

DEEP HOLE DRILLER

AN ATLAS COPCO PUBLICATION FOR THE DRILLING PROFESSIONAL — NO. 3 / 2010



RD20 reaches new depths in CO

Breaking from tradition with the TH60

Page 8



Driller prefers deck engine design of T3W

Page 11



DTH hammer drilling is high-tech business

Page 20



Atlas Copco

EDITORIAL



This issue of Deep Hole Driller highlights the differences and similarities of the TH60 and the T3W. There was a time when these rigs were quite different drilling platforms, yet today the drilling performance and operation is very much the same.

For the first time in decades, a TH60 was sold into Pennsylvania, a region that has more T3W drill rigs than anywhere. I am one of the lucky individuals who accompany a rig at startup. I see first hand what drillers and crews like about the TH60.

Those who have not looked at the TH60 because of distant memories, I can tell you: this is not your grandfather's TH60.

If it's not obvious already, I admit that I am a fan of the TH60. The TH60 is the drill of the future in this class. Deck engines don't offer the power necessity they once did, and in first world countries like the United States, tier 4 regulations have made a deck engine an expensive option.

The TH60 is much more adaptive to add-ons and options and it runs much quieter for the crew and the community. This rig can be outfitted with options, such as a bigger mud pump or wire-line winch for more drilling versatility.

I can't miss this opportunity to talk about the Predator from a product support perspective. The Predator Drilling System is Atlas Copco's new 200,000-pound hook-load rig for the oil and gas industry. This is an exciting rig.

This past week I was with drillers who had never stood on the platform of the Predator and, within a half hour of watching, were comfortable with the advanced technology and ease of operation. The Predator is truly advanced drilling performance. If you have the opportunity to check this rig out someday, I recommend you jump at the chance.

Ray Kranzusch
Deep Hole Product Support
Western Region
Atlas Copco

CONTENTS



3	FEATURES Colorado company uses the RD20 to reach gas previously unobtainable
7	Apples or Oranges - Drilling company owners compare the TH60 and T3W
8	Pennsylvania drilling company mixes its fleet with a TH60
11	California driller prefers the T3W's deck engine design for his location
14	Oil & gas drilling company reviews the QLX hammer
16	Atlas Copco drill rigs help get to Panama's clean water
18	Down-the-hole hammer drilling is high-tech business
21	IN BRIEF Atlas Copco products and news
22	MARKETPLACE Atlas Copco Used Equipment



DEEP HOLE DRILLER IS PUBLISHED BY

Atlas Copco Drilling Solutions
2100 N. First Street
Garland, TX 75040
Telephone:
+1 972-496-7240

PUBLISHER Ulf Linder
ulf.linder@us.atlascopco.com

EDITOR Scott Ellenbecker, scott@ellcom.us
Editorial production, design and layout:
Ellenbecker Communications
30120 State Highway 264
Round Lake, MN 56167 USA
507-945-0100

Free Subscriptions: www.deepoledriller.com
Changes to Address: DHD-Subscription@ellcom.us

FREE REPRODUCTION OF ARTICLES

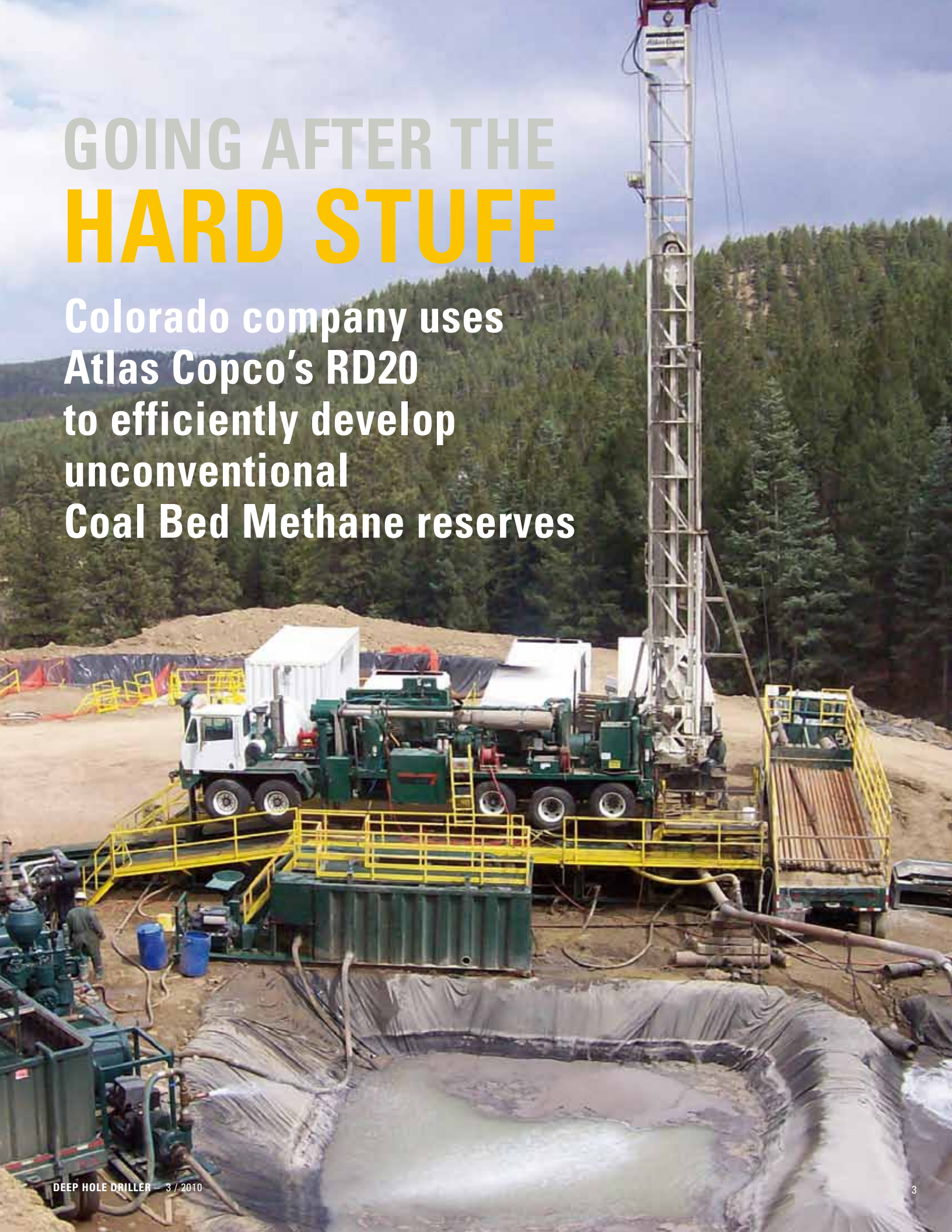
All product names such as Predator and Secoroc are registered Atlas Copco trademarks. However, all material in this publication, including the product names, may be reproduced or referred to free of charge. For artwork or additional information please contact Atlas Copco.

