



Above. Beyond. And below.

Pressure Control





From the top of the rig to the bottom of the stack, we partner with you to build the most dependable pressure control equipment in the industry. We constantly raise the bar for performance and safety to achieve greater operational efficiency.

We recognize needs earlier and respond faster, allowing us to expand our capabilities and shorten lead times. We continually invest in training to make sure our people have the expertise you can depend on. And we consistently set new industry standards for research, testing, and development to strengthen your confidence in our equipment.

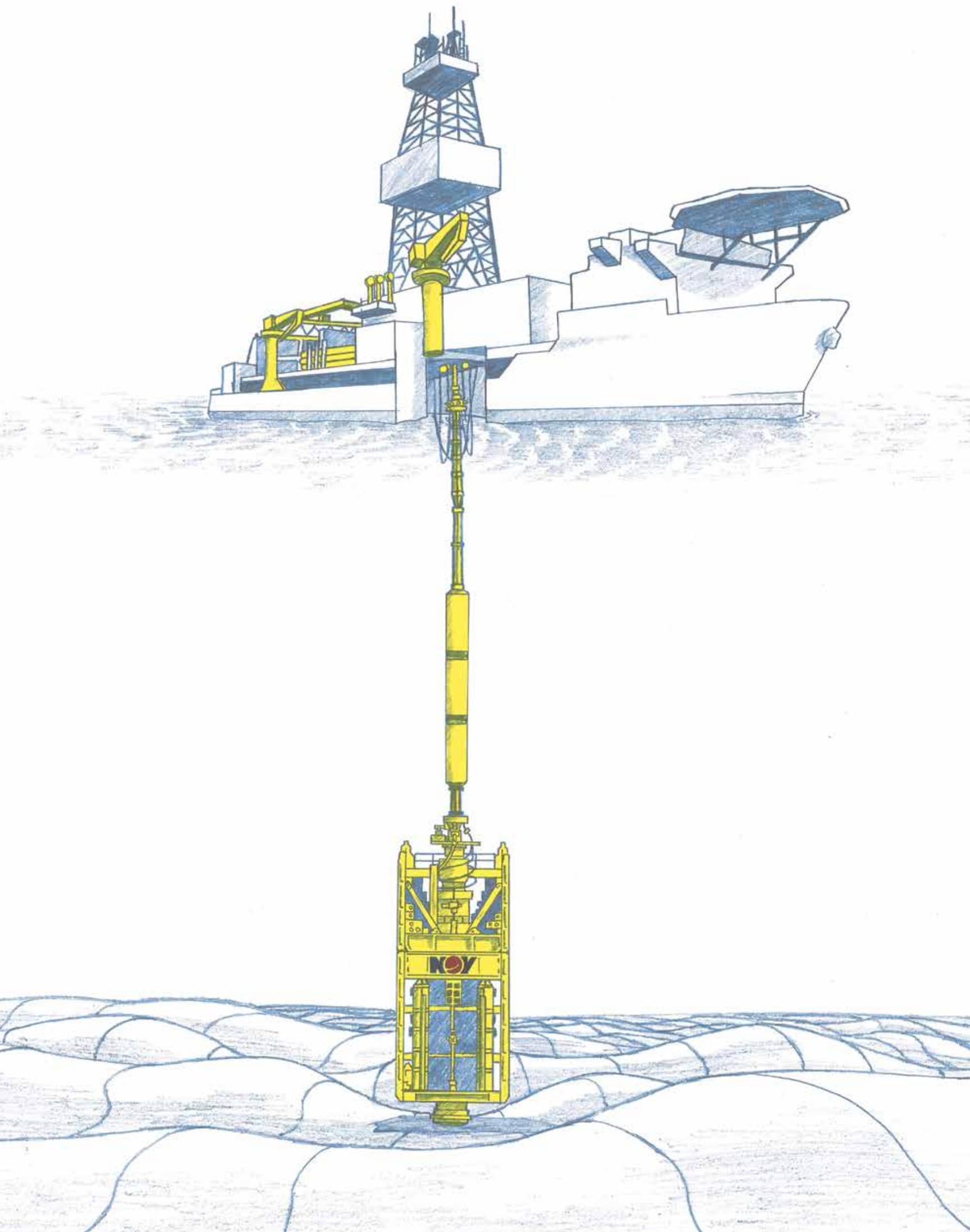
We believe there are always safer, smarter, and more advanced solutions to your challenges. That's what drives us. We're continually pushing our own standards higher to meet those challenges and be the technical leader you can count on.

Let's raise the bar for technical leadership.

Driven by innovation, we continually optimize equipment and integrate new technology with one goal in mind—improving overall performance.

We deliver a complete pressure control system, from remote monitoring stations to the wellhead connector. Our comprehensive expertise, global manufacturing capabilities, and unparalleled investment in R&D help you control costs and maximize productivity.









12K
FEET



A word-class testing facility for world-class products.

The foundation of our technical leadership is a state-of-the-art R&D facility that enables us to test and develop the safest, most reliable products on the market.

Our 45,000 square-foot facility houses 13 bays that our engineers use to test blowout preventers (BOPs), elastomers, components, and other critical equipment at temperatures ranging from -30°F to 350°F. A hyperbaric chamber installed in 2014 can simulate depths of up to 15,000 feet and pressure up to 20,000 psi.

