

Land Rig Upgrades

Three upgrade packs to power you through the next stage of drilling



NOV

Shifting gears

Moving forward with the right equipment has just been made easier

NOV provides a comprehensive array of land rig upgrade packages to ensure that your rigs outperform the competition. We've developed these packages in several critical areas—hydraulics, torque, and optimization—to enable improved performance, increased uptime, reduced equipment damage, and better well construction in even the most challenging of land drilling operations.

Our upgrades allow you the freedom and flexibility to take on the bigger jobs, deeper wells, and tougher terrains ahead.



Upgrades...powering you through the next stage of drilling





Land Rig Upgrade Packs

- ⤴ Hydraulic Pack
- ⤴ Torque Pack
- ⤴ Optimization Packs

Hydraulic Pack

Achieve new levels of performance.

Improve your wellbore hydraulics with this rig upgrade pack and drill deeper, longer, and more complex laterals more effectively, ensuring performance improvements in even the most challenging drilling environments.

NOV's higher-pressure pumps, increased mud cleaning capability, and enhanced power systems easily meet the demands of difficult horizontal and directional applications, and compliment any larger flow drill pipe choices you make.



Level up with more capacity to take on extreme workloads

Our hydraulic upgrade package integrates seamlessly with your rig, providing the power and additional hydraulic pressure to increase uptime and streamline maintenance in your drilling operations.



**NATIONAL
OILWELL
VARCO**

Hydraulic Pack Upgrades

7,500-psi conversion and third mud pump

Our FD-series mud pumps are adaptable and ready for conversion from 5,000 psi to 7,500 psi, providing you the added pressure you need for longer, deeper laterals. Add a third mud pump to improve HP mud capacity, hole-cleaning capacity, increase uptime, and streamline maintenance schedules. The FD-1600 mud pump is equipped with L-shape modules and can be equipped with 7,500-psi operating pressure capabilities.

Features

- Increase HP mud capacity, primarily hole-cleaning capacity
 - 7,500-psi operating pressure
 - Suction desurger built into the suction manifold for reduction of pressure surges
 - Low weight-to-horsepower ratio
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VFD upgrades and fourth GENSET

The power behind the equipment upgrades and control system comes from the Drill Force™ VFD system and the addition of a fourth GENSET. Our VFDs are designed with the most demanding applications in mind and keep rig machinery functioning effectively and safely for maximum uptime. The Drill Force power system's modular design is adaptable for any size rig application or equipment scope. Drill Force VFD enhancements and a fourth GENSET provide necessary power for increased horsepower and torque.

Features

- CAT 3512C engine and NOV generator for unmatched power
 - Four-stroke-cycle diesel engine combines consistent performance and excellent fuel economy with minimum weight
 - NOV generator - matched to the performance and output characteristics of CAT engines
 - Generator and mud pump add-ons
 - Upgrade to high-torque TDS
 - Rig conversion to AC-driven drawworks
-

Add third shale shaker

The modular design and standardized platform of the KING COBRA VENOM™ shale shaker offers a wide range of options. The basket's patented CONTOUR PLUS™ design reduces the liquid pool depth to provide better conveyance of drilled solids across the screens. Configured for 0° at the feed panel and +5° on the remaining panels, the CONTOUR PLUS design minimizes basket angle elevation and achieves drier solids and increased screen life by decreasing the mud pool weight over the screens. Our Constant-G Control™ (CGC) means performance actually improves under loaded conditions. CGC is a patented technology that monitors and automatically adjusts motor speed to maintain optimal G-force depending on fluids and solids loading on the basket. Motor speed increases with load, so it is G-Force when you need it, reducing wear and tear on components and screens when loads are light.

Features

- Unique basket design provides optimal mud coverage of the screen surface
 - Solids are separated and discharged rapidly
 - Easily removes large, sticky, hydrated clays and other troublesome solids
 - Dual-motion configuration allows the user to select the vibration motion that best suits the drilling application
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Torque Pack

Increase power and torque for challenging wells.

The NOV top drive—a product that revolutionized how wells are drilled—is now the industry standard. The TDS-11SAE builds upon the undisputed popularity of the TDS-11SA top drive, the industry standard for durability, reliability, and performance. The TDS-11SAE represents an enhancement to the original TDS-11SA that meets the needs of the land drilling market for higher torque and higher speeds, achieving 32,000 ft-lb at 180 RPM at the drill stem.