SAFETY FIRST

Atlas Copco is committed to comply with or exceed all global and local safety rules and regulations for personal safety. Some photographs in this magazine may, however, show circumstances that are beyond our control. All users of Atlas Copco equipment are urged to think safety first and always use proper ear, eye, head and other protection as required to minimize the risk of personal injury.

GOING AFTER THE **HARD STUFF**

Colorado company uses
Atlas Copco's RD20
to efficiently develop
unconventional
Coal Bed Methane reserves





“The topography out here is really rough. We routinely deal with inclines in excess of 10%. The RD20 is exactly what we need for this depth and mobility.”

Bill Chase,
Pioneer's Drilling Superintendent

The Raton Basin stretches from southern Colorado to northern New Mexico, running about 30 miles long and 30 miles wide. Although this coal field has been an energy source for over 100 years and has a colorful history, in recent years the energy has come more from methane gas in the coal beds than from the coal itself. Extracting coal bed methane from this formation requires an adventurous climb through the mountains and a drilling method that has been customized for the formation.

Pioneer Natural Resources is a large independent energy company with drilling operations in the Raton Coal Basin. Pioneer has a vertically integrated operation in the basin whose primary business is gas production. In-house services include a drilling rig, location construction equipment, pipeline installation equipment, cementing services, fracking services, workover rigs and a maintenance department—most of the major services required to put a hole in the ground and complete a well.

“Because we are out here where there are not a lot of support companies for the

drilling industry, we need everything to keep the drilling operation moving,” said Pioneer’s Drilling Superintendent, Bill Chase.

Pioneer utilizes an Atlas Copco RD20 range III drill rig for their drilling operations. Although the company has deployed the rig outside the Raton Basin in the Kansas and Texas Panhandles, the RD20III has proven itself as the drill of choice because of its mobility and versatility in the mountains.

“Most other rigs are just too big to work in the upper elevations,” said Chase. “Gas well depths can range from 600 to 4,000 feet, depending on the elevation. The RD20 works well because the roads to reach drill sites have steep inclines and switchbacks. The topography out here is really rough. We routinely deal with inclines in excess of 10%. The RD20 is exactly what we need for this depth and mobility.”

As for versatility, the rig is outfitted and plumbed to drill using multiple methods. The rig setup includes equipment for air hammer drilling, rotary mud drilling, and aerated water drilling using a down-hole »

motor with a PDC bit.

Rig manager Robbie Revas said his crew enjoys air hammer drilling. They operate a Hurricane B7-41/1000 booster that, combined with the 1250 cfm rig air and 1150 cfm auxiliary compressor, supplies 2,400 cfm at 1,000 psi.

Driller Tony Caldarelli said, “Air hammer drilling is my favorite because it’s faster. I love the hammer because I can drill 7 7/8 inch at 200 feet an hour—that’s about 6 1/2 to 7 rods an hour. I can finish a 2,400-foot hole, move and begin setting conductor on the next hole in 48 hours.”

Chase said an aerated water drilled well to 3200 feet will drill at 160 feet per hour and consume a four-day cycle time from spud to spud.

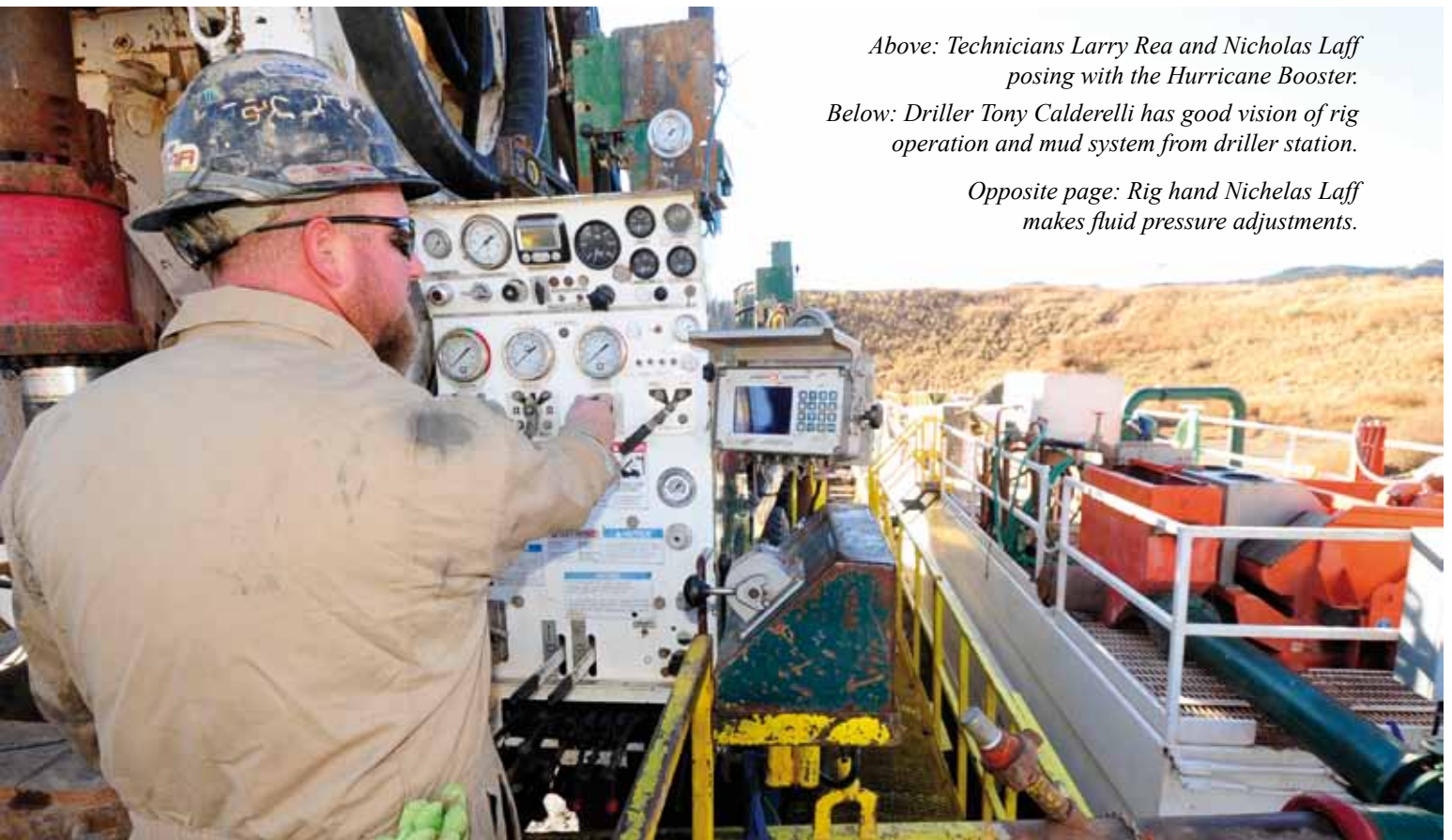
Depending on the method of drilling, it takes up to 14 loads to rig up onsite. Revas said it’s “like assembling a jigsaw puzzle.” The rig, doghouse, pipe trailer and trailer-mounted auxiliary equipment are placed close together, so hinged or retracted catwalks give the entire work area an elevated platform. This safety measure requires minimal climbing from the ground to the work area. Motorman Larry Rea likes that the booster and other equipment are enclosed to protect the maintenance crews from the weather. »



Above: Technicians Larry Rea and Nicholas Laff posing with the Hurricane Booster.