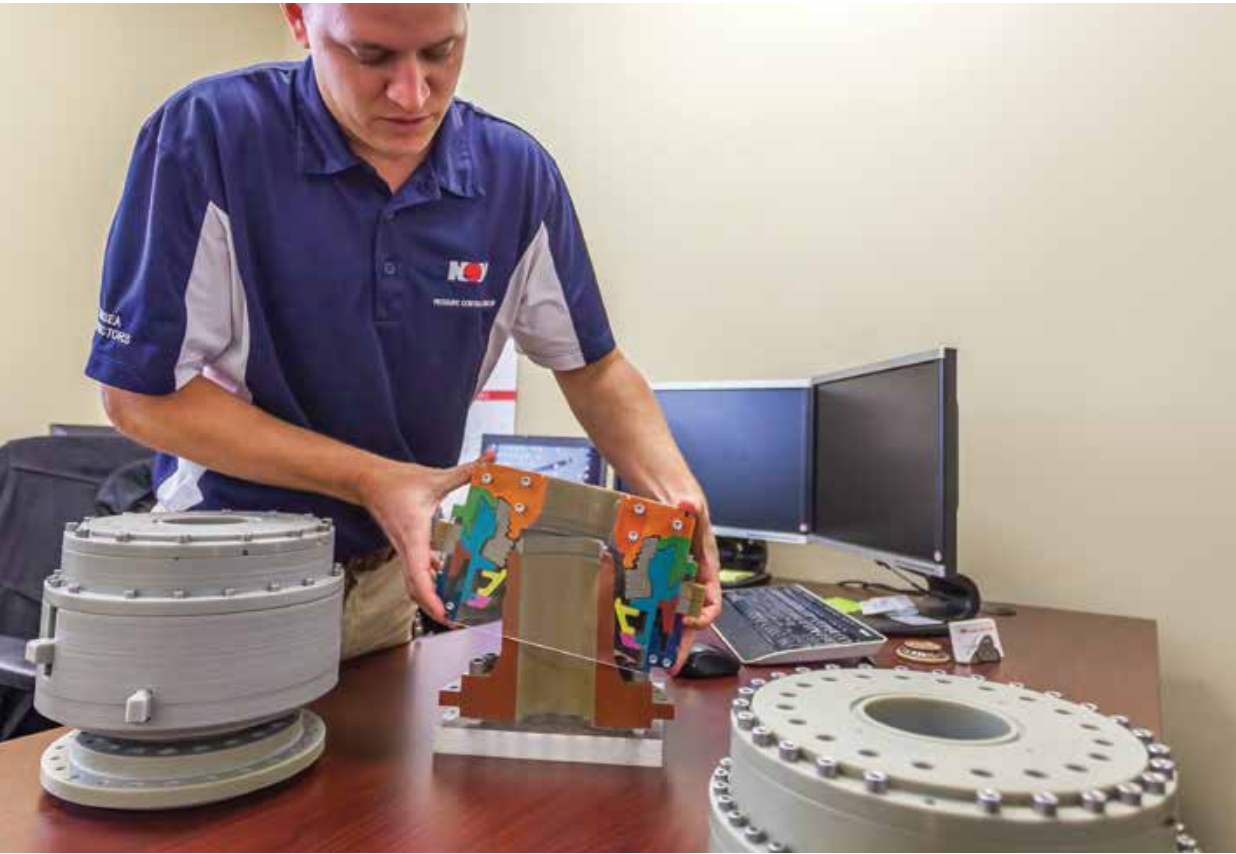
Every day, we work with customers to design tests that push our equipment forward, whether that's exploring a new hypothesis or recreating situations in which failures have occurred. By researching the causes and finding resolutions, we can optimize the performance of field-proven products.

Whether we're simulating arctic conditions or finding a way to shear materials nobody else can, our tests go well beyond industry standards to prove that our equipment can thrive in the world's most difficult drilling conditions.

Looking forward, we're conducting qualification and validation testing on new equipment to solve your evolving challenges. Our investment in the facility allows us to constantly develop new tools and hypotheses that will help product design take the next step.



Completed in 2012, the pressure control R&D facility features 13 multifunctional test bays. By applying manufacturing principles to building design and testing processes, our engineers can now safely perform up to 30 tests per week.





Our culture of revolutionary thinking didn't develop from a mandate. It's the natural evolution of people who are proud of the work they do and are constantly holding themselves to a higher standard.



53
ENGINEERS
2010

250+
ENGINEERS
2015



Great products start with great people.

With a strong commitment to engineer and manufacture the most reliable, robust pressure control equipment, we attract the brightest talent in our field. People who embrace solving your well control challenges. As our customer partnerships have grown, we've broadened our capabilities and expertise by expanding our team from 53 engineers in 2010 to more than 250 in 2015.

Purposeful innovation is our priority.

The first question we ask when designing a reliable system is not how do we make this piece of equipment better—it's do we need that piece at all? That's the essence of robustness and reliability. Our continual cycle of design, testing, and refinement leads to breakthrough products that improve overall performance, including our RCX pods, high-angle release connector, 20K BOP systems, shear technology, BOP elastomer technology, low shock SPM valves, and condition monitoring and maintenance.

