrations sufficient for achieving the design objectives?
- Were any portions of the net pay left unstimulated?

ProTechnics can answer all of these questions and more. Our advanced Zero Wash® tracers, coupled with the SpectraScan Imager®, allow us to detail the completion placement and effectiveness of your hydraulic fracturing and acidizing treatments.

Zero Wash tracers, which won the 1993 Meritorious Award for Engineering Innovation, have proven to be accurate and cost effective in verifying stimulation designs and in identifying necessary improvements and restimulation candidates from traced completions. A new dimension in completion imaging has recently been added with our Completion Profiler™, a revolutionary production logging service, which is available in conjunction with the SpectraScan Imager. During a single trip into the wellbore, Completion Profiler's additional imaging capabilities allow you to view completion placement and measure the flow rate and fluid properties from each individual set of contributing perforations. Bypassed pay zones are easily marked for recompletion, and the quality of each zone's stimulation treatment and its contribution to the well's overall production are compared.

Whether in single-phase or multi-phase flow, our superior measurements, coupled with unrivaled completion experience, produce the most comprehensive data set and engineered analysis available in the industry. Because these tools are memory-based and combinable, they can be deployed on a variety of mechanisms, including slickline, electric line, and coiled tubing.

Applications

The Completion Profiler can perform the following:

- Measure zonal flow rates by layer. These measurements include fluid-holdup fractions.
- Identify intervals which are producing undesirable fluids (water or gas).
- Obtain accurate bottomhole pressures, temperatures, and respective gradients.
- Evaluate cement channeling and stimulation-height containment.
- Flag unstimulated and understimulated pay for recompletion.

Maximize your well's performance by combining our tracer-analysis expertise with the most robust production logging measurements available on the market today.

The Completion Profiler performs simultaneous measurements of pressure, temperature, fluid-flow velocity, casing-collar location, fluid density, and fluid capacitance. When combined with the SpectraScan

Imager, the Completion Profiler provides a complete diagnostic image of your completion's effectiveness.

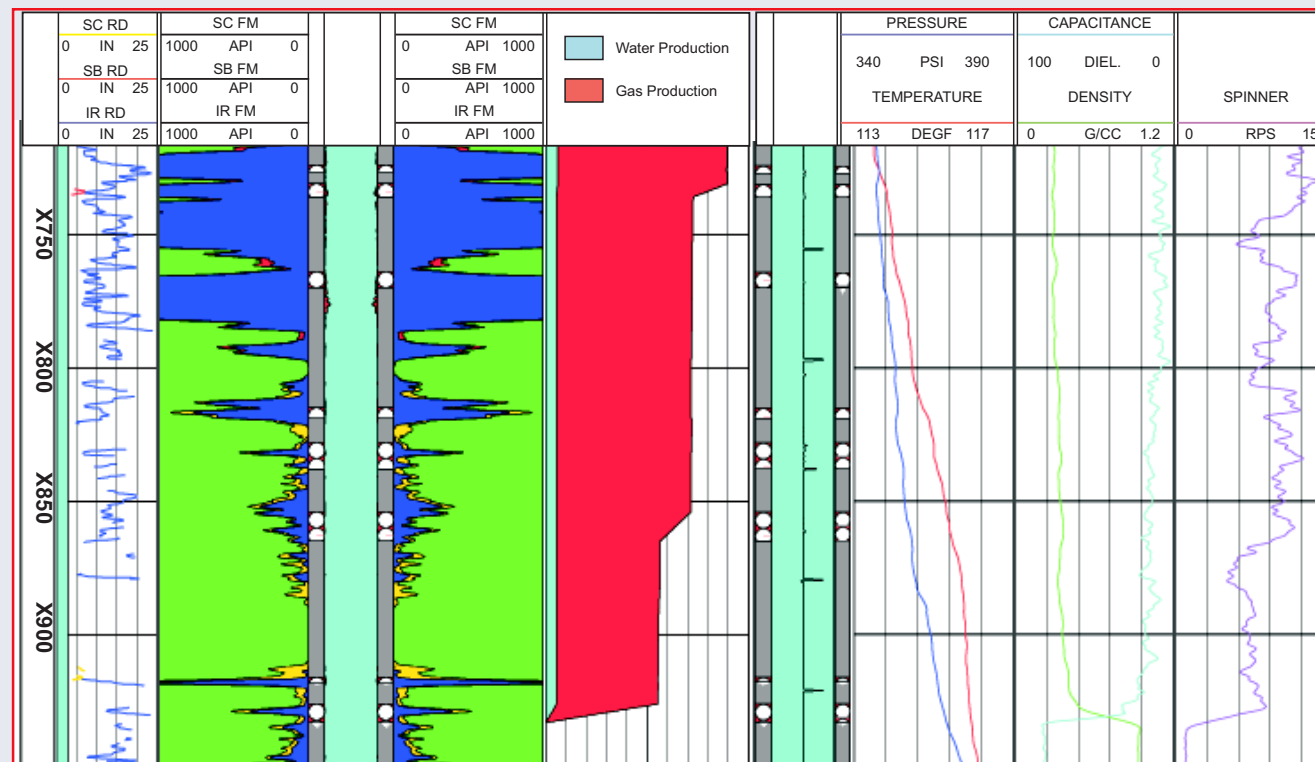
The Completion Profiler can be run as a stand-alone device or in combination with the award-winning SpectraScan Imager.