Below: Driller Tony Calderelli has good vision of rig operation and mud system from driller station.

Opposite page: Rig hand Nicholas Laff makes fluid pressure adjustments.






The drilling tools used in this area are typically an 11-inch DTH air-hammered surface hole 250 to 1,000 feet, depending on well design. Pioneer uses Atlas Copco's QL120 DTH hammer for its surface work. The well is then cased and cemented with 8 5/8-inch casing. The well will be drilled to total depth with a 7 7/8-inch bit and cased with 5 1/2-inch casing. For DTH hammer drilling, Pioneer uses an Atlas Copco Secoroc TD60 DTH hammer.

As anywhere else, the formation dictates the method. Here that could include coal seams, sandstone and old lava flows—many geological variables that could cause the loss of circulation. As a result, even though DTH hammer drilling is popular with the crews, aerated water drilling is also used on the deeper wells. Pioneer has redesigned the piping on the deck to handle both air and fluid.

Chase said, "Aerated water drilling is what we do more of today as the development moves to the higher altitudes."

He pointed out that aerated drilling is essentially underbalanced drilling with a mixture of water, foam and air instead of mud. There is no set amount of air volume or pressure but, Chase said, they operate at 300 to 700 cfm and 500 to 600 psi. A choke valve is used to adjust the mixture: "The important thing is to inject enough mix to allow the hole to circulate."

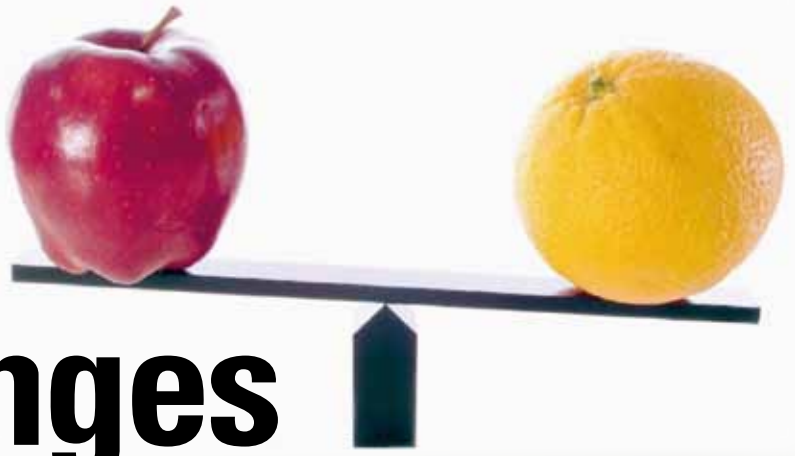
Chase mentions the abundance of natural gas that is a clean-burning fuel source for homes, industry and automobiles: "Drilling methods continuously adapt to meet the challenges of reaching the CBM resources. We couldn't do this 10 years ago. I think we've taken the RD20 to a new level. Natural gas is today's green energy, and now we can go after it ways that was not available in years past." 



Above: Aerated drilling is underbalanced drilling mixing water, foam and high pressure air.

Left: Driller Tony Caldarelli and Rig Manager Rob Revas take a minute to pose for a photo.

Apples or Oranges



Drilling company owners compare their years of experience with the TH60 and T3W



Atlas Copco's TH60

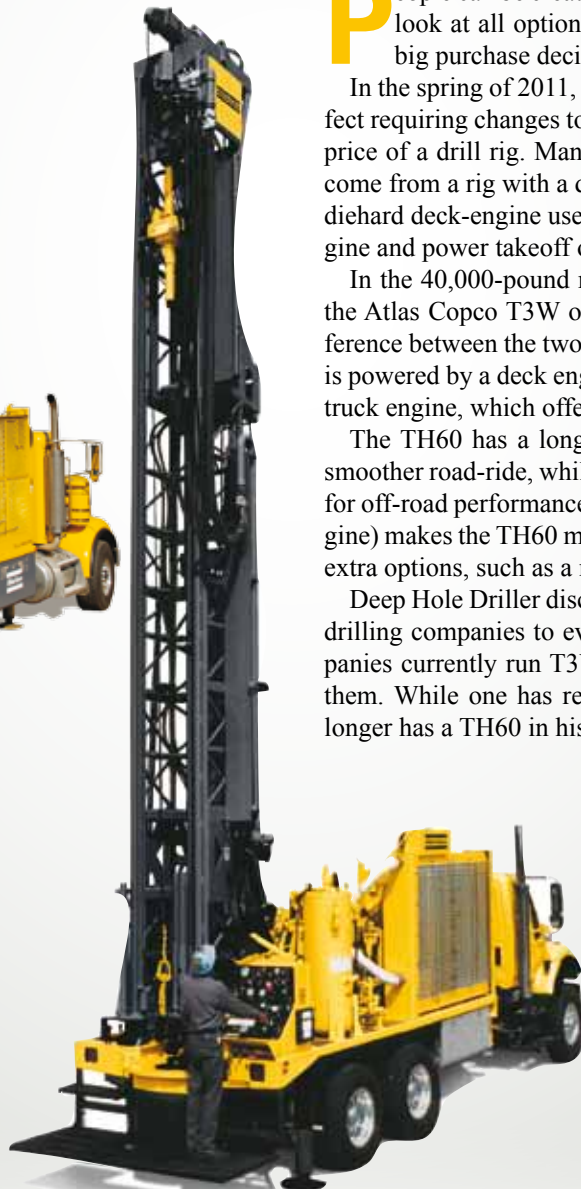
People can be creatures of habit, so it's good to occasionally look at all options from a new perspective when making big purchase decisions...and a drill rig is a big purchase.

In the spring of 2011, Tier 4 engine regulations will go into effect requiring changes to deck engines that will greatly affect the price of a drill rig. Many drillers need or want the benefits that come from a rig with a deck engine, but many drillers who were diehard deck-engine users have found success with the truck engine and power takeoff options.

In the 40,000-pound rig class, the choice for many drillers is the Atlas Copco T3W or TH60 model drill rigs. The major difference between the two is that the drilling operation of the T3W is powered by a deck engine while the TH60 is powered with the truck engine, which offers a few other variables.

The TH60 has a longer chassis than the T3W, making for a smoother road-ride, while the T3W offers a tighter turning radius for off-road performance. The open deck (because there is no engine) makes the TH60 more appealing for maintenance or adding extra options, such as a mud pump.

