THE RESERVOIR-EVALUATION AND WELL-DELIVERY EXPERTS

Halliburton Wireline and Perforating has industry-leading technology. But in this market, technology is just the price of entry. A wide range of integrated services sets us apart from most of our competitors. Our accessibility, collaborative attitude, reliability and responsiveness set us apart from the rest.

Full Integration
Improving both process efficiency and asset value through tighter teamwork among the many parts of Halliburton and other service providers.

Accessibility
Using proven technologies appropriate for the task to obtain information that clients need and to connect them to rigsites in real time.

Collaboration
Working together to customize optimal solutions to your process- and reservoir-specific issues.

Reliability
Doing everything possible to ensure operational and service excellence, and to quickly resolve issues that might cause problems or delays.

Responsiveness
Ensuring that equipment and highly trained personnel are readily available when and where you need them.

Operational Excellence...
Halliburton has always stood for operational excellence. This brochure explains the qualities of our service that help you produce reliable results faster.

...With a solution focus
Halliburton custom tailors solutions around your individual needs. This consultative approach has proven it can save clients money, reduce risk and cut nonproductive time (NPT). It also frequently helps locate bypassed pay and extend the producing life of reservoirs.
REMOTE LOGGING OPERATIONS REDUCES RIG TIME

E&P companies everywhere are stepping up their efforts. Remote Logging Operations increases efficiency so today’s talent pool can handle increased needs reliably, quickly, accurately and safely.

Proven Time and Money Saver
Remote Logging Operations (RLO) uses satellite or land communications to connect engineers and operators at rig sites around the world with supervisors at central locations.

Halliburton has used RLO for years and found that it helps make better decisions that prevent NPT. RLO has also proven that it can reduce the cost of poor quality, by speeding up operations at client rig sites. Offshore, the value of rig time saved sometimes exceeds the cost of logging! RLO also helps improve data accuracy and reservoir understanding as well as health, safety and environmental compliance.

Connecting Rig, Truck, Remote Centers and Experts
RLO pilot programs proved so successful that we are now building a complete RLO network and making it available to clients everywhere as a normal part of our service. Telepresence technology links onsite logging trucks to the rig floor, cab, catwalk and remote centers. Satellite, landlines or both establish full voice, video and data connectivity.

Be In Many Places at Once
Should issues arise, supervisors in remote centers back up onsite professionals. Supervisors can make decisions in real time to save time. RLO enables them to monitor operations in multiple locations simultaneously – without travel.

Real-World Training in a Fraction of the Time
RLO also helps employees gain years of experience in months. They learn from the best instead of from mistakes.

INSITE® Anywhere® Service
With well data stored in the INSITE® database and distributed through the INSITE Anywhere® interface, you can collaborate with your team in real time wherever you are, and manage wellsite situations as they arise.

Integrated Knowledge Management
Knowledge management capabilities make a wealth of information available to experts in remote centers and to operators and engineers on jobsites worldwide. RLO does far more than reduce costs. It improves results.

Worldwide, Real-Time Connectivity Will Soon Be a Normal Part of All Halliburton Logging Operations. Supervisors monitor and advise professionals at the rig in real time and can even control operations remotely, if necessary. This technology also facilitates collaboration with experts worldwide to help ensure success.
MANUFACTURING AND TRAINING CAPACITY EXPANDED TO HELP ENSURE RESPONSIVENESS

High demand for logging and perforating tools has stimulated high demand for skilled professionals to run them. To help ensure availability of both, Halliburton has increased its manufacturing and training capacities.

Manufacturing Capacity Increased
The addition of our new Singapore plant in 2008 increased our manufacturing capacity significantly.

Rigorous and Repeated Testing
Still, we do not mass produce tools. Each is assembled by hand. To ensure reliability, we test both individual components and the final assembly at nine different points throughout the manufacturing process – in the lab and in actual wells – with heat and under pressure.

Increasing Tool Availability
We also engineer our tools with maintenance in mind. Modular components ensure that parts can be changed quickly and easily in the rare event of a failure. Backup tools on or near rig sites allow us to replace tools rapidly, if necessary. To further ensure that your job runs efficiently, we inspect and refurbish tools regularly – some as frequently as every run.

