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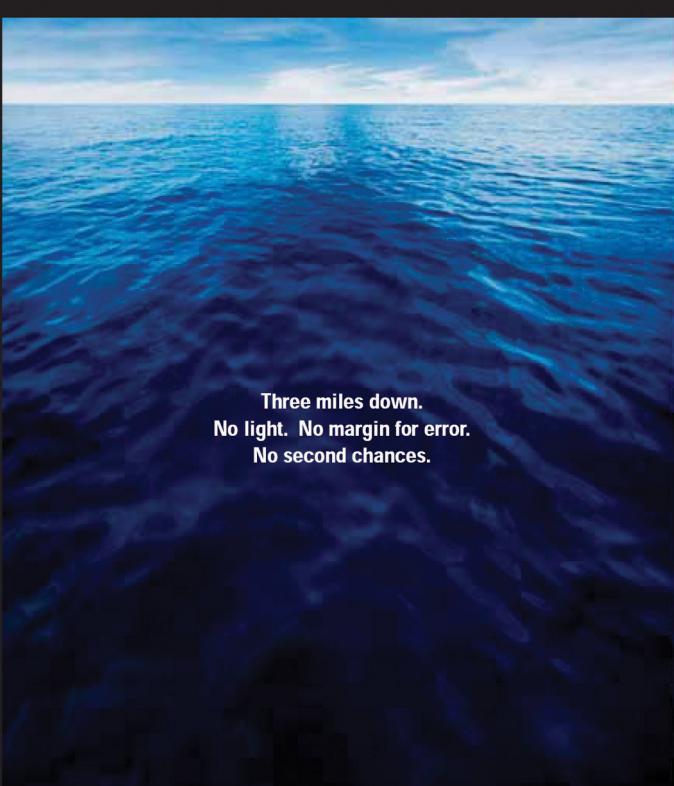
SPE Suez Canal University Student Chapter Magazine

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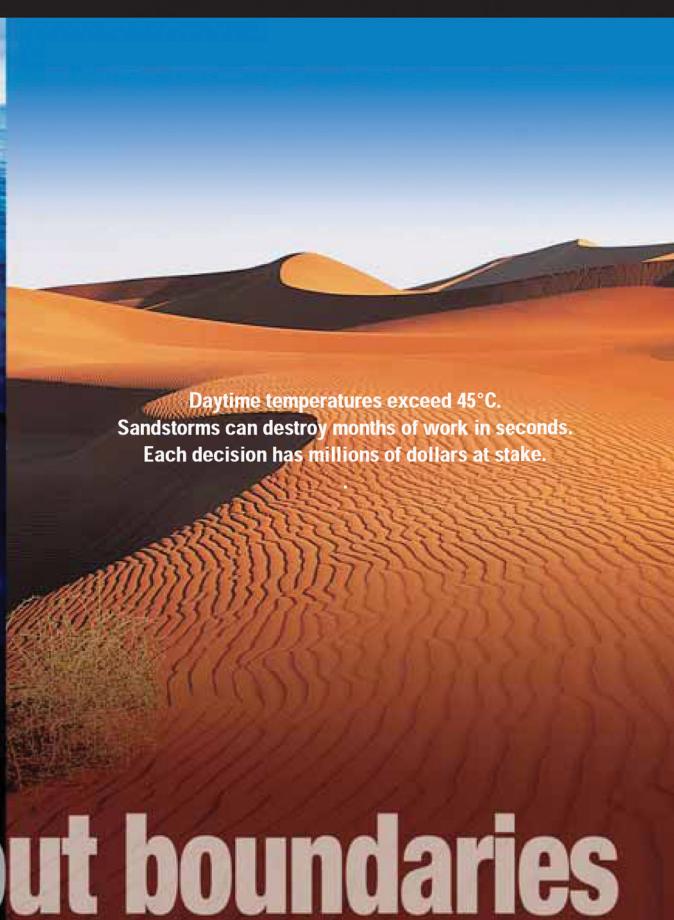


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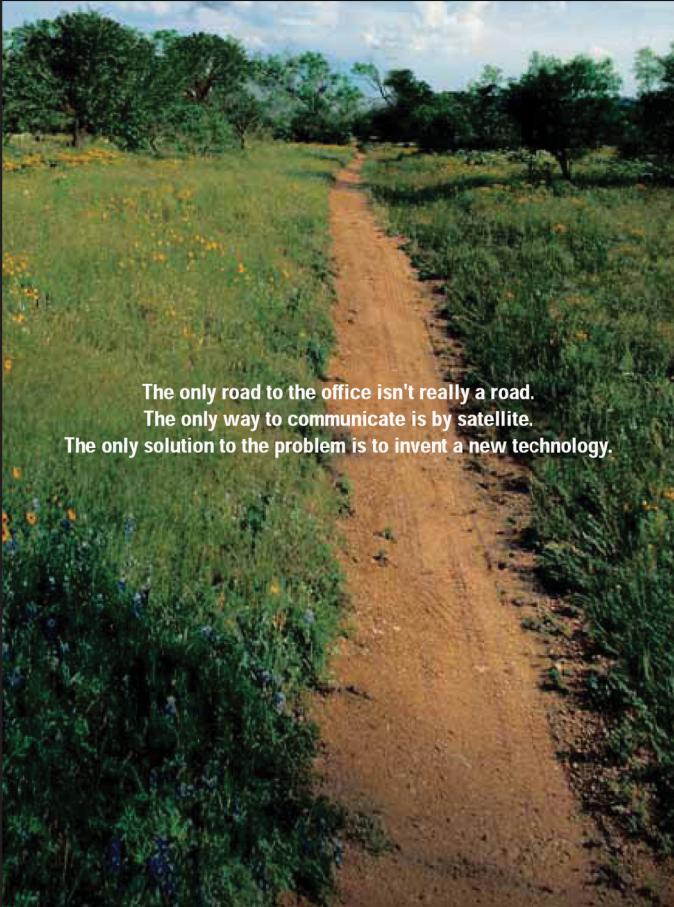


Three miles down.
No light. No margin for error.
No second chances.