Advantages

Several important advantages of the Completion Profiler should be noted. An induction-type collar locator adds a dimension of sensitivity not previously available for detecting casing collars, perforations, damage, and imperfections. Additionally, the fluid-identification sensor is unique in the industry because both fluid density and fluid capacitance are measured simultaneously within the same sample chamber rather than at different depths in the wellbore. This measurement method removes the uncertainty from fluid identification in wells that are experiencing turbulent or slug flow.

Using the acclaimed PLATO analysis package, our experienced reservoir engineers and log analysts use

(continued on page 4)



The Completion image shown above reveals that the lower fracture stage (X815 ft to X933 ft) is producing the majority of gas and some water. The gas production from the upper fracture stage (X720 ft to X775 ft) is much lower, indicating formation damage or the presence of a poor-quality reservoir. The completion image also confirms that the upper fracture stage has grown down into the lower fracture stage, causing the premature screenout indicated by high tracer concentrations.

Visit Us

Stop by our booths at the upcoming shows listed below, and let us show you the latest technologies in Completion Diagnostics.

Expetro

Merida, Mexico
April 15 - 17, booths 83 and 90

Southwest Petroleum

Short Course
Lubbock, Texas
April 20 - 22, booth 8

SPE Latin America

Caracas, Venezuela
April 21 - 23, booth 27

OTC

Houston, Texas
May 3 - 6, booth 4101

SPE / ATCE

Houston, Texas
October 3 - 6

Another Acquisition

Our parent company, Core Laboratories, recently acquired the Andrews Group International (AGI), which provides specialized seismic-data processing and interpretation, as well as other geophysical, geological, and engineering services. AGI's services are available primarily in Mexico and other Latin American markets. AGI conducts large integrated field studies aimed at maximizing hydrocarbon recovery. This acquisition strengthens Core Lab's ability to offer a wider range of reservoir-management and optimization technologies.

(continued on from page 3)

the best available techniques, including Global Statistical Analysis, Material Balance, Energy Balance, and Momentum Balance.

Forward-modeling allows more accurate calibration and quality-control checks. PLATO is more than a simple interpretation; it helps us understand your well. PLATO provides three-phase

analysis, simultaneous use of depth and time data, a flow profile from the spinner or temperature, and quick, easy integration of new tools and user-derived models.

The Completion Profiler™

Tool Specifications:

OD	1 11/16 in. (42.86 mm)
Length	8.07 ft (2.7 m) in combo or 19.6 ft (5.98 m) as stand-alone
Pressure Rating	15,000 psi (103,448 KPa)
Temperature Rating	350°F (177°C)


Sensor Performance

Resolution

Accuracy

Fluid Capacitance	1.6 Dielectric Constant Units (MKU)	up to > 80% watercut
Fluid Density	.01 g/cc	.01 g/cc
Pressure	.02 psi (0.138 KPa)	10 psi (68.97 KPa)
Temperature	.01°F (0.006°C)	1°F (0.55°C)
Flowmeter	.0125 rps/fpm (0.04101 rps/mpm)	

Bulk Rate
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