Developing More Engineers and Operators
To meet demand, we are expanding our workforce 20 percent per year through a combination of recruitment, training, career development and retention programs.
To help you produce the best results possible, we provide a huge array of integrated open hole and cased hole products and services (surrounding). They can also be easily integrated with other Halliburton products and services.

**Production Enhancement** Fracturing, acidizing, near-wellbore stimulation, well intervention and water management

**Project Management** Efficient and integrated well construction and intervention services

**Halliburton Drill Bits** High-performance drill bits, coring tools, reamers and downhole tools/services

**Sperry Drilling Services** Directional drilling, LWD/ MWD, real-time drilling optimization, surface data logging, multilateral systems, underbalanced and managed pressure drilling

**Testing and Subsea** Providing the dynamic information that empowers customers with the ability to optimize their financial investments as well as their reservoirs

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**Mechanical Completion Intervention and Maintenance**
- Wellbore gauging
- Well clean-up
- Fishing lost tools
- Downhole Power Unit (DPU*) tool
- Subsurface flow control installation and retrieval
- Gas lift valve installation and maintenance

**Near Wellbore Stimulation**
- Extreme overbalanced perforation
- Fracture induction
- Frac conductivity maximization
- Propellant stimulation

**Live Well Interventions**
- Intelligent Downhole Power Unit (DPU-I*)

**Pipe Recovery**
- Halliburton Free Point Tool
- Jet cutters
- Chemical cutters
- Drill collar severing
- Plasma cutters

**Production Logging**
- Production profiling
- Injection profiling
- Fluid identification
- Phase holdup measurements
- Phase velocity measurements
- Phase distribution mapping
- Inflow performance monitoring
- Wellbore diagnostics
- Reservoir surveillance (Time-lapse monitoring)

**Wireline Perforating**
- Oriented Perforating
- Through-tubing Perforating
- High-temperature systems

**Tubing Conveyed Perforating**
- Normal conditions
- Overbalanced environments
- Underbalanced environments
- High-pressure gun systems

**Cement Evaluation**
- Cement bond logging
- Radial cement bond logging
- Fast circumferential acoustic scanning

**Reservoir Monitoring and Evaluation**
- Detection and quantification of downhole water flow
- Producible-zone detection
- Reservoir monitoring
- Compensated spectral natural gamma measurement
- Pulsed spectral gamma logging
- Oil saturation measurement
- Gamma ray background measurement

**Slickline Intervention Services**
- Downhole Power Unit (DPU*) tool
- Setting and retrieving Monolock® lock mandrels, bridge plugs and packers
- Flow profiling and diagnostics
- Mechanical intervention
- Evo-Trieve® Bridge Plug

**Slickline Intervention Services**
- Shaped Charges
  - Low-debris charges
  - Extreme-condition charges
  - For sand control
  - Special applications
  - Customized perforating systems

**Reservoir Monitoring and Evaluation**
- Cement bond logging
- Radial cement bond logging
- Fast circumferential acoustic scanning

**Pipe Inspection**
- MIT - Multi-finger caliper tools
- MTT - Magnetic thickness tools
- Fast circumferential acoustic scanning
- Downhole camera services
**Training Centers Worldwide**
We screen new hires for analytical and troubleshooting skills, plus the ability to operate independently. Depending on their specialty, training lasts between eight months and a year. Before graduation, trainees must pass numerous tests.

During that time, they repeatedly alternate between classrooms and the field to learn about our industry, Company and technologies.

**Additional Training in the Field**
Before trainees operate alone in the field, they train under an experienced operator or engineer for an additional period of time. The steep learning curve weeds out many applicants. Fewer than half of those who apply will meet our high technical and professional standards and become full-fledged operators and field engineers.

**Increasing Manufacturing Output**
Halliburton has implemented Six Sigma and Lean Manufacturing processes at all of its manufacturing facilities – including our new Singapore plant – to improve speed, operational excellence, efficiency and, ultimately, throughput.

**Major Investment in Education**
We invest more than US$100,000 in each person who completes our training. That is more than the average cost of a four-year college education in the U.S. Halliburton has training centers in the U.S., Egypt, Indonesia and Brazil.
A FULL UNDERSTANDING OF YOUR RESERVOIR IS NECESSARY TO FULLY EXPLOIT IT

To exploit your reservoir more fully, we can help you quickly and easily capture accurate information, images and samples under conditions once considered difficult or impossible.