275 TON CAPACITY
SERIAL NO. 14806

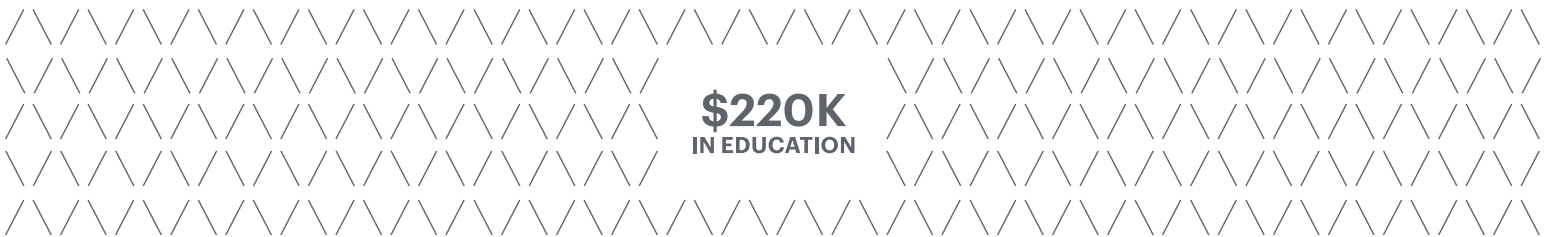


Project success is built into everything we produce.

We continually invest in our manufacturing capabilities and workforce training to save time, ensure consistency, and increase reliability. With an expanded stack pad, we now have the ability to work on seven stacks at a time. The development of a separate state of the art rubber production facility allows us to produce more of a proprietary elastomer line that is developed in our R&D lab.

Products you can depend on—every time they're needed.

Our people and process allow us to produce equipment that performs as expected. We test, refine, and engineer advanced products that lower failure rates and deliver consistently. Our focus on quality gives you the confidence you're working with unmatched technical expertise.



Our pressure control training program shortens the productivity curve for new hires and develops the skills of experienced workers. It includes six education modules, competency certifications for different levels and partnerships with technical colleges. More than \$220,000 is invested in every field service engineer before they work on solving your challenges.



A large yellow industrial component, possibly a wellhead or valve, is being hoisted by a red crane hook. The hook is suspended by black cables and has the text "T78 JW2" visible on its side. The component is cylindrical with a complex internal structure and a black, multi-lobed seal or valve at the bottom. The background shows a vast blue ocean under a clear sky. The scene is set on an offshore platform, with white railings and structural elements visible in the foreground and bottom right.

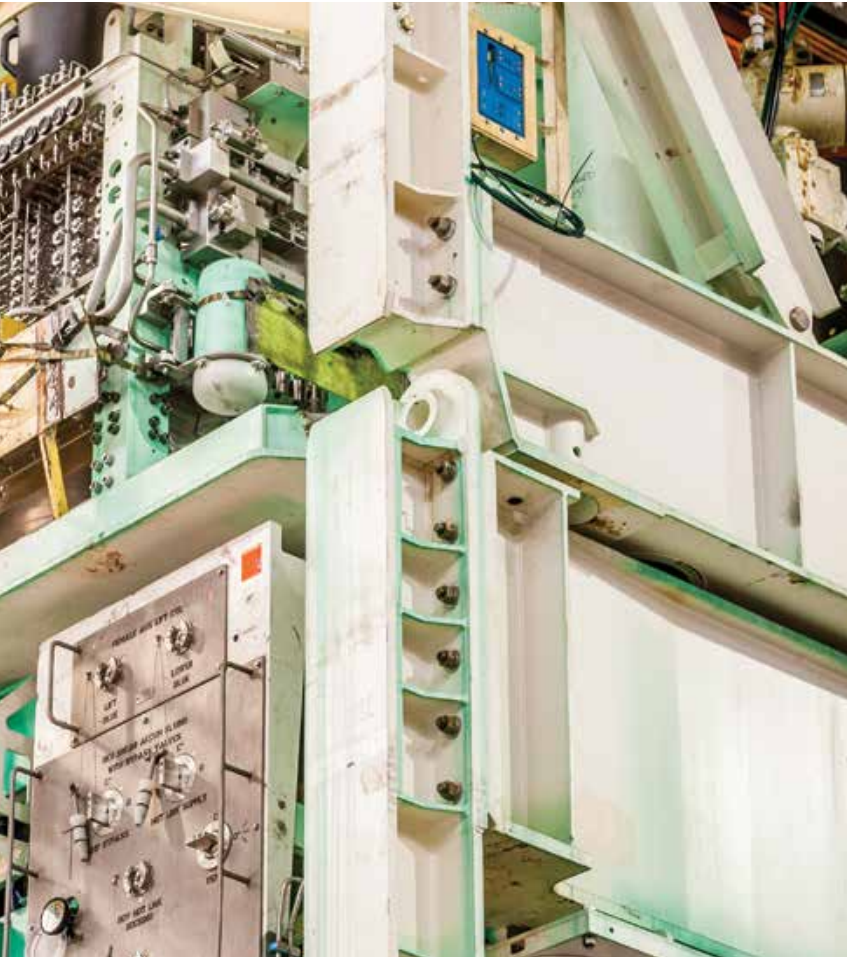
Let's raise the bar for customer confidence.