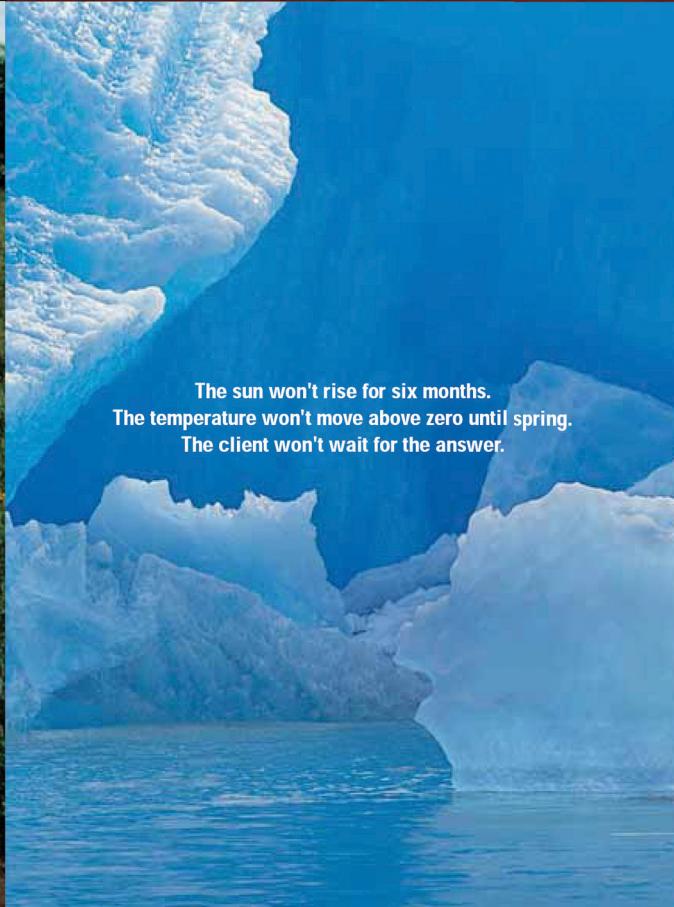


Daytime temperatures exceed 45°C.
Sandstorms can destroy months of work in seconds.
Each decision has millions of dollars at stake.

Success without boundaries



The only road to the office isn't really a road.
The only way to communicate is by satellite.
The only solution to the problem is to invent a new technology.



The sun won't rise for six months.
The temperature won't move above zero until spring.
The client won't wait for the answer.

It's about as far from an ordinary career as you can get.

It's not for everyone. But if you're ambitious, innovative, and truly open-minded, a career at Schlumberger just may be right for you. Here you'll find yourself taking on some of the most complex engineering and technical challenges in the world. And you won't have to wait to test your ability. Our recent graduates are expected to perform from day one.

As the leading name in oilfield services, clients expect us to deliver results under the most demanding situations in business. We give you the training, the support, and the opportunities to make an impact. The rest is up to you. At Schlumberger, success is without boundaries.

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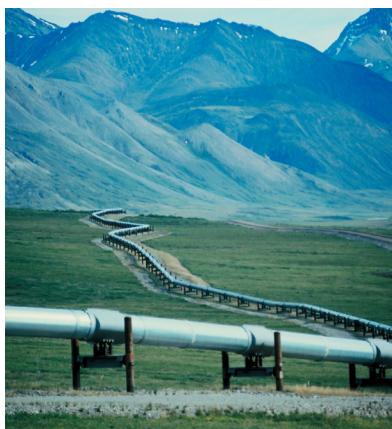
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PressureXpress Tool 10

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THE COVER



Alaska Pipeline
Stretches 800 Miles And
Can Transport Nearly
Half A Million Barrels Of
Oil A Day.



Ahmed Magdy
Chapter President

The Power of Us

"Dictionary is the only place where success comes before work. Hard work is the price we must pay for success. I think you can accomplish anything if you're willing to pay the price." Vince Lombardi. I couldn't find a more fitting beginning for this article. Vince Lombardi summarized all success stories in two words; hard work! Any successful human being who carved his name on the stones of history would have never been capable of that unless he had had been hard at work. And then from the power of hard working you can take a platform on which all your deeds in your life rely.

When we look at our position in the world nowadays we will find that the development of human life has reached its highest rates compared to all the previous eras. We are living in different conditions; habits and traditions develop and differ from time to time; sometimes we find ourselves at the top but in other times our position is ruefully disappointing. Thus, in order to have a good picture of what is going on around us and where we relatively stand, we started to search for actual models.

Japan! A symphony being played on the strings of success. Japan decided to cast away the remnants of war and it was home and dry. Moreover, it established one of the world's greatest economies. And what makes us stand astounded is that after every single natural catastrophe, the Japanese people there are able to return stronger than before. This isn't because of an enigmatic superpower of the Japanese. However, it is a result Vince Lombardi's aforementioned assertion; the will to change expressed in hard work and transformed in turn into success.