Dramatically increase your power, torque, makeup and breakout power, and overall drilling capabilities by combining the TDS-11SAE upgrade with our ST-100 iron roughneck and 5½-in. Delta pipe.

- With more than 2,500 top drives delivered, NOV has set the industry standard for top-drive performance
- ST-100 iron roughneck provides the increased torque magnitude to meet the emerging application demands associated with longer lateral wells
- High-strength drill pipe enables you to drill deeper and step out further



The power and torque you need to drive longer, heavier strings in more complex well construction



Torque Pack Upgrades

TDS-11HD Top Drive

The TDS-11HD provides up to 45% more power and torque, allowing you to drill wells beyond the technical limits of the standard top drive. Two 600-horsepower induction motors drive significantly more torque, while a 500-ton main thrust bearing means you can handle heavier hookloads. Combined, these benefits mean you can drill faster and deeper, both vertically and horizontally, to reach your payzone in even the most challenging formation. NOVOS-enabled, the TDS-11HD also works with drilling performance software, like our SoftSpeed™ II stick/slip mitigation system.

TDS-11SAE Top Drive

The TDS-11SAE is an aftermarket upgrade that can be retrofitted to your TDS-11SA to boost the horsepower from 800 to 1,200. Combining two new induction motors with updated gear box internals, the upgrade provides you with a cost-effective, OEM-engineered solution to increase the performance of one of your most critical pieces of drilling equipment. We perform the upgrade at an NOV shop during standard overhaul services, minimizing your downtime and ensuring you get our expertise.

Optimized 5½-in. OD drill pipe

Uses a streamlined Grant Prideco™ premium connection with 6 ⅝-in. OD tool joints to provide better drilling performance. Available in all standard API material grades as well as Grant Prideco proprietary ones (including sour service and high strength grade).

Features

- Improved hydraulic drill pipe performance with reduction of the pressure losses up to 66% for 4½-in. drill pipe and 57% for 5-in. drill pipe
- Increased connection torque capacity by 80 to 130% compared to 4½-in. NC 46, and by over 25 to 75% compared to 5-in. NC 50
- No need for more rig space with 6 ⅝-in. OD tool joints and keeping the setback capacity unchanged if using high strength thin-wall pipe
- Using these optimized 5½-in. drill-pipe configurations minimizes rig modifications for rigs currently running 4½- and 5-in. drill pipe

ST-100 Iron Roughneck

The ST-100 Iron Roughneck sets the standard for performance and reliability by incorporating modern technology in a rugged, high-performance package. The ST-100 offers make-up torque (MUT) and breakout torque (BOT) respectively at 100,000 and 120,000 ft-lb.

Features

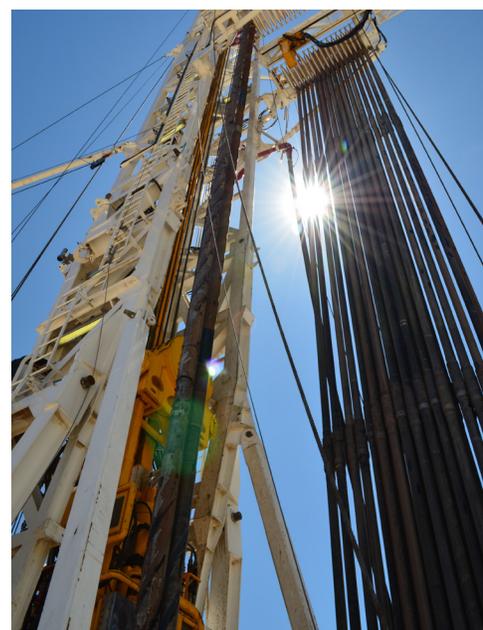
- ST-100 Transfer Barrier allows the machine to deploy at the same location every time
- NOV Soft Clamp feature applies minimal clamp force while protecting the life of tool joints
- The ST-100 is equipped with slewing and rotating capabilities to utilize mouseholes
- The ST-100 installs on virtually any drill floor and comes with a 5' or 8' reach option, eliminating the need for socket extenders
- Ergonomic, intuitive controls feature an emergency stop button located on the control panel for easy access to manual shutdown
- Available with remote options distancing personnel from drill floor hazard

Increased setback

NOV is ready to partner with you to increase your rig's setback capacity for extended horizontal drilling programs. For legacy NOV masts and subs we can perform engineering analysis and develop kits to modify structures. For Ideal™ rigs we have upgrade kits available for immediate delivery.