We back the industry's most advanced, reliable equipment with global service and field support.

Our equipment is tested and proven under extreme conditions to prove it will perform in the field—as intended, without fail. And we're constantly developing new repair and maintenance systems that can be executed on the rig to save time. At every step, you can depend on our people and equipment for project success.



Our configurable stack design and other equipment advancements have simplified installation and commissioning in the shipyard, one reason NOV has become a preferred partner for customers around the globe.

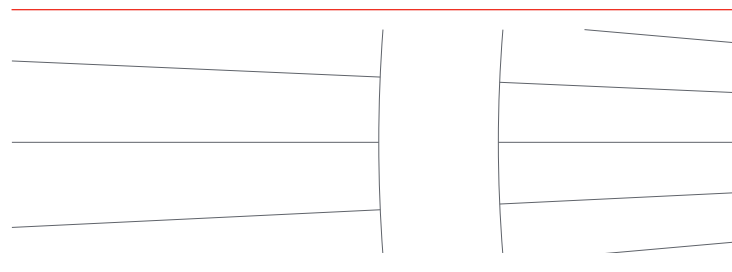


Going the extra mile is who we are.

Follow-through is everything. Dozens of our global engineering and manufacturing facilities work together to ensure that your equipment arrives on time and works together seamlessly. Our coordination with your rig team creates a more efficient installation when the complete package arrives on site. We support that with integration testing to ensure the system will be ready to perform.

Superior performance is our standard.

Real performance starts with trust. We partner with our customers to understand their challenges, then build and deliver the most dependable pressure control products in the industry. With a focus on reliability, redundancy, and robustness, you can be confident our equipment will perform the way you need it to.



Globally, we have more than 1,700 highly skilled field engineers dedicated to the service and repair of offshore rig technology. Our team is constantly developing new methods for in-situ repairs to prevent interruption in your drilling operations.



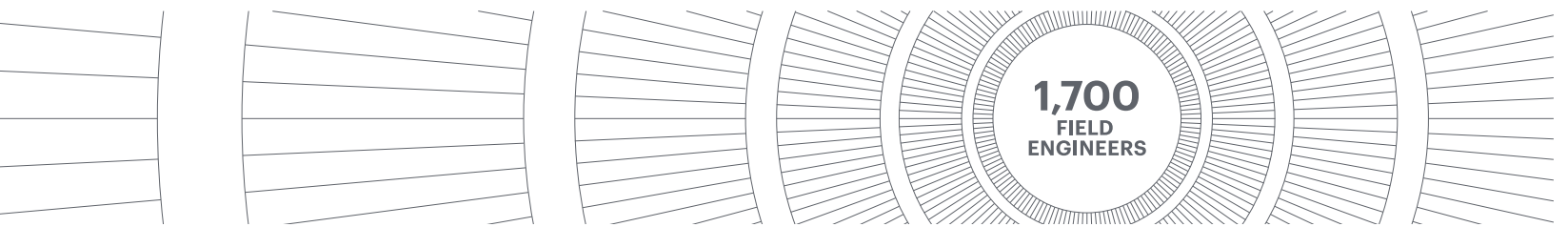


Big data leads to continuous improvement.

The more you know, the easier it is to make informed decisions. Our engineers regularly review performance data and technical queries to optimize current and future products. That feedback loop continues to grow. Through our big data initiative, we're integrating real-time performance data with test data to find new patterns. Our goal is to develop algorithms that predict and correct failures before they happen.

We believe nothing should interrupt your operation.

We maximize uptime by designing equipment that's easy to maintain and developing repair solutions that can be executed on the rig. If repairs are needed, our regional service centers are close by to support you. As an OEM, we hold our rebuilds to the highest recertification and quality assurance standards. From BOP face or riser pin resurfacing in field to replacement options, our global parts inventory and service teams help minimize issues that could interrupt your critical path.