Throughout our life witnessed such models and discussed the importance of people for building their countries. We've heard times and times that people are the pivotal factor in nations' prosperity; they can think of a promising future; people can build robust economies. People, only people, can alter their future, draw the outlines through which they move, and most importantly, they are the power that exerts actual work with an inside belief that they are the fuel, the only fuel that can push their nations forward.

A step backward – and I feel deeply sorry for saying backward – to our position, can we make a difference? Can we be even a small spark that ignites the future of our nation? Can we be the good sons of Egypt and the good antecessor of the revolution martyrs? Yes we can, we can take Egypt to the horizons of success. The road is not that difficult but it's rather long. Fortunately we have a point of privilege that lacked our predecessor; we are a rebellious generation. We are free despite the restriction being continuously tightened in our way. We dream the impossible dream. When we fall down seven times we stand up the eighth. In summary, we have a dream!

Four paragraphs back, returning to the beginning, what is the sensible doctrine to make this dream comes true? The answer lies with Vince Lombardi. Please, every single worker please work hard. Margaret Thatcher once said, "I do not know anyone who has gotten to the top without hard work. That is the recipe. It will not always get you to the top, but it will get you pretty near." Put your personal interests aside for a while and think about what you can give for this country. Hard work is the only way to move forward.

Finally, we tried to present a self-improvement proposal that will reflect on our lives as Egyptians:

- 1-Dream; let's have a dream of a prosperous future for our nation. Today was yesterday's dream and tomorrow is today's dream.
- 2-Belief; working without believing is in vain.
- 3-We have to get what we love, so we will not be obliged to love what we get.
- 4-Knowledge; we have to admit that knowledge is one of the most powerful weapons to be armed with.
- 5-Motives; the engine of the human personality and behavior, without the genuine motives we won't have the will to work and develop.
- 6-Think and plan; never unconsciously let life take you where you never wanted to go; have clear plans for your future. There is a simple rule in life that says, "We are now where our thoughts took us, and we will be tomorrow where our thought take us".
- 7-Actions; execute what you have planned.
Discipline and commitment; as failure often results from the lack of discipline and commitment, not due to the lack of knowledge and ability.
- 8-Patience; people sometimes give up when they are at the very brink of reaching their goals.

And Always bear in mind that;

Winter is the beginning of Spring.
Darkness is the beginning of Light.
Failure is the beginning of Success.

Regard the past as a treasure of experiences and learn from it. Look forward to the future as a dream that you have to bring to fruition.

And NEVER underestimate your power and ability to accomplish anything, Always have faith that
WE CAN.



A New Approach Towards A Brighter Engineer

[SPE SCU SC: Leading the Route of Success]

Mamdouh Reda
Chapter Vice President

At the Suez Canal University Student Chapter of the Society of Petroleum Engineers "SPE SCU SC" we took it upon ourselves to get every member to the advanced level of competition present in the oil field industry through our mission to seal the gap between the practical life and the academic attitude of the learning process. To ensure the success of our mission we provide much more than just technical support throughout sessions and seminars. Here at Echo, our team strives to meet your demands whether you are a student or a professional. So once again we introduce to you Echo magazine in its fourth issue as a window for the chapter's greatest accomplishments, news and collected articles.

SPE SCU SC would have wanted to kick this season off with a lot more achievements; however the current status of Egypt regarding economical and political instability has kept raising obstacles our way, from a hesitant market all the way to inconsistent schedules for the faculty students. But being one of the best at what we do, we could not allow any of this to stop us from moving forward and achieving our goals.

Egyptians are currently drafting the future of this country. Their selfless efforts are the only hope that Egypt has to rise from this mess, stronger than ever; with every one standing for their rights but also knowing their duties towards each and every member of the society and his country.

That being defined as our working environment just gave us the will and determination to reach out and help in every way possible. Coalitions with other SPE chapters in Egypt with the help of SPE young professionals, and other non SPE charity and development organizations and chapters all over Egypt were made, working on projects that would give back to our society from reviving a public heart hospital, to volunteering for help at 57357 children's cancer hospital, to blood donations and Tahrir Aid while simultaneously providing events that would raise the bar of studying at the Suez Canal University.

During the last two seasons we have been granted the golden standard status award and also named the best chapter in Egypt for the latter one. But our aspirations have only the sky as their limit and hence our aim is to be appointed the number one outstanding chapter for this year. This can only be achieved by the indefinite and boundless efforts of our team working in complete harmony, and also flexibly adapting to our current conditions.

Through previous seasons SPE SCU SC mainly focused on technical and soft skills courses and sessions, attending professional events and supporting students with our Website, Virtual Campus, ECHO and summer trainings. During the course of last year we have conducted more than fifty educational events, fifteen soft skills sessions, attended twenty professional events and provided one hundred and ten summer training opportunities, and these are just to mention a few.

However great our last season was, our target is nothing but to top it. We have carried on the pace and we have so far surpassed the last season in most categories for the previous months landing one hundred and fifty eight summer trainings, twenty technical and soft skills sessions and fifteen extracurricular and charity events, and more is yet to come. As for the charity events, they are one of our main targets this season in a fashion that aims to help improve not only our members but our beloved country as a whole, specially after the recent events and instability that have spread throughout the country.

