



# DIRECTIONAL DRILLING SERVICES



BETTER PERFORMANCE EVERY DAY

CATHEDRAL ENERGY SERVICES IS A TRUSTED PARTNER TO NORTH AMERICAN ENERGY COMPANIES REQUIRING HIGH PERFORMANCE DIRECTIONAL DRILLING SERVICES.

Since 1998, Cathedral has worked in collaboration with our clients to tailor our equipment and expertise to meet their specific geographic and technical needs. This combination results in our clients achieving accurate wellbore placement, enhanced drilling efficiencies and lower project costs.

We take pride in being highly responsive and prepared while providing exceptional services. With eight operating centers located in the key basins across North America, Cathedral is strategically located to meet our clients' evolving requirements.

Cathedral is committed to:

- Exceeding industry standards with proprietary high-performance motors and measurement-while-drilling technology
- Implementing rigorous in-house quality control, testing capabilities and maintenance programs developed to improve reliability and performance
- Combining our expertise and technical insight to provide clients with customized solutions and comprehensive recommendations
- Managing risk to better ensure no person, operation or the environment is compromised
- Delivering exceptional service and ensuring we add value to our clients' business

*BETTER PERFORMANCE EVERY DAY*



## PROPRIETARY EQUIPMENT DESIGNED AND MANUFACTURED IN-HOUSE

### INNOVATIVE TECHNOLOGY LEADERSHIP

Cathedral has always been an innovative technology leader in directional drilling. Our focus on technology and our accumulated knowledge have positioned Cathedral to be a trusted business partner with our clients.

Our measurement-while-drilling (MWD) equipment is designed, manufactured and tested at our research facility in Calgary, Alberta, while the development of our directional drilling motors takes place at our main motor facility in Nisku, Alberta.

By designing and manufacturing our own tools, we are able to direct and control technology improvements and reduce response time required to deliver customized solutions specific to our clients' requirements.

As we apply our technology to the increasingly challenging drilling environments, we continue to regularly achieve performance records and provide distinct advantages to many drilling programs across North America.

DESIGNED FOR  
**RELIABILITY  
AND HIGH  
PERFORMANCE**

### QUALITY CONTROL AND TESTING OPERATIONS

Cathedral provides equipment designed and built with a focus on quality. Our in-house testing capabilities allow our team to perform extensive tests to properly qualify equipment for field use. Cathedral's comprehensive maintenance, testing programs and procedures improve tool reliability and result in better performance.

Our testing methods use specialized equipment, including:

- **Dynamometer:** Verifies torque and force specifications for motors under simulated operating conditions
- **Automated coordinate measuring machine:** Provides precise measurements of complex components used in bottom hole assembly (BHA) equipment
- **Vibration table:** Capable of testing MWD components at forces up to 50 G's to accurately reproduce drilling conditions that cause service interruptions
- **Heat chamber:** Simulates extreme temperatures from -70°C to 200°C to ensure all electronic equipment in our MWD systems can function in downhole environments



## EM CAPABLE IN ALL NORTH AMERICAN BASINS

### FUSION™ MWD TECHNOLOGY

During directional drilling operations, data is gathered downhole and transmitted to surface through our FUSION MWD technology platform. FUSION MWD integrates Cathedral's technology into a common platform providing clients with seamless, reliable data acquisition and transmission that is critical for accurate wellbore placement.

### FUSION EM G5.0

Our latest FUSION EM (electromagnetic MWD system) leads the industry in depth achievements and signal reliability. Cathedral successfully uses our EM in formations where conventional EM systems are not reliable. We continue to drill deeper and further, setting EM records for depth throughout Western Canada and the United States.

Our consistent performance with EM technology delivers a time saving benefit to our clients through the elimination of survey-on-connection non-productive time.

### THE HAWK™

The HAWK is an integrated downhole vibration measurement tool that enables operators to detect and mitigate harsh drilling conditions as they occur by recording and transmitting real-time shock and vibration data to surface. The data can then be used to alter drilling parameters to reduce excessive bit wear and mitigate downhole equipment damage caused by drillstring shock and vibration effects.