Deep Hole Driller discussed the personal preferences with two drilling companies to evaluate the benefits of each. Both companies currently run T3Ws and have extensive experience with them. While one has recently purchased a TH60, the other no longer has a TH60 in his fleet. ☉



Atlas Copco's T3W



BREAKING WITH TRADITION

“The TH60 goes up the mountains as fast as it goes down.”

Dave Ortman
Stackhouse & Sons driller

Pennsylvania drilling company, Stackhouse & Son, mixes its fleet with a TH60

Dave Stackhouse, the son in Stackhouse & Son, Inc., has been a T3W user since the mid-90s. Recently Stackhouse broke from tradition, purchasing an Atlas Copco TH60 drill rig to go with his two-year-old T3W. “I’m happy with one of each,” he said. The new rig he purchased has a few different options, giving him added flexibility on the job site.

“We had Atlas Copco mount a hydraulic welder to the rig to give us welding capability when we couldn’t get the tender truck close enough,” said Stackhouse. “This is a great add-on that I would recommend to anyone because you don’t need extra length on the leads.”

Having enough working room was also a

reason Stackhouse went with 3 ½-inch pipe. All previous rigs he has run with 4 ½-inch drill pipe, but he decided to try the smaller diameter pipe, which allows him to have 600 feet of onboard pipe versus 400 feet. “Having smaller pipe gives us 200 feet more depth in the box and carousel. Sometimes it’s hard to get extra pipe into the tight drill site.”

With the 3 ½-inch you get 9 versus 7 drill rods in the carousel for faster drilling. The shallow wells, like the 167-foot well photographed, can be drilled to depth without pulling a stick from the box. The well produced 15 gpm, which is a good well in this area.

For the guy at the controls, driller Dave Ortman was skeptical at first about running 3 ½-inch pipe and has had to adjust his drilling technique. “With the T3W, I torque up the 4 ½-inch drill pipe to 3,500 lb at the top and 1,500 lb at the bottom. The 3 ½-inch can’t take that. I torque to 2,300 at the top and 1,200 at the bottom.”



Ortman is an expert on the T3W rig, with years of experience. The recent conversion to the TH60 has come pretty easily. He said, "I think they drill exactly the same, although I prefer the over-the-road handling and quieter operation on the platform of the TH60."

There is no lack of power with the TH60, either. The International truck features a 600-hp Cummins that Ortman said has more than enough power for the Pennsylvania mountains. With a grin, Ortman said, "The TH60 goes up the mountains as fast as it goes down."

Stackhouse agreed with Ortman, saying, "600 hp is a hell of a difference from the [older] 380 horsepower engine."

Stackhouse owned a Cyclone TH60 in the 1980s. "Back then the cotta box (power take off) was an issue...always a problem." Some called it a "slosh box" because >>

Right: A hydraulic welder is a popular option with Stackhouse's crew.





Above: Dave Stackhouse works in the office with his daughter, Tisha Book. The family business involves mostly relatives.

Right, from left: Drill Helper Shaun Hummer, Atlas Copco sales representative Dean Woodward, and Driller Dave Ortmann.

of its loose characteristics. “The Fabco box is a whole lot better,” Stackhouse continued.

“The cooler couldn’t keep up, either, on the Cyclone drill. It was behind the cab and couldn’t get cool air,” he said. Stackhouse purchased his first T3W in 1989. “That was a home run for us. We loved it, especially getting into tight jobs.”

Since the mid-90s, when the company sold its last T4W, the T3W has been their only model. “The T4W is cumbersome and expensive, but great when on a really bad hole...it’s indestructible,” he said. “With the new TH60,” Stackhouse said, “even with the extra 200 feet of pipe, it weighs a thousand pounds less than his T3W.”

Pennsylvania drilling conditions

The formation in this part of Pennsylvania is sandstone and shale with sand and gravel on top. When setting surface casing, Stackhouse said they often have to drive the casing because the hole collapses. The formation is also very unpredictable.

“The rock is often tight and doesn’t give up much water. We may drill 600 feet to get one or two gallons a minute.”

Hole depths vary widely because of the mountainous elevations. Valley floors can be less than 200 feet, while mountain wells can go several hundred. Stackhouse likes the auto cable tensioner feature because now they don’t have to tighten the cables. “Before, we were tightening the cables after every other 700- to 800-foot hole.”

For holes deeper than 300 feet, it’s common for the company to hydro-frac the well. “Ninety-five percent of the time, we will increase flow,” said Stackhouse.

Water flow fluctuates greatly in the region. The increase in geothermal projects has given them a better picture of the for-

mation. “Two holes 15 feet apart could be totally different. One will produce 20 gallons per minute and the other is dry. This variation is more frequent than we thought it would be.”

For Stackhouse, the TH60 gives him all the power he needs with the ability to be more versatile. The TH60’s open deck makes it easier to work on and maintain, and, geographically, it will go anywhere. Stackhouse said, “No two holes are the same.” And now, with the TH60 and T3W team, he is confident he has the right rigs for any job. ☉

IF THE SHOE FITS

The T3W rig fits the environment and requirements for this northern California Driller

Over the years, Greg Peters said he has drilled over 14,000 wells in California's Sierra Foothills east of Sacramento. The average depth is about 400 feet, but many wells have been in the 1,000-foot range. At one time, his company ran as many as six rigs including four TH60s, a T3W and T4W drill. Today, they run two T3Ws and one T4W. "I prefer the two engines of the T3W," said Peters.

Fuel consumption is better on all Atlas Copco T3W and TH60 rigs built since 2007 because of the introduction of the electronic air regulation system (EARS) and on demand hydraulics. EARS allows the operator to idle back the air when tripping the hole, which saves on fuel.

As compared to the old-style rig, Peters said the newer generation of the T3W is a better rig overall. "It makes more holes and trips faster with the same compressor." He also mentioned the big sheaves that reduce maintenance by extending cable life. "Before, we would replace the cables once or twice a year. The newer T3W has run for the last year-and-a-half, showing no wear on the cable. The fact that they're now greaseless is nice, too."

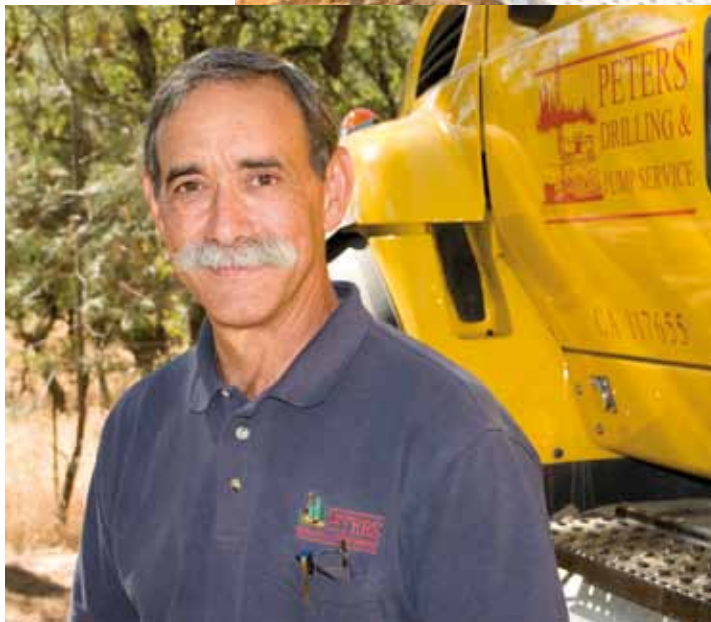
The crew on the new T3W prefers this rig too. In addition to the CD player, operator Leon Fletcher said the comfort features designed into the truck make a difference. >>



“ You can't beat the TH60's open table design for setting casing, but I prefer the two engines of the T3W

Greg Peters

Owner, Peters' Drilling & Pump Service



Greg Peters, owner of Peters' Drilling & Pump Service (left), said the company has tried a lot of other hammers and keeps coming back to the "bullet proof" Atlas Copco QL60.