Another great achievement that rolled out in the past few weeks was the launching of our new version of website that is an 'echo' to the hard work and dedication of this team.

And thus we stay focused to abide by our motto "**Compete for the Elite.**"

Casing While Drilling

The Future of Drilling

Peter Mabrouk

Teacher Assistant

American University in Cairo

Petroleum and Energy Department



Introduction:

"We don't trip. We drill it; the casing is there." Boyle describes, the vice president of CASING DRILLING™, for Tesco Corporation. This technology is the latest innovated one in drilling wells. It has gained its strength from the great advancing in metallurgy which allows the casing to sustain greater strength to carry higher torque. In the past, 9 $\frac{5}{8}$ inches casing could handle only 14,000 ft-lb, but now, special 9 $\frac{5}{8}$ inches casing can take more than 100,000 ft-lb. TESCO and Weatherford are the two main providers of this technology. They offer different approaches to help drillers get the bit to total depth.

Drilling with the casing string technology introduced for field trials in mid-1999 by Bob Tessari while he was drilling on the island of Java in Indonesia. Over the last five years and through \$50,000,000 have been spent on intensive research and development, TESCO had elevated the Casing Drilling CD™ to a proven success.

It's used successfully in more than 40 locations all over the world. These locations include United States of America, Canada, Gulf of Mexico, Ecuador, Brazil, Argentina, United Kingdom, China, Indonesia, Norway, and Columbia. It's also used in the Middle East in United Arab of Emeritus, Qatar, and Sultanate of Oman.

Casing While Drilling proved that it is a technology of potential use in drilling both onshore and offshore oil and gas wells; however they are vertical, direc-

tional, or horizontal. It allows the operators to drill and case the well simultaneously, moreover, it is the solution for many drilling problems encountered during drilling oil and gas wells. Until the end of August 2009, TESCO Corp. had drilled about 3,100,000 ft in 1130 sections. Weatherford also uses Drilling with Casing™ technology on more than 800 projects in almost 1,000 intervals including more than 350 complete wells.

This technology is composed of downhole and surface components that provide the ability to use normal oil field casing as the drill string so that the well is simultaneously drilled and cased. An optional wire line retrievable drilling assembly is suspended in a profile nipple located near the bottom of the casing. The BHA may be retrieved by a wire line for small casing diameter or on drillpipes for larger casing diameter.

It allows operators to drill in troublesome formations where loss of circulation and wellbore instability often happen during conventional drilling. It also can reduce well-construction costs, improve operational efficiency and safety, and minimize environmental impact. It improves personnel safety by reducing pipe handling which causes about 70% of incidents. Casing strings have longer joints than standard drillpipes, which means that drillers make about 25% fewer connections. For offshore wells; it reduces drilling costs due to the high cost of rigs per day.

Casing While Drilling Procedures:

Drilling with casing system integrates the drilling and casing running processes into a single operation, providing a more efficient way to drill a well. The drilling with the casing system may be provided by a conventional top drive rig or a special automated PLC controlled rig for drilling the well. After the rig is set at the wellsite, a normal casing is prepared by adding the torque rings, the casing joints are connected by using the casing drive system (CDS). A non-retrievable drilling bit is attached to the end of the casing; this drilling bit may be drill-

able. Also the bottom Hole Assembly (BHA) may be attached to the casing string. This BHA consists of pilot bit, this bit drill a pilot hole which needs to be opened, so an underreamer is used to open the hole. In directional drilling, MWD, LWD and motors are also added to the BHA. The BHA is attached to Drill Lock Assembly (DLA) which connects the BHA to a profile nipple immediately above casing shoe. After drilling the desired section, the BHA is retrieved and cementing takes place, and then a new section is drilled by the same way.

There are two primary Casing While Drilling techniques available in the market: one technique allows the BHA to be changed without tripping the casing, and another one which uses a fixed cutter pilot bit.

The system is composed of downhole and surface components that provide the ability to use normal oil field casing as the drill string. The casing connections require a change from the conventional well design because they must provide adequate torsional strength, fatigue resistance. The casing provides hydraulic and mechanical energy to a retrievable drilling assembly suspended from a profile nipple located near the bottom of the casing.

The BHA is attached to a Drill Lock Assembly (DLA), which connects the BHA to a profile nipple immediately above the casing shoe. The BHA can be tripped with wire line, coiled tubing or drill pipe. A large wire line unit with sufficient power to run and pull the BHA efficiently is needed.

A wire line retrievable drilling assembly is suspended in a profile nipple located near the bottom of the casing. The drilling fluid is circulated down the casing inner diameter and back through the annulus between the casing string and the wellbore.

The drilling assembly below the DLA terminates in a pilot bit, but may include other conventional drill-string components such as an underreamer, mud motor, coring or directional assembly.

For vertical wells, the BHA may consist of a pilot bit, stabilizers, and underreamer. For directional wells, the BHA would include a downhole motor, MWD and LWD.

In most Casing While Drilling applications an underreamer is used above the pilot bit to open the hole from the pilot bit diameter to the final diameter. The pilot bit must be sized to pass through the active casing and the underreamer opens the hole to the size that would normally be drilled to run the active casing. For example, an 8 1/2" pilot bit and 12 1/4" underreamer may be used while drilling with 9 5/8" 36 lb/ft casing.