## nDURANCE® MOTORS OUTPERFORM CONVENTIONAL MOTORS

Cathedral's nDURANCE motor series patented design delivers increased torque capabilities, proven reliability and outstanding drilling performance.

With established success in the most demanding areas of Western Canada and the United States, our nDURANCE motors have delivered higher total rate of penetration (ROP) compared to traditional motors and have significantly reduced non-productive time and project costs for our clients.

At the core of the design is our unique multi-stack, split bearing assembly that operates in an oil sealed environment. In the unlikely event of a seal failure, bearings will continue to function in a mud lubricated mode until the next scheduled bit trip. This results in longer run times and greater reliability.

### MAXIMIZING PERFORMANCE

- ✓ Enhanced bit life
- ✓ Greater reliability and fewer trips
- ✓ Increased horsepower and torque
- ✓ Higher durability
- ✓ Greater weight-on-bit capacity

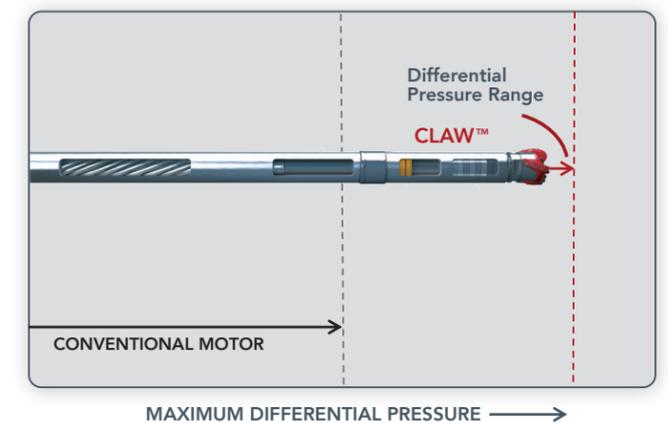
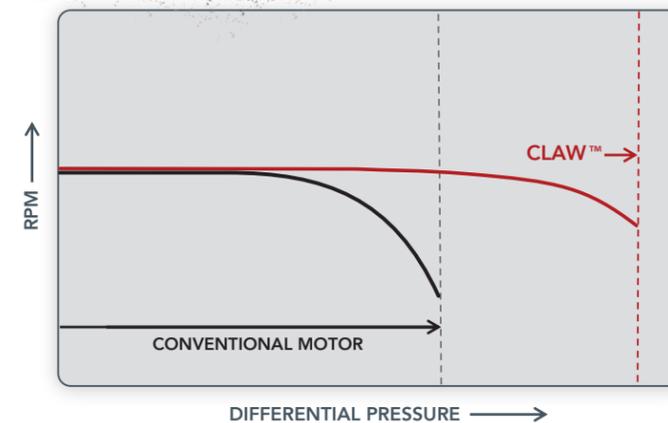
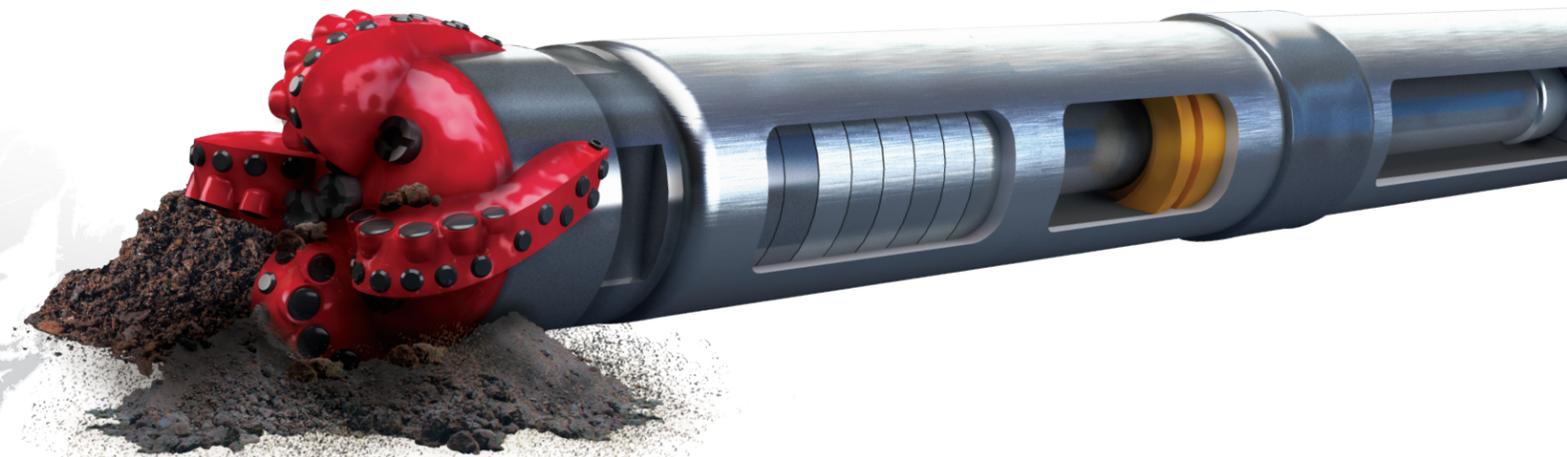
### THE CLAW™