We Do More Than Acquire Well Log Data; We Help You Interpret It

Our Formation and Reservoir Solutions (FRS) consultants provide single-well and multiwell formation evaluation solutions for your exploration and production projects worldwide.

FRS analysts strive to maximize the value of acquired well log data (open hole and cased hole) to help improve your understanding of reservoirs targeted for exploration and/or production. Analysts evaluate reservoir production potential, as well as performance. By enhancing the accuracy of reservoir description, we can help lower production costs, increase recoverable reserves and enhance the net present value of your asset.

In High-Pressure/High-Temperature Extremes…

Halliburton makes a complete suite of tools that permit reliable logging in high-pressure/high-temperature (HPHT) wells. We build the tools to handle the severe conditions encountered in deep, hot, hydrocarbon-bearing formations where conventional tools lose accuracy. Our tools contain internal temperature sensors that provide quality-control data on performance. Such data is critical in maintaining accuracy as temperatures approach operational limits.

In Slim Holes…

We also offer a variety of slimhole tools. They reduce the chance of getting stuck in slim wellbores. Their outside diameter, 2.35 to 3.5 inches, means we can even deploy them inside drill pipe in many cases.

Performance Under Pressure

Our Hostile Sequential Formation Tester (HSFT™) tool has demonstrated unprecedented performance in hostile conditions in the Gulf of Thailand and elsewhere around the world. In Thailand, the tester performed more than 300 successful runs.
For Large Holes…
Hard-to-reach reservoirs require wider wellbores that accommodate steerable bits. Our MRIL-XL™ tool produces highly accurate nuclear magnetic resonance (NMR) images in boreholes with diameters of 7.875 to 12.25 inches. A bowspring pushes the tool to the side of the wellbore, allowing the signal to penetrate up to four inches into the formation, providing more accurate measurements.

In Deeper, More Deviated Wells…
To reduce the number of logging runs, tool strings are becoming longer and therefore heavier. In today’s deeper, more deviated, rotary-steered wells, their weight sometimes exceeds the tension capacity of wireline.

In response, we have developed lighter, shorter tools to minimize the chance of fishing. We have also increased wireline breaking strengths dramatically and developed specialized cable heads. Together with powered sheaves, hydraulic direct drive and other innovations, Halliburton can pull industry-leading tensions with increased safety.

This often means that we can help log wells that other companies cannot, get production online faster and helps reduce your costs.

In Fluids with Low Mobility…
The Halliburton Hostile Sequential Formation Tester (HSFT™) tool acquires formation pressure data and fluid samples under extreme conditions, operating reliably at up to 450°F and 30,000 psi in boreholes down to four inches in diameter. It is especially useful in low fluid-mobility conditions such as those often encountered in HPHT wells.

In Oil-Based Muds…
Because of their high resistivity, oil-based muds present special imaging challenges. In such muds, our patented Oil Mud Reservoir Imager (OMRI™) tool generates crisp, high-resolution digital wellbore images down to one inch of vertical resolution. This makes thin bed pay and other important features clearly visible in challenging situations.

The Right Technology for the Job
Increasingly, thorough evaluation requires specialized tools to retrieve accurate data from challenging environments. Halliburton offers a complete arsenal of tools to meet any logging challenge.

High-Resolution Imaging in Oil-Based Muds
Advanced sensor pads on our Oil Mud Reservoir Imager (OMRI™) tool each generate six resistivity measurements with a depth of investigation up to three inches and collect 120 samples per foot. Independent linkage of each caliper arm ensures true assessment of borehole shape and stress, and improves pad contact to produce unparalleled borehole image fidelity, even in less than ideal conditions.
**For High-Resistivity Formations…**

When formation and mud resistivity ratios make conventional electrical microconductivity imaging (EMI) difficult, our Extended-Range Micro-Imager (XRMI™) tool obtains superior images.

Compared to raw microresistivity measurements, it offers a fivefold increase in signal-to-noise ratio and a threefold increase in dynamic range. As a result, images from nominal downhole environments offer superior resolution and fidelity. The tool’s operating range – up to 350°F and 20,000 psi – greatly exceeds that of conventional micro-resistivity imaging tools.