Each joint of casing is picked up with a Casing Drive System located below the top drive. This tool supports the full weight of the casing string, applies torque for both drilling and make-up, and facilitates circulation without making a threaded connection to the top of the casing.

For offshore applications, most Drilling with casing -about 80%- is done by attaching a non-retrievable bit to the bottom of the casing and leaving the bit in the hole.

Directional casing while drilling (DCwD) uses a steerable BHA that is retrieved—not left in the hole, and makes DCwD a viable alternative to conventional directional drilling in depleted or mature fields that have severe lost circulation and wellbore stability problems.

"We don't trip. We drill it; the casing is there."

Boyle describes, the vice president of CASING DRILLING™, Tesco Corporation

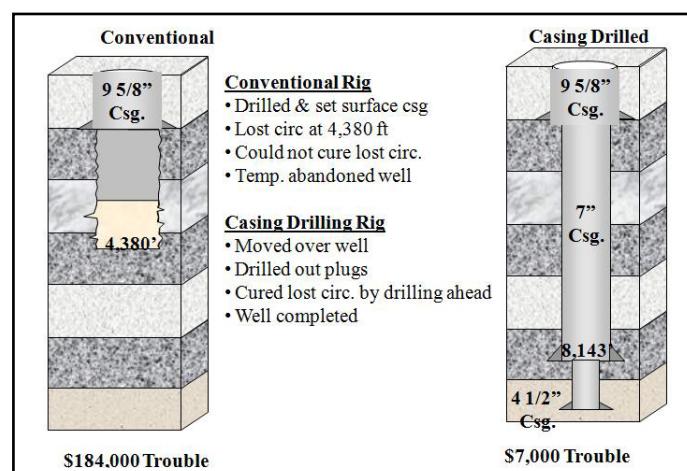
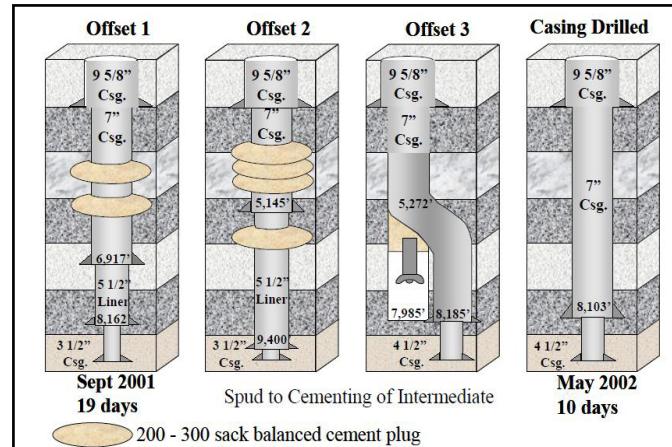
Case History - Lobo Field:

Loss of circulation, stuck drillpipe and inability to run casing to TD were common in Lobo trend wells, accounting for about 75% of trouble time in 2000 and 2001. The location chosen to drill with casing was surrounded by three recently drilled conventional wells that had trouble related to lost circulation **as shown in the figure**. The first two wells lost full returns while drilling with 8.7 ppg mud and the losses could not be cured with conventional LCM pills. After setting several 200-300 sack cement plugs, the losses remained at about 150 bbl/hr when drilling ahead. This inability to establish full returns prevented drilling to the planned casing point in a pressure transition zone. The 7" intermediate casing was set early and leak-off tests indicated that the formation was not strong enough to reach total depth without setting liners in both wells. The third well reached the normal casing point for the 7" casing, but the BHA became stuck on the final wiper trip while fighting the loss of circulation. Continued lost circulation impeded the fishing operation and the well was sidetracked.

The Casing While Drilling rig was used to drill a well between these three wells with no significant lost circulation, even while drilling with 10.5 ppg mud. The BHA was retrieved and the 7" casing was cemented in place at the normal casing point of 8,103 ft.

Soon after this experience, a well in an area of known lost circulation was being drilled with a conventional rig at 4,206 ft when full returns were lost while drilling ahead. Numerous LCM pills were spotted over the next two days and each time drilling resumed, full losses recurred. After two and a half days of fighting lost circulation and making only 174 feet of drilling progress, cement plugs were spotted in the well to temporarily abandon it and the conventional rig was released.

Approximately one month later, a Casing While Drilling rig was moved over the location and the cement plugs drilled out. The well began to lose fluid at rates of 60 – 200 bbl/hr while drilling the bottom cement plug. By the time the cement was drilled out and new formation was being drilled, the losses had decreased to less than 20 bbl/hr. The losses remained at 5 to 10 bbl/hr until the casing point of 8,143 ft was reached where the casing was cemented in place with no difficulty **as shown in the figure**.



Schlumberger New Technologies Applications in Reservoir Evaluation

Valentina Vallega

Borehole Geologist, Schlumberger
Midland, TX, USA



The application of new technologies in reservoir evaluation has been shown to be extremely beneficial in order to be able to delineate the reservoir with more accuracy. All the information and data that we can get from the reservoir evaluation using new technologies will all be beneficial in order to be able to create a finer reservoir model for future FDP studies.

In this short paper I would like to share with you some of the technologies that Schlumberger has deployed in the past few years in order to help our customers in a better characterizing of their reservoir. The new technologies that will be explained will focus on the reservoir evaluation and delineation with additional focusing on the methodologies used to interpret some of the data acquired through an open hole wire line acquisition.