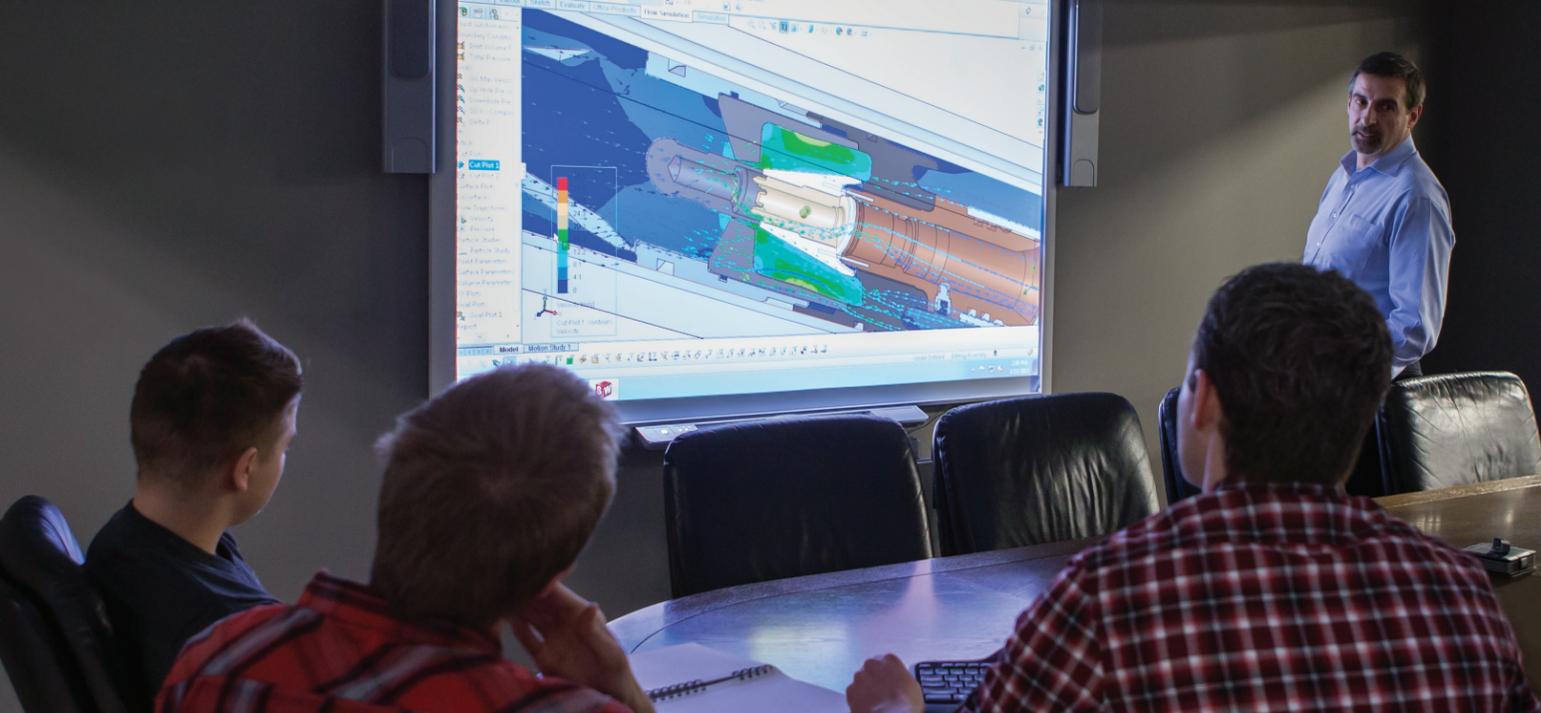
#### POWER AND RELIABILITY

Using industry-leading even-wall power section technology, the CLAW maintains RPM under higher loads delivering 50-90% more torque, horsepower and ROP than conventional motors.

The CLAW features include:

- Proprietary sealed bearing assembly
- Larger oil reservoir for extended run times
- High strength materials and driveline design to handle higher torque loads
- Large range of power sections available





## CUSTOMIZED SOLUTIONS FIT FOR OUR CLIENTS' NEEDS

### WELL PLANNING AND ENGINEERING

With the dramatic shift toward horizontal wells in the past decade, well planning has emerged as one of the most critical components of a drilling project. Cathedral's team relies on its accumulated knowledge and experience, reliable technology and innovative design solutions to achieve the most optimal well trajectories and BHA designs.

Our services and expertise include:

- Collaboration with our Drilling Optimization Group
- Survey quality assurance
- Multi-well pad design
- Advanced modeling using high definition geomagnetic models for improved accuracy in wellbore placement and anti-collision analysis

### REMOTE DRILLING

Through satellite-based communication links with our drilling operations, Cathedral provides 24 hour coverage from our remote drilling command center. By centralizing multiple projects across different basins, our remote technical personnel are able to monitor drilling and MWD tool performance. Through providing analytical and problem solving support to local on-site resources we can reduce overall field staff, minimize risks associated with travel and lower daily well costs.