Features

- Upgrade rig to your desired racking capacity and drill pipe size
- Utilize certified welders of your choice with NOV service tech supervision
- OEM upgrade nameplate available



Optimization Packs

Working with you to pinpoint places of effective differentiation, our optimization services and upgrades manage our state-of-the-art equipment and controls to effectively improve drilling processes, yielding cost savings, reduced wear, increased uptime, and more desirable well construction.

Automation Pack

Optimization Pack

Health Pack

Walking Pack



**The power and torque you need to drive longer,
heavier strings in more complex well construction**



STRONGARM Vertica

NOVOBS 09 September 20, 2:13 pm

DRILLING

PIPE HANDLING

Engineering Panel

PIPE HANDLING

IBOP

SLIPS

CIRCULATION

DISCONNECT PENDING

TARE

39

42

Buttons and controls on the lower monitor interface.

Optimization Packs

Automation Pack

NOVOS™ reflexive drilling system | Simple integration into existing NOV Amphion drilling controls

Envision faster, safer, and more effective drilling operations through NOVOS, an operating system that integrates drilling intelligence into your existing NOV control system. NOVOS provides the foundation for consistent and optimized well creation that is scalable across your entire fleet. NOVOS enables you to oversee sequences of well construction without demanding constant attention, freeing you to concentrate on what is important.

Optimization Pack

eVolve™ optimization pack | Efficient wellbore construction through optimized drilling and enhanced rig process control

While drilling, our eVolve downhole tools acquire pressure, dynamics, and MWD information, transmitting real-time data via the IntelliServe high-speed telemetry network. Our tools acquire data at multiple positions in the drillstring, providing internal and annular pressure, temperature, rotation, and three-axis vibration information to determine the most efficient drilling parameters.

Health Pack

RIGSENTRY™ | Predictive solution that monitors equipment health and maximizes uptime

Rig Insight: See a real-time snapshot of your topside equipment through a network of native and CM sensors. Turn raw data into usable condition information that compares your rig with acceptable usage, wear, and fatigue models. Recommended action reports alert of potential equipment issues, while event reporting provides valuable insight into equipment failures.

Rig Predictive: Rig predictive builds upon the information provided through Rig insight. By utilizing predictive analytic tools, we provide you with proactive alerts that warn you of potential breakdowns, allowing you to address the problem before it becomes a costly event. Have a question about equipment performance issues? Rig predictive also provides you with access to condition-monitoring experts that can help you interpret your data with confidence.