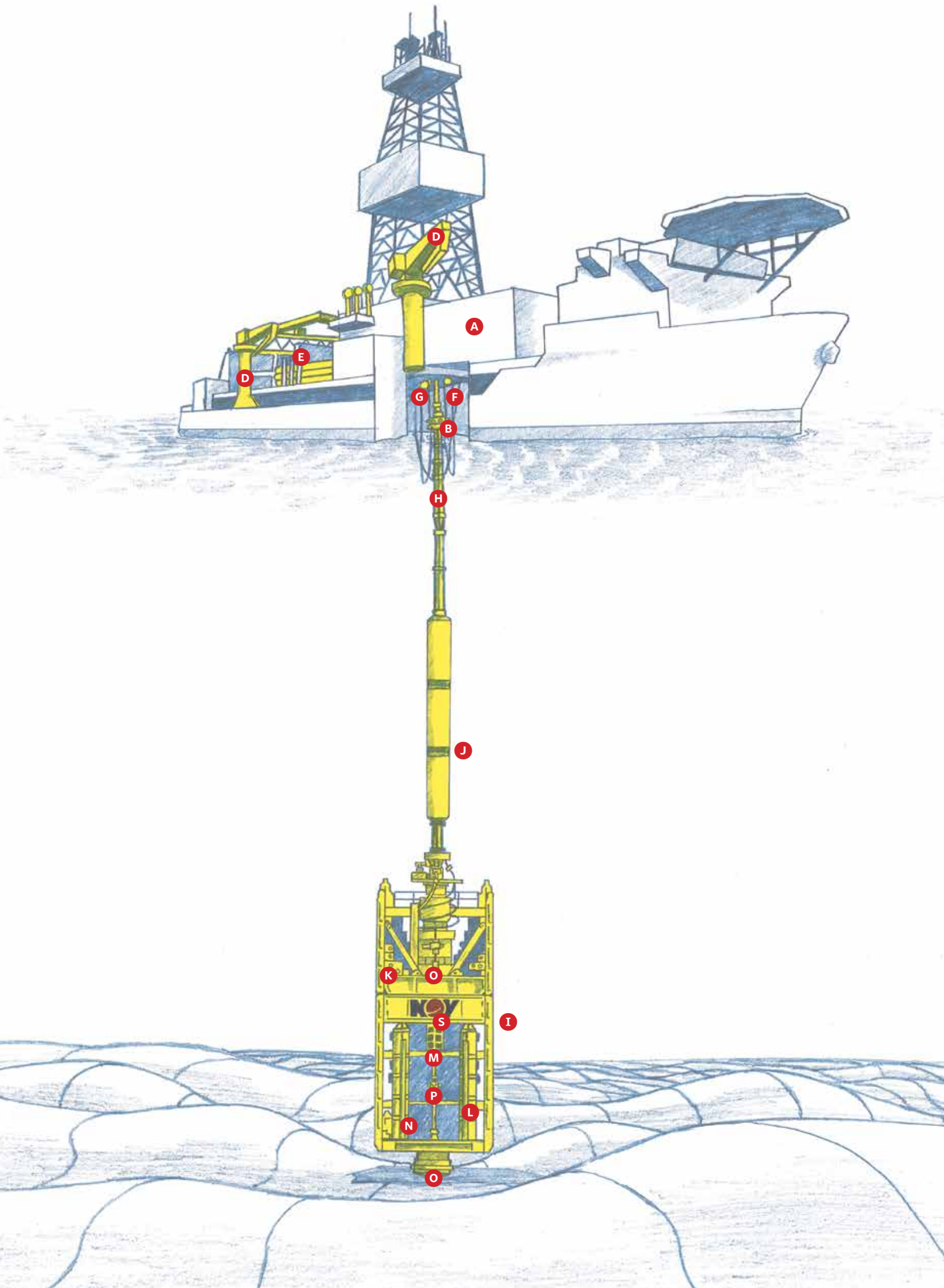
Service and support above all.

As equipment enters the field, we stand ready to support it with the best technical service in the industry. In addition to 24/7 technical support centers and a global team of field service technicians, we provide real-time remote monitoring of critical equipment to reduce response and resolution times. This allows you to identify potential problems and prevent critical failures.



Let's raise the bar for product performance.





Topside Equipment

A BOP CONTROLS

We provide top of the line offerings for surface and subsea BOP Controls

- Modular software design
- Touch screen or push-button designs
- Smart alarm system
- Regulator increase/decrease functions
- Pressure display digital readout
- HPU status displays
- Logging and trending
- Condition monitoring enabled
- HIL tested software
- High speed diagnostics
- Full redundancy
- Safety assessed design

B HANDS FREE GOOSENECK

Newer, safer alternative to conventional goosenecks. Removes the field technician in the safety harness from the telescopic joint assembly.

- Simple connection process with improved safety
- Retrofittable to existing NOV riser systems with minimal modifications
- Emergency packing element in each cartridge
- 75 ½" diverter configuration
- Weight: 47,250 lbs – choke/kill line: 15,000 psi
- 60 ½" diverter configuration
- Weight: 41,532 lbs – choke/kill line: 15,000 psi

C HYDRAULIC POWER UNIT

Our units have an expanded product range which better responds to the industry demands for dependable hydraulic power unit with simple maintenance requirements.

- Accumulator rack
- Fluid storage tank
- Manual valves
- Pneumatic assist
- Electrical junction box
- Dual triplex pumps
- Air pumps backup optional
- 3,000 psi and 5,000 psi versions
- Dual/triple triplex units
- Belt driven
- 480 VAC standard electric motors
- Staggered set points
- Relief valve
- Filtration

D ACTIVE HEAVE CRANES

Designed for subsea load handling from vessel or rig. Can minimize operation costs by reducing down time caused by severe weather conditions.

- Typical SWL (main winch) is 2 X 240 tonnes
- SWL (auxiliary winch) is 35 tonnes
- Main winches with the capabilities of lifting the LMRP off of the BOP stack
- Electro/hydraulic control for main winch
- Increased weather window
- High compensation accuracy
- Reduced power consumption

E BOP HANDLING SYSTEMS

Placed on top of the main beams and runs on four load-bearing track rollers. Works with a guiding system for safe, reliable lifting of the BOP stack.

- Main winches with capabilities of lifting the BOP stack or LMRP
- Electro/hydraulic control for main winch synchronization
- All winches can be controlled independently
- Emergency lowering possible
- Auxiliary winches for service of BOP stack
- Auxiliary winch mounted on trolley for movement along main beam
- Ladders and walkways for safe walking to the control area
- Sound and light during movement

F MARINE RISER TENSIONERS

Our riser tensioners provide positive tension to the marine riser and compensate for the relative motion between the riser and the drilling rig.