Tight turns and mountainous conditions also make the T3W a preferred rig for maneuvering into difficult drill sites. “The electric mirrors make it easy backing into some of the tight sites and the rig runs up and down the road like a Cadillac.”

Fletcher also cited some drilling operation features he likes better. “I definitely like the air control when developing a hole. The draw works are perfect, and the high speed winch saves time... and I like the feathering [control] on the winch.”

In this part of northern California, Peters feels the Atlas Copco Secoroc QL60 down-the-hole hammer works the best when air-hammer drilling in the 6-inch class. Everything is rock, while overburden, unconsolidated or alluvial formations require Symmetrix near the surface. “We drill most wells with 6 1/8-inch button bit, but also do some 5- and 8-inch wells,” said Peters. “We’ve tried a lot of other hammers and keep coming back. The [Atlas Copco] QL60 is bullet proof. We get 2,800 to 4,000 feet on a bit with good bit management,” he said.

Peters orders his rigs with the 1070 cfm compressor, versus the 900 cfm option. “I like the 1070 better for cleaning the hole, which wears less on tooling,” he said.

Greg Peters has found success with the rig that fits his environment and technical needs: the T3W. 

Drilling manager Greg Steffen and journeyman driller Leon Fletcher discuss drilling an irrigation well in the foothills of Central California. The completed 360 ft deep well produced over 60 gpm—excellent results from the area’s hard rock formations.”

“ The electric mirrors make it easy backing into some of the tight sites and the rig runs up and down the road like a Cadillac.

Leon Fletcher

T3W operator, Peters’ Drilling & Pump Service







GREAT EXPECTATIONS

From left, Drilling Operations Manager Chris Ratliff with Gasco, Tony Funk, Store Manager with Keystone Drill Services and Josh Marcus, Product Specialist Atlas Copco DTH Equipment.

Oil & gas drilling company reviews the new QLX hammer

“It’s about making sound engineering changes. I’m confident Atlas Copco and Keystone will work with us to engineer better products, it’s a win-win... and it sets the bar for others to have something to work towards.”

Chris Ratliff, Gasco Drilling Operations Mgr.

Atlas Copco has introduced a new down-the-hole hammer that will totally change production expectations. The QLX series down-the-hole hammer takes the best attributes of the two most popular hammers used for deeper down-the-hole applications, the Atlas Copco Secoroc TD60 and QL60, and puts them together in a new design. With this introduction, customers will experience the durability of the Quantum Leap series hammer and the speed of the Total Depth series hammer.

Chris Ratliff manages the drilling operations for Gasco Drilling, Inc. of Cedar Bluff, Va. Gasco is a footage-compensated, contract drilling company in the coal bed methane and natural gas industry of Virginia. Because of the performance-driven compensation structure, Ratliff’s philosophy in trying new things is geared to adding speed and performance to his drilling operation. He said, “I’m a sucker for something new and don’t mind being a guinea pig if it makes sense.”

Ratliff has worked with tooling providers in the past to develop new products. “If it passes the intelligence test, it’s a win-win

for us to work with Atlas Copco and our distributor, Keystone [Drill Services], to be better.”

Ratliff is very familiar with the Quantum Leap and Total Depth series hammers. “When the TD hammer came out, we saw a 30 percent increase in performance over the QL hammer, but it has had problems with the rubber check seal.

“Drillers don’t like coming out of the hole, especially if the problem is the hammer. I have to weigh performance with dependability when selecting a hammer. It could be better to get less speed if it means staying in the hole longer,” continues Ratliff.

“The TD60 hammer gets the best penetration rate by far,” according to Ratliff. “It tickles me to death to get 180 to 200 feet an hour. But if a driller has to trip because of a hammer problem, he’s not so happy.”

Ratliff says he has really good crews who share his philosophy for trying new things. He complements his guys, saying “They are very receptive to exploring new products.” He also speaks with pride that his crews can trip at 1,200 feet an hour and will try new things to be better.

Ratliff said, “They like to challenge themselves and get the most from a tool. Then they give good feedback to the performance of that tooling.”

Keystone Drill Services manager Tony Funk said, “They push us to give them better service.” Keystone provides tooling, but also communicates daily with the customer and Atlas Copco’s engineering department. They look at everything from hammer performance to bit wash. “If we can offer assistance, we are there.”

Ratliff agrees, “It’s about making sound engineering changes. I’m confident Atlas Copco and Keystone will work with us to engineer better products. It’s a win-win... and it sets the bar for others to have something to work towards.”

Testing limits

The bar has made a big jump with the QLX series hammer. Ratliff said, “I didn’t think it was possible to make a hammer that would penetrate faster than the TD, but the QLX60 adds 10 to 15 percent. Ratliff credits some of this increase in speed to the QLX’s smoother operation and what he calls “less erratic behavior.”

With the speed that came with the TD hammer, the tradeoff was a propensity to have maintenance issues. Ratliff said, “The new QLX reduces downtime by 30 percent. Its reliability is similar to the QL hammer.”

For Ratliff, this overall increase in speed and decrease in downtime results in greater productivity. The advantage of greater drilling speed is keeping ahead of the water. “Most of the time we drill in a dry hole, which adds to productivity,” said Ratliff.

A slower hammer consumes much less air which makes cleaning a wet hole difficult. This reduced performance lowers the chances of “out running” the water influx. A water filled hole would result in adding a compressor or booster which increases fuel usage. Another option with a water-filled hole is to change drilling methods to a tri-cone, which would result in slower drilling. Changing drilling methods also wastes time. “I don’t like coming out of a hole unless I’m TD on a hole,” said Ratliff.

In this area, coal-bed methane wells average 2,000 feet, whereas conventional gas wells could go more than 7,000 feet. The average conventional well is 5,500 feet.

There are great expectations for the new QLX hammer, but for Gasco and Chris Ratliff, it’s passing the test. ☉

Operations Manager Chris Ratliff holding the Atlas Copco Secoroc QLX 60 hammer.