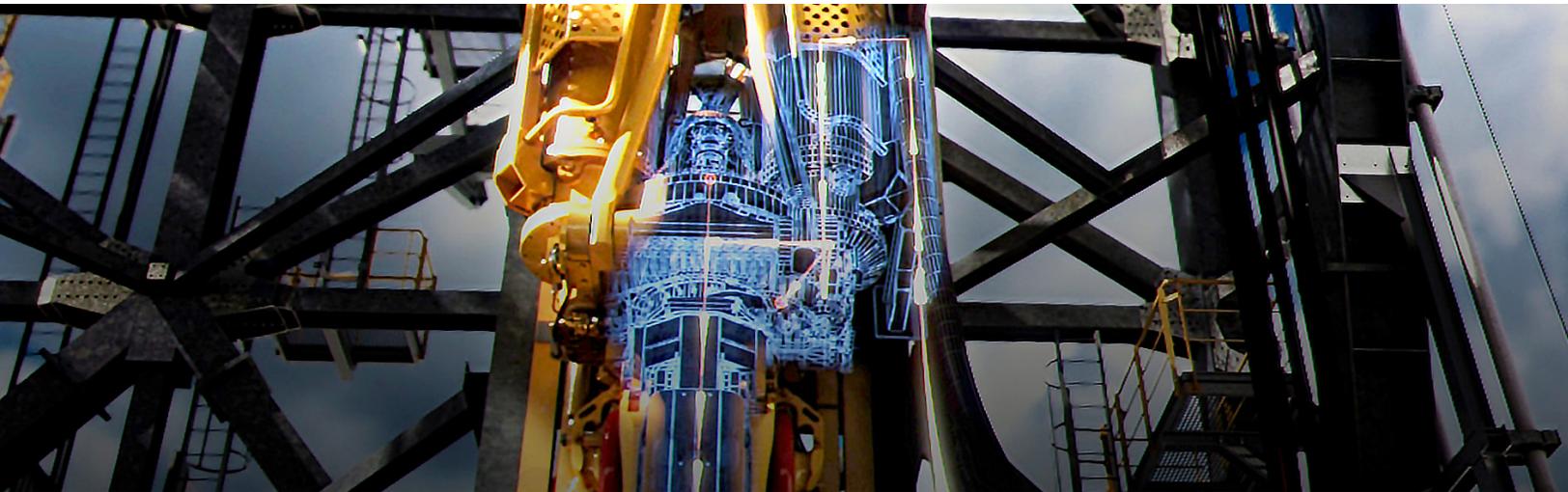
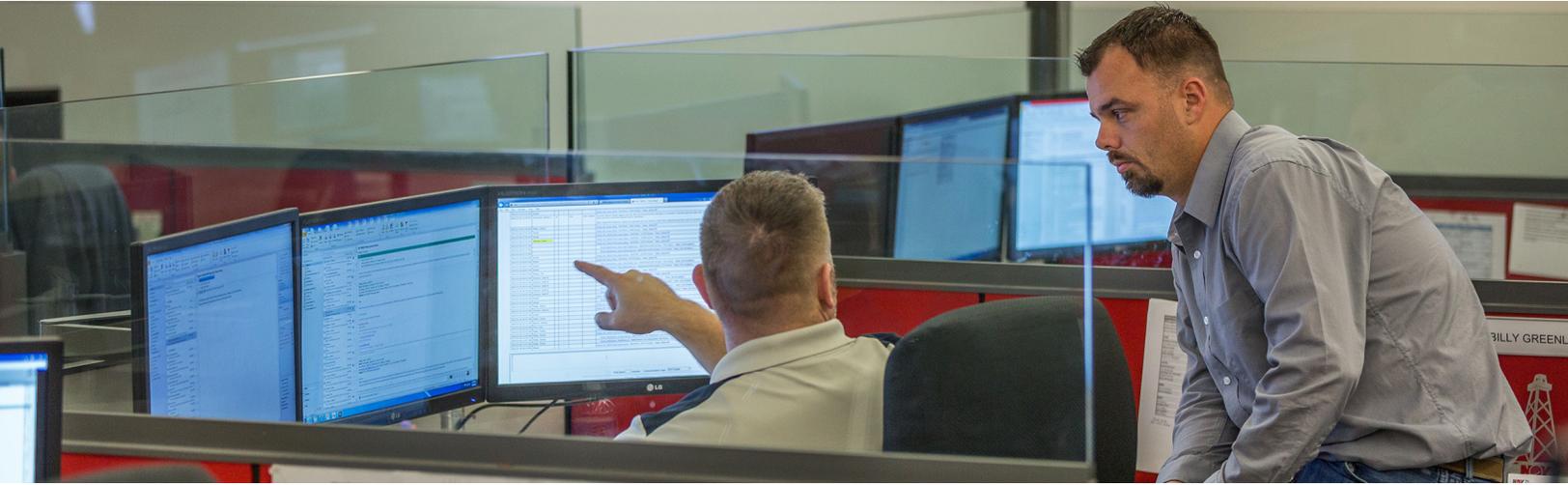
Rig CBM Services: On top of insight and predictive services, rig CBM services use our combination of equipment knowledge, operational data, and condition-monitoring data to help you develop a condition-based maintenance schedule that aligns with your operational plan. As the OEM, we have the most comprehensive knowledge of NOV equipment and systems, down to engineering tolerances at the component level. Use that expertise to help you estimate when components or systems are nearing their end-of-life or plan an equipment change-out or repair.