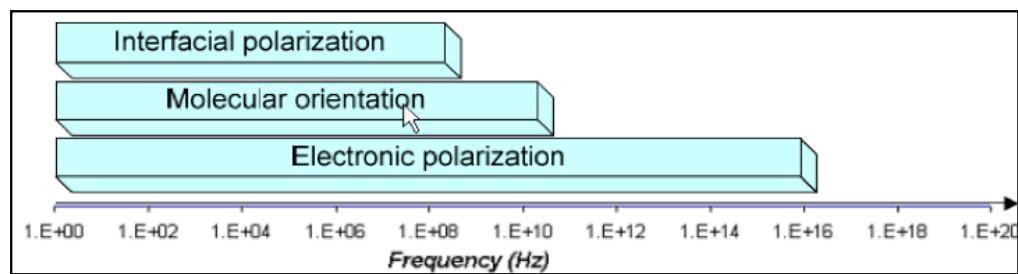
ADT: Dielectric Measurement

In 1980s, the first dielectric measurements were introduced, but were not able to find a wide use due to some measurements limitations that appeared in the form of moderate accuracy and insufficient quality control. At the start of 2011, Schlumberger commercialized the new-generation Dielectric tool (ADT or Dielectric Scanner) which overcomes the limitations of the previous generation tools.

The Dielectric Scanner is able to have a continuous measurement of the dielectric dispersion properties of the medium which is the variation of the formation dielectric properties as a function of frequency. The vertical resolution of this measurement is 1 inch. The tool is designed to operate multiple-spacing antenna arrays which emit signals at multiple frequencies (MHz and GHz). The antenna have collocated longitudinal and transversal polarizations.

This measurement finds an optimum application in carbonate and in heavy oil reservoir characterization on top of traditional dielectric formation-evaluation in fresh-water and thinly laminated sands.

The main applications of this new technology are: pore fluid analysis (hydrocarbon residual saturation and invaded zone water salinity; invasion profile: hydrocarbon saturation profile in heavy oil reservoir); Matrix analysis from dielectric dispersion (in carbonate will give textural information like the cementation factor, m , for input into Archie's equation; in shaly sand will help in high resolution clay volume and anisotropy); geological structure analysis like thin bed analysis, structural anisotropy measurement in very thin beds, carbonate classification and geological features extraction.



How does the tool achieve the measurements?

The permittivity of a medium is related to the sensitivity of the medium to an electric field. There are the main factors that contribute to the permittivity of the rock: the displacement of the electronic cloud of an atom (rock permittivity), the pre-existing orientation of microscopic electric dipoles (water molecule) and the polarization effect at the interface (pore geometry and ions). The predominance of one of the three factors depends on the frequency of the external electro-magnetic field applied. The figure below shows which polarization mechanisms are present at certain frequencies of electromagnetic fields.

The electron polarization is caused by an electromagnetic field applied to the rock. In this case, the electron cloud of the material will be displaced one way and the nucleus another way creating a temporary dipolar moment. This will contribute to the overall polarization density of the medium.



The heart of the Dielectric Scanner measurement lies in its short, multi-spacing array pad. Each of the cross-dipole antennas has collocated magnetic dipoles. The transmitters (Ta and Tb) are in the center and the receivers (Ra1-1 and Rb1-4) are placed symmetrically around them for optimal measurement accuracy and borehole compensation (see picture on the side). To minimize environmental effects, the short, fully articulated antenna pad is applied firmly against the borehole wall by a hydraulically operated eccentric caliper to enable optimal pad contact, even in rugose boreholes. Electromagnetic waves are propagated into the formation at four frequencies and two polarizations for high-resolution, high-accuracy measurements of reservoir properties at up to 4 in from the borehole wall.

Below is a table which summarizes the permittivity of some abundant minerals.

Mineral	Relative Permeability
Sandstone	4.65
Dolomite	6.8
Limestone	7.5 - 9.2
Oil	2 - 2.2
Gas	1

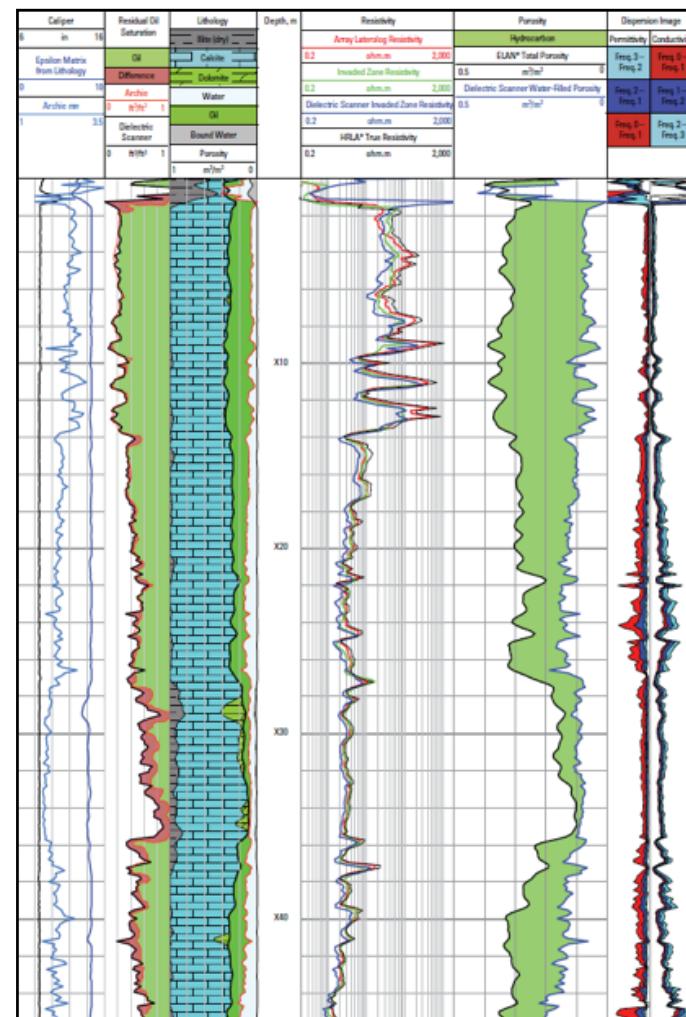
It needs to be noted that temperature, pressure and presence of salt will affect the permittivity of the rock; higher temperature reduces the permittivity while higher pressure increases the permittivity of the rock. The presence of salt means the presence of hydrated ions surrounded with water molecules. The internal orientation of the molecules will negatively impact the overall permittivity of the material.