CLEAN WATER FOR PANAMA

Atlas Copco drilling equipment used for community development

The Panamanian government supports the water needs of its people with two development entities. One is the Institute of Water & Infrastructure (IDAAN). The other is the Ministry of Development (MDA). They both use Atlas Copco drilling equipment to accomplish this goal.

Supervising manager for rig maintenance in Panama, Nancy Gaitan, oversees both IDAAN and MDA fleets: three T3Ws, four TH60s and three TH10s. Although some of the fleet is aging, including a 26-year-old TH60, IDAAN recently took delivery of the three new T3Ws.

Today drilling equipment in Panama is supported through the efforts of a newly opened Customer Center managed by Business Development Manager Hugo



From left to right: Ivan Cedeno Chong, IDAAN Chief of Drilling; Villegas Arias, IDAAN Director of Administration; Nancy Gaitan, IDAAN Maintenance Manager; Hugo Arce Sanchez, Atlas Copco Business Development Manager, Central America & Caribbean; and Ivan Tejera, TIESA Sales Representative.

“ I’m very happy with the performance of the new drills. Like anything new, there were small issues at first, but now all is perfect.”

Nancy Gaitan, Supervising manager for rig maintenance

Arce. Arce also oversees all market growth throughout Central America and the Caribbean.

Arce is focused on training highly skilled technicians that will support the ongoing development of Panama: “The current expansion of the Panama Canal has brought growth to the region, and we are committed to the prosperity of Panama.”

Drilling Conditions in Panama

Environmental factors weighed heavily in the selection of which rigs would work best for Panama. Panama is a very rugged country, and the T3W will go anywhere. The rig they chose needed to drill to 1,000-foot depths and handle down-the-hole hammers up to the QL120.

A lot of the drilling is done for community projects. The well under development in the photograph was designed to support 100 residences, with a growth capacity to 500. “This is a common scenario,” said Director of Administration Mr. Villegas. He points out that the plan is to provide clean water to all communities in Panama.

Chief of Drilling Ivan Cedeño said the minimum water flow they want to see on a well is 30 gpm. Normal procedure involves flow testing the well after drilling and again at 72 hours to ensure consistent performance. The well will also undergo tests to analyze the chemical composition of the water.

Drilling the well is just part of the pro- >>



The well pictured above now supports 100 residences with 500% growth capacity — just one of the many wells installed with the newly acquired T3Ws to keep up with a surge in the region’s market.

cess. Developers at this site ran water lines to each home. A 500-gallon gravity tank maintains a constant supply to the village.

Cedeño said the geology throughout Panama requires both mud and air drilling methods. This site, 8 km from the Pacific coast, presents a common formation for this region. The surface is a heavy loam to clay, then consolidated sandstone, and finally igneous rock.

The well photographed here was clay to 20 m (60 ft) then another 20 m (60 ft) of consolidated sandstone and rock. The full 40 m was drilled at 10 inches in diameter and cased with 8 inch PVC.

It's common here to start drilling with mud and a tricone then switch to air. IDAAN purchased Atlas Copco Secoroc tricone bits in 9 7/8- and 12-inch diameters and DTH button bits in 7 7/8-, 9 7/8- and 12-inch diameters. They selected Atlas Copco Secoroc Quantum Leap series hammers for air drilling, including a QL60, QL80 and QL120. The QL gets the best penetration and has the longest life in this formation.

IDAAN wants to keep all Atlas Copco products on site so there is one source for service and support. In addition to drilling consumables, they purchase parts and service items from Atlas Copco. Atlas Copco is also supplying a complete training



Workers near completion of the numerous wells of an IDAAN initiative to supply clean drinking water to all communities in Panama. Geology throughout the area required both mud and air drilling methods to penetrate the various layers of heavy loam and clay, consolidated sandstone and igneous rock.

program and service plans to ensure the drillers get the most from the new drills, and they are working at optimum performance levels.

Nancy Gaitan, who has been with Panama's water development program for 20 years, appreciates the support she receives from Atlas Copco. "I'm

very happy with the performance of the new drills. Like anything new, there were small issues at first, but now all is perfect," she said with confidence. ☉

Expanding Atlas Copco's support for Central America



Dignitaries including Robert Fassl, President of Atlas Copco Drilling Solutions (3rd from left) preside over the ribbon cutting of the new downtown Panama City Customer Center. The Center provides prompt regional service to Central America and the Caribbean.

executives from neighboring Mexico and Europe. "I don't know why we haven't been here before," said Fassl.

Fassl sees Panama as a central location for better support for the region. "With the Canal expansion I see only opportunity for the people of Panama."

Business Development Manager for Panama, Hugo Arce said, "As a Peruvian supporting the region, I have been coming to this area for Atlas Copco for a long time, I'm excited about the additional support we will be able to provide our customers."

Recently Atlas Copco opened its Customer Center in Panama that will act as a central support location for Central America and the countries of the Caribbean. Much growth in water development, infrastructure and mining is underway in this region.

To mark the occasion, a ribbon cutting was held at the new offices in downtown Panama City and a gala was hosted for customers of the region at the Intercontinental Hotel. The festivities brought nearly 200 customers and their guests from many of the countries represented by the new Customer Center.

Dignitaries included Robert Fassl, President of Atlas Copco Drilling Solutions, the product company that builds waterwell and blasthole drills and ex-

Atlas Copco introduces new QAS variant diesel generating sets



In response to the basic power demands of the markets outside Europe and North America, Atlas Copco has launched an extra variant of QAS generators with standard specifications. This new version, the QAS flx is ideal for all kinds of heavy-duty applications like rental, construction, mining and shipyards. It will be available in 50 and 60 Hz.

The Atlas Copco QAS range of portable generators has been designed for fast, easy and safe transportation and on-site handling on virtually any unprepared surface. The QAS range has a proven track record and already includes a wide variety of models rated between 14-571 kVA. The standard specifications of the QAS flx variant are more basic than others of the QAS range. Starting from these standard configurations, the end-user can customize options to meet individual power demands. This new variant of QAS generators will first come in the 13 to 45 kVA models, adding more models later.

Housed in a noise canceling enclosure made from zinc plated steel and painted with powder coating, the QAS range is ideal for applications in noise sensitive areas. The enclosure also provides optimum resistance against corrosion ensuring that it remains in good condition and retains the highest possible resale value.

Options

The new QAS flx will come with an extensive option structure to enable customers to design the most suitable generating set for their application. Heavy-duty, dual stage air filtration with safety cartridge and dual stage fuel filtration with water separator, earth pin and battery switch and charger are all available as options. Also available are a spark arrestor, air inlet shut down valve, coolant heater, quick couplings for an external fuel tank, a trailer and Cosmos.

Atlas Copco part of international effort for water quality

Twenty-six years ago, a severe drought in Peru inspired Atlas Copco as a corporation to help the plight of the thirsty. Rather than just donate money to a cause, Atlas Copco enlisted contributions from its employees and formed Water for All. The company organization is funded through employee contributions, which Atlas Copco matches. The motto of Water for All is, “Clean drinking water is a basic human right.”