Walking Pack

Steel Toe™ walking system | Mobility and functionality

Spend less time rigging up and down with safe and simple walking to your next well. Our innovative Steel Toe moves your rig while keeping critical equipment stationary or mounted in place and ready for the next well. Wireless controls keep personnel at safe distances during moves to ensure safe operations. Custom configured system to maximize operational effectiveness.

The system has four lift and slide walking feet with modifications to the substructure and system controls. An integrated cable management system, gravity mud return, high-pressure piping extensions, and choke reconfigurations integrate your backyard for full functionality.



Strengthen your rig fleet with more efficient drilling performance.

The conventional drilling process is dependent on the experience of the driller. NOV Automation gives you the opportunity to capture lessons learned from well to well, apply improved processes and drilling parameters, and reduce the potential for human inconsistency in your drilling operations.

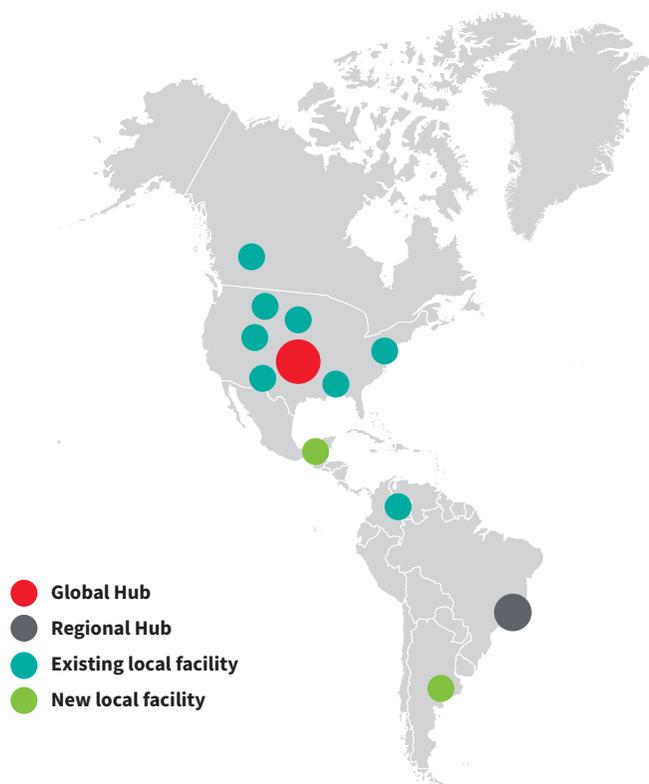
When our integrated automation system is deployed on your rig, the driller is free to coordinate and focus on the most important aspects of drilling—ensuring the safety of the crew and rig, maintaining an optimal downhole environment, and maximizing overall performance. Our advanced process controller automatically repeats the steps involved with manual drilling, but those steps are now completed faster and with more consistency.

The integrated system controls the drilling process and derives its setpoints from surface data, high-speed downhole data, and a comprehensive drilling model, using accurate information that reflects the true downhole environment and allows the system to be run with less conservative safety margins. Throughout the drilling process, our drilling applications and software interface with the control system, providing real-time downhole dynamics data such as weight on bit, toolface control, cuttings monitoring, and downhole pressure management.

When the well is completed, the lessons learned can be automatically captured and the optimized well program is uploaded to the system where it will repeat the process. Through NOV Automation, your rig can drill close to its technical limit, applying proven drilling processes for consistent, repeatable performance.



Aftermarket Operations



Americas comprehensive aftermarket products and services

Field Service

Our staff of proven field service personnel is available 24/7 to support all NOV products. Knowledgeable field service technicians can quickly deploy to your operating site to resolve your equipment issues, whether structural, mechanical, electrical, or software-related. Our FAST solution service trucks are pre-stocked with an extensive list of NOV's top drive, iron roughneck, BOP, EDS, and Amphion replacement parts, filters, consumables and tools to get your NOV equipment running at OEM specifications. Expert on-call technicians are ready to provide FAST, on-site service and repair.

Training

Field technicians train extensively on NOV Rig Systems product lines, including competency training and evaluations through our NOV technical colleges and training facilities, to ensure the highest quality service and support for your equipment repairs on-site.