- Slot opening: 2000 mm² – 3000 mm²
- Qty of tensioner cylinders: 4 pieces
- System tension at null point: 80 – 250 tonnes
- Max design pressure per tensioner: 207 bar
- Nominal (null) pressure per tensioner: 100 bar – 160 bar
- Riser vertical stroke range: 120 mm – 2500 mm
- Hydraulic fluid: Erifon 818 TLP water glycol based

G DIVERTER

Our diverters are unique to the industry in that we have our own proprietary sealing technology and manufacture our own rubber.

- Maintains and diverts wellbore fluids/gases during drilling operations
- Acts to direct the flow of mud returning from the marine riser
- Can be used to control low pressure kicks
- Sizes: 21 ¼", 60 ½", 75 ½"
- Few parts, strong construction, simple to operate, easy to service
- Rugged, reliable sealing element strengthened by steel segments
- Wear bands to prevent metal-to-metal contact

H TELESCOPIC JOINT

Reduce the stress on riser string with our goosenecks that allow floating drilling vessels to move up and down with waves. Available in different models.

- 55-70 ft stroke
- Robust packer assemblies
- Minimal working parts
- Upper flange w/ seal sub
- Inner barrel
- Upper primary packer
- Lower secondary packer
- Tension ring interface

Drillships, Semi-Submersibles and Jackups

I CONFIGURABLE STACK

Space-saving, modular configuration improves accessibility and operational safety while providing a consistent design platform for a fleet of stacks.

- LMRP connector guide funnel is designed to be integral with the upper and spider on the lower stack
- Work platforms have more usable space
- Modular construction
- Ability to build up by using fixtures
- New floating, fixed, non-locking choke and kill stabs
- Better access to BOPs and rams
- Ladder access from the bottom of the stack all the way to the riser adapter

J RISER

We have delivered over 135 miles of riser with superior history in the manufacturing and innovation of this equipment.

- Dog type riser
 - DT-1 – (C class) 1,125,000 lb tension load
 - DT-2 – (E class) 2,000,000 lb tension load
- Flange type riser
 - FT-E – 2,000,000 lb tension load
 - FT-G – 3,000,000 lb tension load
 - FT-GB – 3,000,000 lb tension load
 - FT-H – 3,500,000 lb tension load
 - FT-I – 4,000,000 lb tension load

K RCX PODS

Our next-gen, pod embraces the 4 “R”s: robust, reliable, retrievable and retrofitable. Replaces Gen 4/5 pods, enabling you to modify your current systems.

- Dual retrievable modules
- 143”T x 91”W x 54”D (retrofitable)
- 140 lines/5,000 psi supply
- Regulated pressures
- 12K ft water depth (-20C to 50C)
- 480 VAC single phase input
- 24 VDC solenoids
- Redundant fiber optics Communications to pod
- Redundant ethernet communications to each module
- Modbus sensors
- Water based soluble oil
- Reduced leak paths/function rqmts.

L DEPTH COMPENSATED BOTTLES

The most efficient subsea hydraulic accumulator—maintains its performance regardless of water depth.

- Use in conjunction with NOV shear system
- Provides the lightest weight subsea stack in the industry
- 2 to 4 bottles vs 78 bladders
- 2 to 3 bottles vs 10 pistons
- Most efficient subsea accumulator
- Maintains performance regardless of depth

M 20K PSI NXT BOP

Our latest and most advanced ultra-deep water BOP, capable of 20k psi pressures. We have developed rams with a wider range that allows for fewer cavities.

- 18 ¾” 20,000 psi
- Boltless doors and replaceable seal seats
- Ram position indicators
- 15 ¼” operator: 19.5/19.6 gallons (open/close) – 3,000 psi max
- 23” operator: 53.2/52.4 gallons (open/close) – 5,000 psi max
- Multi rams (4 ½” – 6 ⅝”)
- Shear rams