Atlas Copco, among other things, is a manufacturer of water well drilling equipment and related accessories, so its employees see and learn about water issues more than most people. Part of Water for All’s mission is to “help people to help themselves.” Water for All prefers to use simple techniques when working on water projects, teaching local people how to work hand pumps and how to protect the natural springs for future water quality. Water for All wants the end users to take part in and have ownership of the project. This helps ensure long-term success.

Atlas Copco North America has made fundraising efforts and expects to contribute to a specific project this year. Chris Heap, vice president of Human Resources at Atlas Copco Drilling Solutions, said, “We look forward to being in a position to fund a project. We can look at it and say, ‘That one’s ours.’”

Heap serves as the chairman of the Water for All Committee in the U.S. Heap said he’s been impressed with the generosity of Atlas Copco employees, especially during a time when many charitable donations are down. Along with Atlas Copco North America, Atlas Copco India and China are also members of Water for All.

Water for All has supported water well work around the world from Afghanistan to Peru. Installing water pumps in schools and villages and protecting natural springs has created sustainable water supplies for more than one million people.

Water for All worked in Malawi in southeast Africa. Water for All worked with the Adventist Development and Relief Agency to drill and dig for water in villages surrounding the Malamulo Hospital in the Mulanje district. This provided much needed access to water in an area where an average 1,600 people had to share one water well and walk long distances to get to it. Now, every village in the area will have its own well and water pump, meaning just 250 people have to share a well.

Malawi has a booming and young population; two out of every three residents are younger than 20. Contaminated water contributes to the spread of diseases such as cholera that can lead to an early death. One in five children dies before age five. Cholera and hepatitis are commonly found in drinking water that doesn’t come from good wells.

Over a billion people worldwide lack access to clean drinking water.



Down-the-hole hammer drilling is a high-tech business

There is occasional ribbing between drill rig salesmen and tooling salesmen: what's more important for making a hole, the drill rig or the rock drilling tool? In reality, it's like the chicken and the egg question. You can't have one without the other. On whichever side of the argument you fall, it's clear that Atlas Copco has the most advanced engineering departments for both drill rigs and rock drilling tools.

Atlas Copco's Secoroc Rock Drilling Tools (RDT) division separates its engineering teams by product lines: Down-the-Hole, Rotary and Top Hammer. In total there are 80 engineers around the world focused on making tooling better, so drillers are more productive and the cost per foot is reduced.

The Secoroc down-the-hole (DTH) hammer engineering group has 25 engineers at facilities in the US, Sweden, China and India. Being close to these local markets is a key strength of the DTH group, while having the ability to collaborate with engineers from around the world infuses global knowledge and perspective into each project.

It's this close-to-the-market communication that's driving the innovation in DTH products. Global collaboration and communication is critical to ensure that know-how and knowledge is shared. For the customer, it's this global effort that offers solid results.

Computer advantage and practical testing

A core competency at each of these four engineering centers also ensures best practices are shared with all groups. For example, the research and development laboratory located in Roanoke, Va., continually exchanges knowledge with the simulation technology group located in Fagersta, Sweden.

The computer simulation of DTH hammers working in virtual reality allows engineers to test the hammer concepts using tens of thousands of combinations and variables before the first prototype is ever made. The addition of computational fluid dynamics



T.J. Plunkett, Atlas Copco's Engineering Manager for Secoroc DTH Products, at the Roanoke, Va., facility. Engineers at Roanoke test a design's simulated predictions, proving its fluid dynamics, wear, and performance characteristics prior to production.

(CFD) allows DTH engineers the ability to simulate the wear and performance changes to hammers and bits. Another computer-aided function shows cutting removal and how it affects overall product performance. Finally, the use of finite element analysis provides engineers with information about expected loads on parts to maximize the life and ability of the tools.

Atlas Copco's DTH R&D laboratories are unique to the industry. The DTH labs provide practical testing of all new percussive products. The ability to test hammers ranging from 2 inches to 30 inches in diameter in a lab environment is critical to each product's success. Physical testing is used to validate the simulations when developing new products, but also to benchmark the competition, increase knowledge about applications, troubleshoot problems from

the field, and, most importantly, ensure the products meet the customer's objectives.

The Secoroc Materials Group also supports all Secoroc product development and gives DTH product development an edge over the competitors. Atlas Copco has long been known for its quality carbide and wear-life found in Cop Gold, Quantum Leap and Total Depth tools. Now much more advanced processes and materials are working their way into DTH products. An example of this would be the CarbidXD diamond button bit, introduced last year for the oil and gas market. Drillers can be assured all parts of the hammers and bits that leave R&D have been thoroughly tested and studied and they are getting the best materials. »



Project Focused Growth

At any one time, 10 to 15 projects are going on in the RDT engineering department. To make it to the final project list, concepts are studied for their market value and benefit to the local and global markets.

An example of that is Secoroc EDGE, a product that is coming out during 2011. EDGE is focused on increasing productivity in DTH drilling applications. Another is the PARD hammer, introduced in 2010, which combines knowledge from the DTH group and rotary drilling engineering team to make a down-the-hole hammer with a rotary cone bit for mining applications.

The percussive device—down-the-hole hammer—hasn't changed much since the 1930s. It's the little things that have made it better. Customers can be assured Atlas Copco will continue to work at the little things to help them be more successful and profitable. ☉

secoroc



A driller's *EDGE*

A driller with years of experience can tell you what his bit and hammer are doing at the bottom of the hole... almost. Up until now, there has been no way to quickly know how the bit and hammer are reacting to fractures, voids, influx of water and other changes in the formation. If a driller could see what is happening at the bottom of the hole, he could react faster and continually optimize drilling performance.

In 2011, Atlas Copco will introduce a new product for down-the-hole hammer drilling that transmits information to a computer at the driller's station. This product, called EDGE, shows the driller—in the form of a simple graphical display—what is happening with the hammer and, therefore, the bit at the bottom of the hole. This real-time driller's assistant will allow the driller to optimize the penetration rate, maintain good flushing and reduce the chance of over-extending the tools, leading to breakage and costly delays.

Testing of EDGE is underway now by experienced drillers. The feedback coming from these seasoned drillers is that EDGE makes them more efficient by increasing drilling performance and decreasing the time to complete a well. This has been described by one driller as having a 6th sense. Company owners say it equalizes the production at a higher level from one driller to the next and decreases the training period for new drillers. EDGE also allows companies the ability to move drillers to locations unfamiliar to them, bringing them up to speed on the local geologic formations and their specific drilling characteristics instantly.

T.J. Plunkett, Atlas Copco's Engineering Manager for Secoroc DTH Products, said "Around the world, experienced drillers use Secoroc tools because of the advanced technology and productivity. Yet, because of lack of training or experience, some customers are unable to benefit from the full value engineered into our products. The Secoroc EDGE drill monitor provides the driller the ability to squeeze every dollar out of our tools.

