The Merlin Control System is Hydra Rig’s next generation of Coiled Tubing Unit (CTU) controls for today’s evolving coiled tubing market. It is a hydraulic powered, computer controlled system that provides unprecedented operational performance and safety for coiled tubing unit operation.

The Merlin Control System is built around the Amphion™ Single Board Computer, a proven, oilfield hardened SBC developed by NOV specifically for use in mobile rig control applications. Multiple touch screens provide complete unit control and monitoring, for consistent unit performance and job results from operator to operator. The system also provides for integrated operation of nitrogen and fluid pumping units for single point job control from the Merlin control cabin.
The Merlin control system is most readily apparent in the control cabin. The cabin is now a "dry" design, with no high pressure hydraulics. Only one electrical umbilical cord is needed to connect the cabin to the rest of the CTU. The interior has been ergonomically redesigned for the new touch screen control console. Interior features include an upgraded operator’s control chair, wrap around solid surface control center, rear bench seat with monitoring station, and purpose-built, ruggedized climate control unit. The cabin shell itself is constructed using Hydra Rig’s rigid foam composite panel shell system and the larger front and side windows provide the operator with excellent job visibility.

- Mundane, repetitive functions are out of the operator’s hands, reducing the potential for operational errors.
- Touch Screen controls with minimal discreet controls for ESD and BOP functions.
- Precise computer control and logic automates auto drill functions for reduced operator fatigue.

- Computer controlled injector chain traction and tension virtually eliminates pipe slippage, and helps protect the tubing string from mechanical damage.
- Programming of safety logic allows the CTU to automatically react with unparalleled speed and precision to changing job conditions that arise during a job.
- Machine and job limits can be preset to protect against damage to critical components and to improve job safety performance.
- Merlin "self troubleshoots." Any failed component, its location and function, is reported to the operator.
- Integrated data acquisition of all job parameters utilizing the CTES Orion and Cerberus DAS allows real time job monitoring, storage, and reporting, as well as remote monitoring.
- Operators can now concentrate on down-hole functions to insure proper job performance.
- Built-in simulator program provides off-well operator training.
The hydraulically driven, fully automated reel, shown left, is based on Hydra Rig's D3000 Drop-In-Drum design. The auto-spooler function controls proper coiled tubing wraps through automated control of the levelwind drive for consistent, even spooling of the coiled tubing on and off the drum. The multifunction, size adjustable counter monitors tubing speed and depth, and is designed to integrate the CTES Argus Tubespec or CT Dog.

The power pack, shown right, is driven by a Caterpillar diesel engine and has a 90 GPM closed loop hydraulic system. Hydraulic lines and all Merlin control cables are stored on reels on power pack and are routed to each Merlin component. On board power generation is supplied by either hydraulic driven or independent engine-driven generator. The power pack has a redundant control console for complete unit control at the power pack in case of emergency.

The Merlin control system is initially installed on the Hydra Rig model HR 680 injector, shown above. The system incorporates computer control of traction, tension, brake state, tubing lubrication, and stripper. Merlin also detects impending chain slippage and auto-adjusts traction pressure, reducing the possibility of pipe damage due to slippage. Encoders monitor chain speed and log injector footage for maintenance. Integrated hydraulic control manifolds reduce the control hose bundle from 15 hoses to 6.
The new NOV CTES OrionSL Life Saver™ acquires, records, and displays slickline operating data to estimate fatigue along the length of a slickline, thereby tracking remaining fatigue life. This tracking helps users avoid costly field failures and optimizes the slickline replacement schedule.

The OrionSL Life Saver operates by monitoring slickline forces and bending events as tools are run in and out of a well. The standalone system records slickline information via an encoder mounted on a cable depth-measuring device. An electronic load cell provides tension data.