**For Multiple Samples on One Run in Real Time…**

Halliburton’s Reservoir Description Tool (RDT™) formation tester paints a highly accurate picture of your reservoir by identifying up to eight fluid and formation properties: viscosity, density, resistivity/capacitance, bubble point, compressibility, and anisotropy as well as horizontal and vertical permeability.

By collecting those data types simultaneously, the RDT tester saves time. Real-time monitoring of critical fluid properties enables operators to identify optimum sampling locations. It also enables them to change testing procedures “on the fly” should they discover something unexpected.

**Simultaneously Collects Eight Types of Data**

The RDT™ focused sampling probe delivers a purer fluid sample than traditional sampling techniques with less pumping time, decreasing uncertainty in establishing connectivity and flow assurance while increasing operational efficiency. The RDT incorporates Oval Pad geometry, meaning lower forces acting on the formation sand face, with reduced sanding.

As fluids are segmented into an inner and outer flow section, fluids in the outer section will be more contaminated and will be discarded back to the borehole. Fluids in the inner section will be pure—in some cases, with contamination too low to be measured.

**Fast and Flexible**

The RDT tester saves rig time by getting the highest quality samples in the timeliest manner possible. A powerful, efficient pumping system flushes away invading fluids, such as mud filtrate, 50 percent faster than similar tools.

**Getting Data Faster Without Compromises**

Our next-generation LOGIQ® logging platform tool reduces the risk of time-consuming downhole failures and NPT. Shorter, lighter tools get in and out quickly with less sticking. Normally, short, light toolstrings compromise data integrity in HPHT environments. But LOGIQ tools operate reliably up to 350°F and 20,000 psi.

Ethernet communication and four high-rate sensors – resistivity, density, neutron, acoustic – increase data capacity fivefold between downhole tools and surface systems.

**Borehole Seismic…**

Halliburton offers a wide variety of borehole seismic services to bridge the gap between surface seismic and the wellbore. Working in both normal and HPHT environments, we validate and improve the accuracy of surface seismic by providing reliable high-resolution seismic answers.

This improved accuracy helps:

- Provide accurate velocity data to update drilling objectives
- Properly position the wellbore in 3D space within the surface seismic volume
- Navigate complex drilling paths, determine critical drilling decisions such as casing and TD points
- Calibrate and validate surface seismic attributes for a more accurate subsurface picture
- Improve reservoir yields, identify reservoirs and drainage issues
- Complex high-resolution 2D and 3D P&S wave imaging for determining reservoir boundaries, fault identification, salt flank and pre-salt imaging
- Improve the vision around and under salt
Pinpointing Bypassed Pay

Using a nuclear magnetic resonance (NMR) technique that Halliburton pioneered, we have been able to identify low-contrast pay zones that clients have repeatedly bypassed. The technique measures the difference in molecular diffusion between bound and unbound oil and water. We then can complete new well intervals to efficiently produce unbound oil from areas with bound water.

Superior Maintenance Minimizes NPT

Obtaining reliable data is a prerequisite in this market. Those who can obtain it are then judged by a higher standard – the NPT they cause.

To ensure that we minimize NPT, Halliburton checks and calibrates tools before they go to the rigsite. We also perform maintenance checks after they return.

Continuous audits of maintenance, tool, and human performance help us ensure reliability and track adherence to industry best practices. They also shape our R&D and training.

Reducing the Number of Logging Trips Needed

Our breakthrough LOGIQ® logging platform tool helped an East Texas independent operator log a 12,000-foot development well in one trip instead of two, without differential sticking. The operator saved five hours in rig time and four hours in rathole drilling.
**THE BEST RESERVOIR DEVELOPMENT STRATEGY IN THE WORLD IS WORTHLESS WITHOUT GOOD EXECUTION**

We not only understand your reservoir challenges, but we also have the production knowledge, experience and technology to help you overcome them.

**Solutions Tailored to Your Specific Reservoir**

Our extensive array of products and services includes those from the rest of Halliburton. This enables us to help you meet virtually any challenge you encounter during well completion, perforating, production or stimulation.