N RAM POSITION INDICATOR

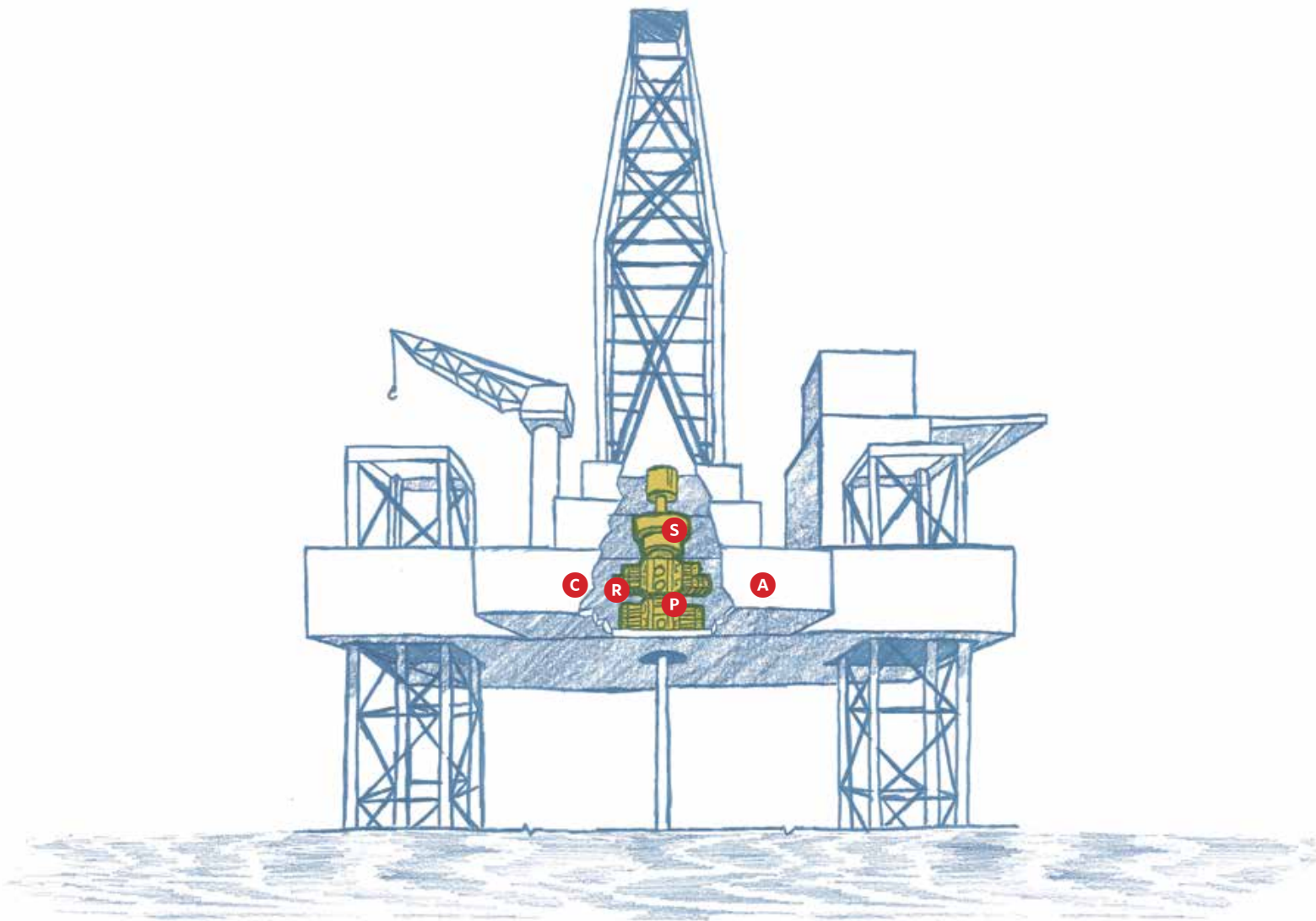
Allows you to visually determine the position of the ram, which can be retrofitted to the existing BOP doors.

- Optional mechanical or electrical
- Cable-operated assembly
- Easy-to-read interface
- Retrofittable to existing BOP doors
- Hyperbaric test: 20,000+ ft water depth
- No external dynamic seals

O RISER LMRP & WELLHEAD CONNECTORS:

Our LMRP connector includes a floating hydrate seal that allows for extreme angle lift off, while maintaining hydrate prevention during operation. Our wellhead connector offers an industry-leading bending load capacity, with a wide variety of optional features to meet your needs.

- Riser LMRP connectors:
 - Bending load capacity: 7.0 mm ft-lbs
 - Preload: 4.9 mm lbs
 - Locking volume: 10.6 gal
 - Unlocking volume: 15.4 gal
 - Maximum service pressure: 15,000 psi
 - Weight: 20,300 lbs
- Wellhead connectors:
 - Bending load capacity: 17.0 VM ft-lbs
 - Preload: 4.64 mm lbs
 - Locking volume: 14.9 gal
 - Unlocking volume: 18.9 gal
 - Maximum service pressure: 15,000 psi
 - Weight: 24,700 lbs



P LOW FORCE BLIND SHEAR (LFS) RAMS

Optimized design reduces the force required shear casing by 50%, improving reliability and extending length of BOP stack deployment.

- Guaranteed two shears per assembly dependent on the shearing design parameters
- Capable of sealing while in hang-off position
- Shearing capabilities 50% less pressure than V-shears
- Temperature range 30F to 300F (-1.2C to +149C)
- New LFS-5 blind shear capable of shearing landing string and casing

Q REMOTE BOP MONITORING

Reduce risk and increase uptime through remote and secure monitoring of a safety critical asset with real-time offshore rig data delivered to you.

- Instant alert if operating beyond predetermined limits
- Automated daily alerts delivered anywhere in the world
- Enhances collaborative decision-making
- BSEE compliant
- 24/7 analyses and guidance from eHawk support centers
- 24/7 access to real-time BOP status and historical data
- Big data analytics performed across the connected fleet

R NXT BOP & NXT-M BOP

Our proven generation of well control systems go far beyond recent incremental changes in the development of BOP design with major enhancements that improve drilling economics.

- 18 3/4", 15,000 psi NXT-M Ram BOP and NXT Ram BOP
- RPI-ram position indicators available
- Patented XT boltless door technology
- Pressure energized door seals
- Replaceable seal cavity and piston wear rings for long service life
- Reversible ram test cavity available
- Low force shear ram technology
- Ultra-temp and critical service and multi-ram
- Lower cost NXT-M option

S SPHERICAL BOP

Custom-molded hemispheres of proprietary elastomer, reinforced with steel segments. Sits in a spherical BOP and compresses during closing, creating a sealing barrier at the interface.