"The EDGE tool provides an innovative leap in DTH drilling technology that will reshape the way you drill," continued Plunkett. "Forget about where you set your limits and prepare to draw a new line. We look forward to drillers reaching new goals that weren't even talked about before."

Plunkett and the DTH engineering group have many new innovations in the works, all focused on increasing productivity and tool life. Plunkett said, "We realize our customers invest heavily in us, and we want them to know we are investing heavily in them, too."

PRE-OWNED DRILLS



Atlas Copco T3W/2000 sn:6547
 Location: Milwaukee, WI
 Tower: 32'
 Drill Engine: CAT 15, 565 hp
 Drill Hours: 6,680
 Compressor: 1070 cfm / 350 psi



Ingersoll Rand T3W/2000 sn: 6592
 Location: Tucson, AZ
 Tower: 32 ft.
 Drill Engine: CAT 3406, 465 hp
 Drill Hours: 10,000
 Compressor: 900 cfm / 350 psi



Atlas Copco RD20 II/1998 sn:6389
 Location: Denver, CO
 Tower: 51 ft.
 Drill Engine: Cummins QSK 19C, 755 hp
 Drill Hours: 7,972
 Compressor: 1250 cfm / 350 psi

**FINANCING
 AVAILABLE
 THROUGH
 ATLAS
 COPCO
 CUSTOMER
 FINANCE**



**SECOROC
 DOWN THE HOLE
 HAMMERS
 AND BITS
 ALSO SOLD.
 SEE SPECIALS
 ONLINE.**

Atlas Copco

WHERE TO FIND US

Please contact your nearest Atlas Copco Customer Center.

Country	City (HQ)	Phone no.
Algeria	Hydra	+021 32 83 25/26/27
Argentina	Buenos Aires	+54 (0)11-47172200
Armania	Yerevan	+374 (00) 10530669
Australia	Blacktown	+61 (0)2-96219700
Austria	Vienna	+43 (0)1-760120
Bahrain	Manama	+973 (00) 17221551
Belgium	Brussels	+32 (0)2-6890511
Bolivia	La Paz	+591 (0)2-2112000
Botswana	Gaborone	+267 (00)395-9155
Brazil	São Paulo	+55 (11)-34788200
Bulgaria	Sofia	+359 (0)2-4893178
Canada	Sudbury North Bay	+1 (0)705-6736711 +1 (0)705-4723320
Chile	Santiago	+56 (0)2-4423600
China	Beijing office	+86 (0)10-65280517
Colombia	Bogotá	+57 (0)1-4199200
Congo, DC	Lubumbashi	+243 (00)991-004430
Croatia	Zagreb	+385 (0)1-6111288
Cyprus	Nicosia	+357 (0)22-480740
Czech Republic	Praha	+420 225 434 002
Denmark	Glostrup	+45 43454611
Egypt	Cairo	+20 (0)2-6102057
Finland	Vantaa	+358 (0) 20 718 9300
France	Saint Ouen l'Aumône	+33 (0)1-39093222
Germany	Essen	+49 (0)201-21770
Ghana	Accra	+233 (0)21-774512
Great Britain	Hemel Hempstead	+44 (0)1442-222100
Greece	Rentis	+30 (0)210-3499600
India	Pune	+91 (0)20-30722222
Indonesia	Jakarta	+62 (0)21-7801008
Iran	Tehran	+98 (0)21-66937711
Ireland	Dublin	+353 (0)1-4505978
Italy	Milan	+39 (0)2-617991
Japan	Tokyo	+81 (0)3-57657890
Kazakhstan	Almaty	+7 (0)727-2588534
Kenya	Nairobi	+254 (0)20-6605000
Kuwait	Safat	+965 (00) 398796061
Macedonia	Skopje	+389 (0)2-3112383
Malaysia	Selangor	+60 (0)3-51238888
Mali	Bamako	+223 (00) 211797
Mexico	Tlalneapantla	+52 55 2282 0600
Mongolia	Ulan Bator	+976 (0)11-344991
Morocco	Casablanca	+212 (0)22-600040
Namibia	Windhoek	+264 (0)61-261396
Netherlands	Zwijndrecht	+31 (0)78-6230230
New Zealand	Auckland	+64 (0)9-5794069
Nigeria	Abuja	+234 7069686223
Norway	Oslo	+47 64860300
Pakistan	Lahore	+92 (0)51-8356075
Panama	Panama City	+507-231-0266
Peru	Lima	+51 (0)1-4116100
Philippines	Manila	+63 (0)2-8430535 to 39
Poland	Raszyn	+48 (0)22-5726800
Portugal	Lisbon	+351 214 168500
Russia	Moscow	+7 (495)-9335552
Saudi Arabia	Jeddah	+966 (0)2-6933357
Senegal	Dakar	+221 (00) 773320033
Serbia	Belgrad	+381 (00) 113116620
Singapore	Jurong	+65 6210-8000
South Africa	Witfield	+27 (0)11-8219000
South Korea	Seoul	+82 (0)2-21894000
Spain	Madrid	+34 (0)916-279100
Sweden	Stockholm	+46 (0)8-7439230
Switzerland	Studen/Biel	+41 (0)32-3741581
Taiwan	Taoyuan Hsien	+886 (0)3-4796838
Tanzania	Dar es Salaam	+255 (00) 222861570
Thailand	Bangkok	+66 (0)-38562900
Turkey	Istanbul	+90 (0)216-5810581
Ukraine	Kiev	+38 (0)44)4991871
United Arab Emirates	Dubai	+971 4-8861996
USA	Denver, Colorado	+1 800-7326762
Uzbekistan	Tashkent	+998 (00) 1204635
Venezuela	Caracas	+58 (0)212-2562311
Vietnam	Ho Chi Minh	+84 (0)8-38989638
Zambia	Chingola	+260 (0)2-311281
Zimbabwe	Harare	+263 (0)4-621761

For further information, please visit www.atlascopco.com
 or contact Atlas Copco AB, SE-105 23 Stockholm, Sweden.
 Telephone: + 46 (0)8 743 80 00.

DEEP HOLE DRILLER

30120 State Hwy 264
Round Lake, MN 56167
USA

www.deepholedriller.com

PRSRT STD
U.S. Postage
PAID
Permit 7922
Sioux Falls, SD

Industry leader



Atlas Copco's TH60 water well drill rig is more powerful and efficient than ever before, and continues to be a leader.

The Atlas Copco TH60 is equipped with an arsenal of features:

- Single engine power source with reliable transfer case for long life, low maintenance. Meets all current federal regulations.
- Cooling system – field tested to 120 degree ambient temperature – allows work in extreme heat.
- On-demand hydraulics improve productivity, efficiency and promote fuel savings.
- Electronic air regulation allows 150 psi to 350 psi pressure control for varying ground conditions.
- Options include various mud systems, air compressors and casing advance systems so rig can be outfitted to any geology.

800-732-6762 Atlas Copco Construction & Mining
www.atlascopco.us

Sustainable Productivity

Atlas Copco