Repair

Our highly skilled shop technicians overhaul, repair, rebuild, and re-certify a wide range of NOV equipment to the NOV Quality Assurance and OEM specifications—using only OEM parts. Our worldwide network of repair centers provides unrivaled quality customer service, on-time delivery, and unmatched technical integrity. In addition, equipment exchange programs are available at various facilities.

Technical support

One phone call to one of our technical support centers initiates a technical support team of multi-skilled backgrounds to troubleshoot and resolve your worldwide equipment needs, 24/7/365. Our team of highly skilled and experienced technical support members work together with our global pool of qualified field service technicians and subject matter experts to keep your rigs operating. The technical support team utilizes our web-based application "Tracker" to record, manage, and resolve issues.

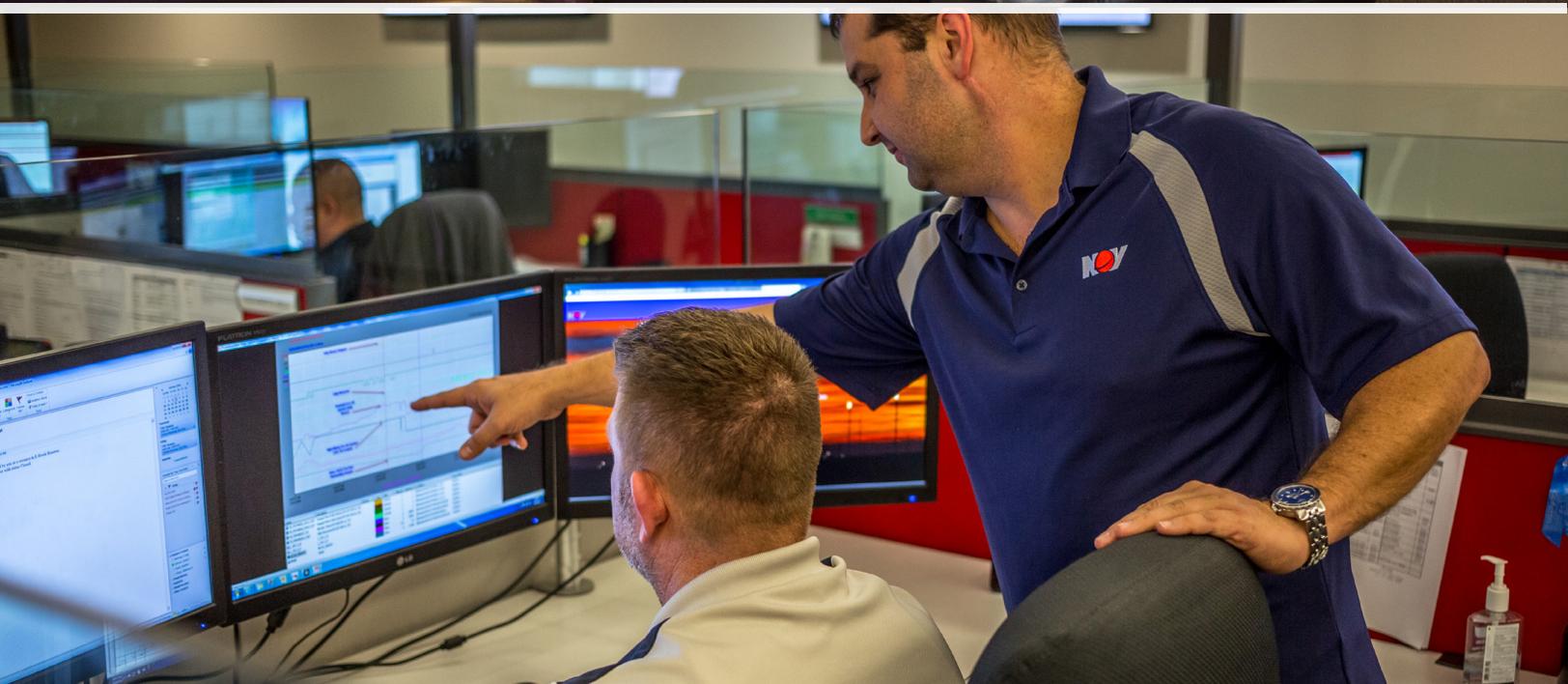
For 24/7 Support Services:

Technical Equipment Support Service

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