**Software Features and Benefits:**

- Real-time SL fatigue calculations help prevent slickline breakage and subsequent fishing jobs
- Acquires, displays, and records depth, tension, line speed, and one additional analog data channel
- High-speed, sensitive tension display detects "tickle" (small variations in tension) when moving past downhole restrictions
- Easy operation: single switch provides "power on and go" data acquisition and USB media storage

**Additional Information:**

- Substantial space saving in subsea rig-up. Overall width decreased by 50%
- Hydraulic ram-change design
- Proven wedgelock design with low friction, quick open feature
- New design manufactured in 7-3/8" bore, 10,000 psi working pressure. Smaller sizes to follow
- Rated to water depth of 10,000 feet
- Designed to API and ISO requirements

To discuss the many advantages of using the OrionSL Life Saver, please contact the NOV CTES Business Development Group at +1 936 521 2200, or stop by Booth #313 at the SPE/IADC 2009 Coiled Tubing Well Intervention Conference.
In-house services at the 62,000 sq. ft. Duncan facility includes:

- Fully dedicated pump shop and cold-end repair facility, well equipped service department with an inventory of commonly used parts for quick turn-around, minor repairs to full rebuilds, complete hose change-outs – troubleshooting, and Engineering support to assist with equipment updates.

Contact Service Manager Joe Slann or Service Supervisor or Paul Richardson at 580-255-4433.
NovaWinch is one of the latest family of containerized slickline units and is available as one piece or modular. Designed for stand alone operation, the unit is self contained and requires no external power source. NovaWinch is proving extremely popular with North Sea customers such as Maersk.

The newly designed TerraTruck family of slickline trucks is proving to be popular with clients such as ENSP in Algeria. Providing the ultimate in flexibility for slickline and memory logging operations, the TerraTruck is suitable for both on and off-road activities and is ideal for operations in desert conditions.

NOV Well Intervention and Stimulation Equipment Group sponsored a Coiled Tubing Equipment Technology Seminar for NOV’s China customers. The Seminar was held in Kunming China and is the first Coiled Tubing Equipment Seminar held in China since Hydra Rig held a similar event in 1996. NOV companies presenting at the two and a half day seminar were Downhole Tools, Hydra Rig, CTES, Texas Oil Tools and Elmar, in addition Sichuan Petroleum Administration gave a presentation on Coiled Tubing Applications being performed in China.

The 2008 Seminar was attended by 80 Chinese managers and engineers from all parts of China. There were 23 Chinese oilfield companies (customers) in attendance. A bus tour of cultural sites near Kunming, which is at 7,000 ft. elevation, was provided for the attendees and presenters. Brad Hastad, Group Far East Sales Manager advised the Seminar was graded as a huge success by both the Chinese attendees and the NOV presenters.
NOV Rolligon has completed development of its computer based Frac Control System. Utilizing the existing CAN (Controller Area Network), multiple frac units can be linked and controlled from a single remote operator station. Use of this system now enables one, experienced frac operator to effectively control a complex, multi-unit frac job.

**PC Based Frac Controls:**
- Control up to 24 Frac units from a single control station using high speed CAN technology.
- View individual unit data and combined data from entire frac spread quickly.
- Control multiple units in unison using Rolligon’s group control and shutdown feature.
- Network entire frac spread to reduce setup time and lengthy cabling.

Pictured right is a truck mounted fluid pumping and heating unit manufactured by NOV Fidmash. These purpose built units are rapidly becoming the standard for coiled tubing operations that require heated fluid when operating in arctic conditions.

Pictured left is a truck mounted nitrogen pumping unit recently supplied to a customer in Russia. With a 180,000 SCFH skid mounted nitrogen unit supplied by NOV Hydra Rig in Canada, NOV Fidmash unitized this joint project on to a Russian carrier along with a tank and climate controlled cabin for service in Siberia.
NOV CTES
David Myrick moves from Aberdeen Scotland to Conroe as NOV CTES Salesman

NOV Hydra Rig
Chelsea Power is promoted to Assembly Manager at NOV Hydra Rig Calgary.

Technical Handbook Update:

NOV Group Coiled Tubing Handbook is available on CD by contacting Gloria.Butchard@nov.com

NOV Group Wireline Handbook is available on CD by contacting Karen.Walker@nov.com

NOV Well Intervention and Stimulation Equipment 2009 Trade Shows

-SPE/ICOTA - Woodlands, Tx. March 31 - April 1
-OTC - Houston, Tx. May 4 - 7
-Brazil Offshore, Macae June 16 - 19
-MIOGE, Moscow June 23 - 26
-Offshore Europe, Scotland September 8 - 11
-LAGCOE, Lafayette October 27 - 29
-SPE Asia Pacific, Jakarta August 4 - 6
-Int. Oil & Gas Conf, Beijing (Date pending)

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