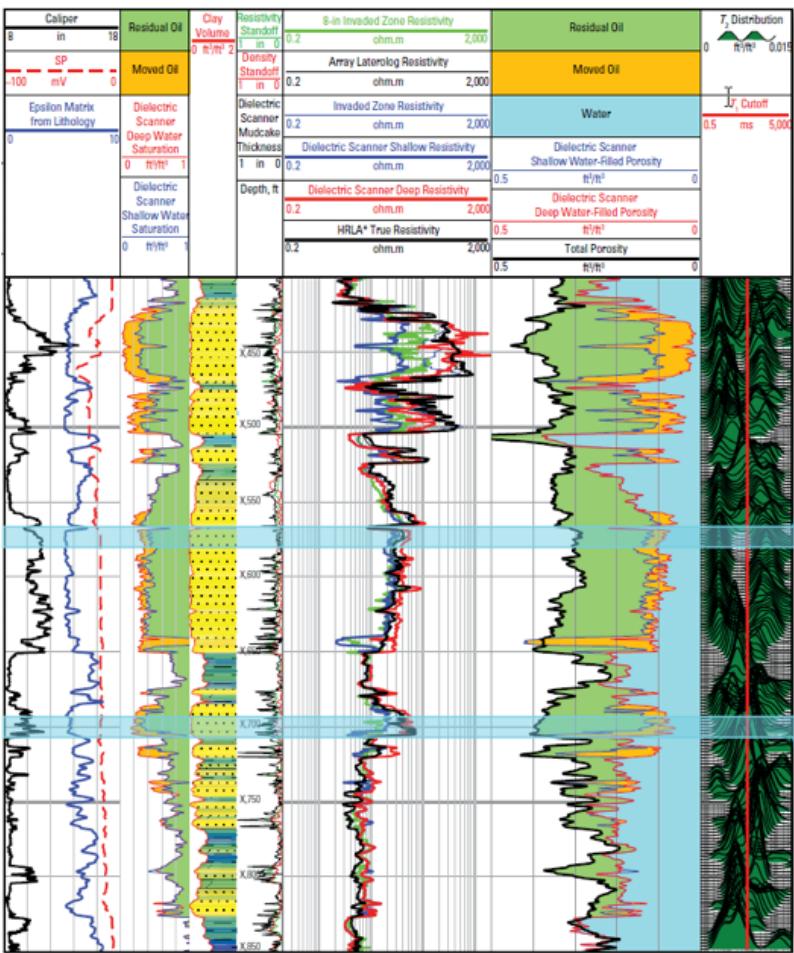
The **following example** is taken from the Dielectric Scanner Schlumberger official brochure; An operator in the Middle East wanted to improve understanding of the fluid saturations in a high-porosity carbonate reservoir where variability in the Archie m and n exponents increased the uncertainty in the conventional log interpretation. The measurements were also ambiguous because the mud filtrate salinity was approximately 180,000 ppm (-ug/g) NaCl.

The carbonate textural information provided by the Dielectric scanner service enabled accurate m and n determination instead of relying on potentially incorrect estimations from conventional log analysis or waiting for laboratory core analysis. Having accurate values of the Archie exponents is important because they are the basis for calculating saturation values from resistivity.

As shown by the porosity curves in Track 5 of the below picture, the significant difference between Dielectric Scanner water-filled porosity (blue curve) and the total porosity calculated from the standard porosity measurements indicates a large volume of residual hydrocarbon in the formation. In Track 2 the Dielectric Scanner hydrocarbon saturation accounts for variation in the Archie exponents across the reservoir and confirm up to 95% residual hydrocarbon. Conventional saturation determination using constant values of the Archies m and n exponents does not account for their variation, as shown by the difference shaded red where the conventional and Dielectric Scanner residual oil saturation do not match. Confirmation of the high residual saturation is in Track 4, where the Rxo measurements from the Dielectric Scanner and conventional resistivity logging closely match each other.