**Managing Complexity with Integration**

The extensive integration among our solutions reduces the burden of coordination on clients. It also reduces NPT.

Compared to multivendor solutions, we also reduce the need to translate data and compensate for differences in measurement techniques. This results in higher accuracy and greater confidence when making decisions.

**Risk and Cost Containment**

Integration also reduces your financial risk. If one of our groups causes a delay, our other groups do not charge a standby fee. For instance, if a logging team encountered a downhole condition that delayed our stimulation crew, the stimulation crew would not charge you for its waiting time.

**Leveraging Basin Knowledge**

We work on thousands of wells per year in almost every oil-producing region of the world. Collected and codified, information on these jobs creates a large body of knowledge that we constantly leverage to improve your results.

**The Right Tool for Every Job**

For today’s challenging environments like heavy oil, deepwater and HPHT, Halliburton offers unique technology that performs reliably in extreme conditions.
Super-Deep Penetrating Charges
The MaxForce line of super-deep penetrating charges is our latest breakthrough. This combination means unsurpassed production performance. The deeper penetration of MaxForce charges:
- Increases productivity
- Penetrates past any near-wellbore damage
- Potentially intersects more natural fractures.

Charges are manufactured with the highest levels of quality assurance and are also randomly tested to ensure consistent charge performance and reliability.

Faster, More Flexible Tools Equal Less NPT
For cement and casing inspection, our Fast Circumferential Acoustic Scanning Tool (FASTCAST™) system is up to five times faster than the competition’s and accurately delivers 100 percent pipe-inspection of casings up to 20 inches in diameter. High-resolution cement and casing data are recorded simultaneously to save even more time.

The flexible FASTCAST scanning tool allows programmable shots per scan to provide the best measurement solution to match the need.

The CAST-M™ scanning tool, the only tool of its type available on mono-conductor cable, provides the same measurement capabilities as the FASTCAST solution.

High-Performance Perforation Customized for Your Needs
Halliburton shaped charges lead the way in quality, reliability and performance. Engineers at our Jet Research Center develop and manufacture perforating systems for virtually every type of reservoir or intervention technique. We can even customize charges for your specific needs.

Putting Safety First
Our Perforating Solutions team maintains an excellent success and safety record while continuously developing and introducing new and innovative products for tubing-conveyed and wireline perforating.
Non-Explosive Alternatives
In some countries, waiting on delivery of explosives to perform routine operations such as perforating and pipe severing contributes to NPT. Such delays can be very costly in lost production. Halliburton offers a comprehensive range of effective non-explosive solutions that cut this NPT. For instance, we have developed ways to:

- Perforate casing and erode tunnels, using fluids
- Punch, pierce and abrade heavyweight tubing with fluids and mechanical arms
- Cut pipe with plasma cutting tools and jetting technology
- Set bridge plugs and packers electromechanically.

Leading the Slickline Service Industry
Halliburton invented the slickline business and still leads the industry today with a wide range of logging, perforating and mechanical services.

Thanks to our patented Downhole Power Unit (DPU®), setting plugs, packers or punching tubing can be accomplished on Slickline or E-Line with non-explosive solutions.

This is significant because slickline tools are generally smaller than other types. Thus, they get up and down faster and easier, reducing costs.

Production Logging Tools For Every Downhole Environment
Whether your well is vertical, deviated or horizontal, we manufacture equipment for memory and e-line production logging:

- Flow rate measurement – continuous flowmeters, basket flowmeters, fullbore flowmeters, and spinner array tools
- Fluid identification/flow composition – gas holdup, capacitance water holdup, radioactive fluid density, differential pressure density, resistance array and capacitance array
- Flow condition and well diagnostics – pressure, temperature, X-Y caliper, inclinometer
- Correlation tools – gamma ray, casing collar locator.

Intervals between readings can be as short as 0.1 second or as long as many hours. Once logging is complete, merging log-time and depth-time data is rapid.

When Explosives Take Too Long to Get…
If waiting for explosives delays your job and causes NPT, consider one of our non-explosive alternatives. They’re just as effective and just in time.
**DPU® Tool Saves Rig Time**

Halliburton's Downhole Power Unit (DPU®) Intelligent series of tools has successfully set permanent packers and cement retainers in more than 25 deepwater wells in the Gulf of Mexico, many at depths greater than 24,000 feet and pressures exceeding 22,000 psi in a variety of fluid systems. One of these set a world record depth of 31,795 feet at 25,600 psi bottom hole pressure.