- 18 3/4", 10,000 psi spherical BOP
- Simple, robust and rugged design that is easy to service
- Only 5 major parts
- Wear rings on moving parts for long service life
- Low operating pressure, 1,500 psi and below
- Critical service temp. Range 30F to 250F and 5% H2S
- Square shoulder design for lift ring and platform engagement

Advanced equipment that performs—time and time again—starts with a belief in continuous innovation.

From configurable stacks to low-shock SPM valves, we develop, test and manufacture products that improve efficiency and increase reliability. Every new product innovation and every improvement we make to an existing product helps you respond to the latest challenges and opportunities. Now and in the future.





OCEAN RIG MYKONOS

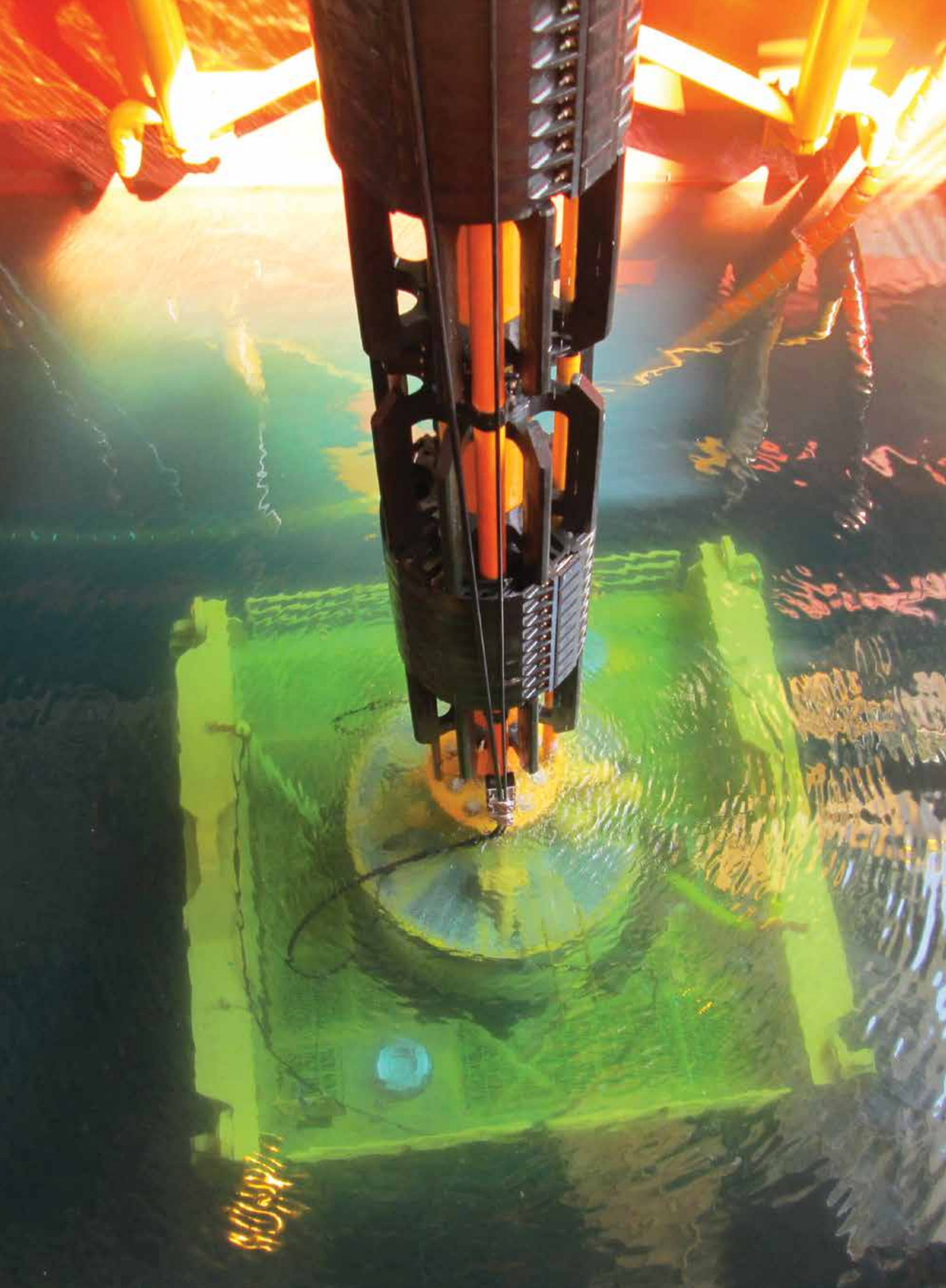
OCEAN RIG COMPANY



Let's raise the bar for future expectations.

Being a good partner means delivering today while preparing for tomorrow.

What challenges will you face as offshore exploration pushes beyond 20K? How can big data and performance analysis improve product reliability? What will be the next innovation that pushes our industry forward? The need to answer those questions—and more—drives us every day. We're continually raising our standards for performance to help you unlock the offshore industry's full potential.



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