**CONTINUING TO INVEST IN TECHNOLOGY TO DELIVER BETTER PERFORMANCE EVERY DAY**

### DRILLING OPTIMIZATION

Cathedral's Drilling Optimization Group combines the expertise of our well planning, drilling operations and technology personnel to investigate, research and provide technical insight into our client's drilling performance. Our goal is to provide clients with customized solutions and comprehensive recommendations for efficient and accurate wellbore placement.

Our team provides insight on:

- BHA design
- Torque and drag analysis
- Hydraulic calculations and modeling
- Drillstring analysis including stress and deflection
- Optimal wellbore trajectory
- Electronic data recording diagnostics

## IDENTIFY, ELIMINATE AND MANAGE RISKS

### HEALTH, SAFETY AND ENVIRONMENT

At Cathedral, we identify, eliminate and manage risks involved in our daily work activities to better ensure no person, operation or environment is compromised. To achieve our own and our clients' HSE objectives, Cathedral has invested in proactive measures to ensure a safe work place, whether in the field or at our facilities, including:

- Minimizing risk through systematic management strategies
- Engaging every employee to be HSE champions
- Continuous improvement of risk management strategies with the participation of employees
- Conducting comprehensive annual reviews and setting goals for achieving incident free operations



## WORK SMART™ LIVE WELL

Cathedral recognizes the importance of making smart decisions so no operation is compromised. By transforming traditional methods and approaches to safety into a risk oriented way of thinking (identify, eliminate, manage), we aim to prevent injuries, protect our environment, and ensure the well-being of ourselves, our coworkers and the communities where we work.

Our company-wide pursuit to **Work Smart** and **Live Well** helps us get home safely every day to what matters most.

**UNDERSTAND AND MANAGE RISKS AT WORK**  
LIVE WELL EVERY DAY



**Contact Cathedral Today**

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