**The DPU® System Helps Reduce Completion Costs, Improve Safety**

Halliburton’s new Downhole Power Unit (DPU®) Intelligent series of tools provide industry-leading pressure, temperature and force measurement capabilities for setting downhole equipment.

The tools offer non-explosive setting operations in hostile environments with real-time surface monitoring of the operation as well as on-board Gamma and CCL instruments for accurate depth control. The ability to operate these tools on most any electric line ensures flexibility and timely feedback for critical operations when rig costs and well completions demand the best.

The 4 1/2 in.-OD tool provides setting forces matched only by pipe conveyed devices when large, high-grade pipe requires high setting-force capabilities.

**Reservoir Monitor Tool (RMT™) System Offers Speed and Precision**

Reservoir management requires timely information. We offer an understanding of production dynamics to enable decisions that optimize production and mitigate risk.

Our RMT™ logging system is crucial in estimating the reserves remaining in a reservoir. It can also be useful in locating missed pay zones.

The RMT system accurately evaluates performance of reservoirs over time without requiring that tubing be pulled from wells. Despite its slim design, this pulsed neutron logging system achieves results and resolutions that previously were available only with large-diameter carbon-oxygen (CO) systems. The system’s modular hardware gives operators flexibility to simultaneously measure CO, sigma and water-flow.
WHY CHOOSE HALLIBURTON WIRELINE AND PERFORATING

Integrated services set us apart from most of our competitors. Our accessibility, collaborative attitude, reliability and responsiveness set us apart from the rest.

Halliburton offers industry-leading technology. But in this business, technology is just a starting point. The way we deliver our service sets us apart. We’re integrated, collaborative, reliable, responsive and accessible.

Use of Industry Data Protocol Underscores Commitment to Open Standards and Collaboration

Halliburton Wireline and Perforating has joined Software and Asset Solutions and Sperry Drilling in supporting WITSML, the Wellsite Information Transfer Standard Markup Language. WITSML is essential in enabling Digital Asset® collaborative workflows. Compared to proprietary data formats that require time-consuming translation, Halliburton’s commitment to open standards and collaboration enables E&P companies to easily share standardized data on any system, improve data quality and accelerate decisions.

Service Integration – An Important Difference

Integration of our services with those from other parts of Halliburton enhances value in many ways:
- More efficient teamwork
- Less data translation
- Higher accuracy
- Single-source accountability
- Reduced NPT
- Reduced risk

While we have successes that we can point to in each of these areas, we recognize that Halliburton is not the only company in the world to offer integrated services.

Increasing Tool Availability

We also engineer our tools with maintenance in mind. Modular components ensure that parts can be changed quickly and easily in the rare event of a failure. Backup tools on or near rigsites allow us to replace tools rapidly, if necessary. To further ensure that your job runs efficiently, we inspect and refurbish tools regularly – some as frequently as every run.

Operational Excellence – The Tie Breaker

Operational excellence has always been a hallmark of Halliburton. We go to great lengths to ensure the reliability and accessibility of our people and tools, and to make sure that our organization is both responsive and collaborative.

That is why few companies in the world work on as many wells as we do each year, why our market share steadily increases, and why clients give us high ratings for:
- Operational excellence – lack of delays due to tool performance
- Service delivery – lack of delays due to operator error
- Job quality – reduction of NPT
- Reaction time – for problem resolution.

Dedication to Continuous Improvement

More than 98 percent of our 50,000+ jobs each year have no problems or issues whatsoever. When we do encounter problems, resolution can usually be measured in minutes, not hours or days.

Our global implementation of real-time logging supervision is also contributing to our steadily increasing scores for client satisfaction and job efficiency. Learn more about how we can benefit your projects.

Resolving Problems in Minutes, Not Days

Thanks to continuous improvement in tool design, manufacturing, training, job preparation, backup systems, and knowledge management, more than 98 percent of our 50,000+ jobs each year have no problems or issues whatsoever.
Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.