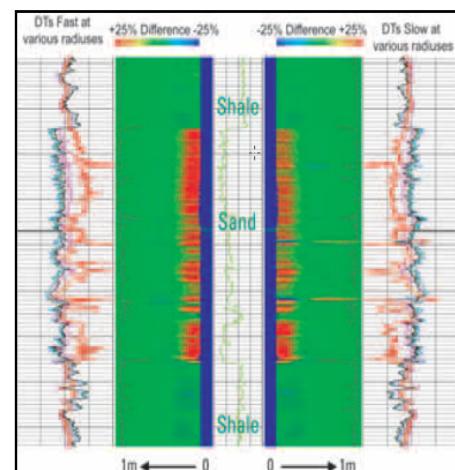
The above information are summarized from the following SPE Paper: SPE 116130, Mehdi Hizem, Henri Budan, Benoit Deville, Olivier Faivre, Laurent Mosse, Matthieu Simon, Schlumberger – “ Dielectric Dispersion: A New Wire line Petrophysical Measurement”. If you would like to know more in details about the Schlumberger Dielectric Scanner tool and its physics of measurement, I do recommend the reading of the above paper and looking for the Dielectric Scanner brochure on the public Schlumberger website for more examples of this tool performances and applications.





To the Left:

Movable heavy oil confirmed by sidewall cores. Although the resistivity in Truck 5 and NMR in Truck 7 cannot readily distinguish between oil and formation freshwater below the oil-bearing interval from X,430 to X,500 ft, Dielectric Scanner measurements of fluid volumes (Truck 6) and the resulting saturations (Truck 2) clearly reveal significant moveable heavy oil down to X,720 ft, as confirmed by sidewall core analysis.



Sonic Scanner: Acoustic Measurement

The new acoustic technology has been designed with an increased number of transmitters and receivers. The higher quality of the waveforms acquired and the more advanced processing techniques aid to an improved compressional and shear slowness and the acoustic radial profiling offers a better anisotropy detection. The advanced inversion algorithms estimate accurately the 3D rock properties utilizing the multiple transmitter-receivers and wideband acoustic signals to be able to accurately determine relevant mechanical rock properties help in making timely decisions in areas like well placement, perforation optimization and sand control.

The properties of sound wave propagation, both compressional and shear waves, are highly affected by the stress action on the borehole which is a consequence of the regional stress and the

hydrostatic pressure of the well itself. This translates in the rock properties variation azimuthally and radially from the borehole. This means that a non uniform stress distribution along or away from the borehole can be detected by analyzing the mechanical rock properties variation azimuthally and radially in the borehole.

The characterization of 3D formation acoustic properties can be achieved thanks to a comprehensive acquisition of broad frequency band waveforms over multiple transmitters and receivers spacing for all propagating borehole modes: monopoles, dipole and Stoneley.

The dispersions curves are analyzed for all the broadband acquired. Below is an example of the formation shear slowness radial profiling which indicates more than one foot of damage into the reservoir.

The figure above shows shear slowness radial profiling which highlights the presence of a damaged zone up to 1 ft. from the borehole wall over the reservoir section. Shear radial profiling is based on the analysis of the dispersion plot for the fast and slow shear and comparing this to a reference state corresponding to a homogeneous and isotropic formation. The monopole radial profiling is based on the analysis of the compressional slowness acquired at the different receivers stations, so at different interval from very short to very long. This is possible thanks to the 13 receivers array and the three different sources at different distances from the receivers.

The radial variation of slowness in the reservoir rocks can identify the areas that are mechanically damaged and present a greater risk of sanding. In stressed formations the radial profiling can provide information on potential drilling hazards.

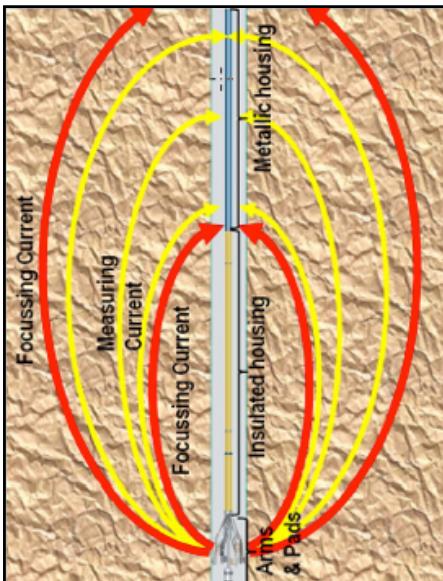
FMI-HD: Borehole Imaging

The comparison between an image log acquired in water based mud and an image log acquired in a non conductive mud system will immediately highlight the difference in the resolution of the measurement and the difference in the borehole coverage provided: in water base mud,

with the current technologies it is possible to reach a coverage of 82% in an 8" borehole, while in OBM we can only achieve a 32% of borehole coverage due to tool design and limitations in the engineering of the tool imposed by the difficult acquisition environment.

A new tool for imaging acquisition in non-conductive mud offers a solution to acquire high-definition, high-resolution and almost full coverage images in formations of moderate to high resistivity. The conventional field-proven sonde and pad design has not been modified, but a

new electronic cartridge provided with novel signal processing capabilities has been designed. The tool has been proven to be successful in the acquisition of good quality images in non conductive mud under some specific conditions. The factor that appears to be critical in the acquisition of high quality images in OBM utilizing this technology seems to be the formation resistivity itself. The analysis of the field test results allowed to clearly understand the operating envelope of the tool in the non conductive mud environment and provided a clear and practical guideline when and when not to attempt to run this tool in non conductive mud. In fact the principle of measurement of the tool has generally not changed, but it is still based on the laterolog principle: the sensor arrays consist of small buttons which are mounted on the pads and flaps assembly which are maintained in contact with the borehole walls during logging.



An AC current is applied between the metallic part of the pads body and the metallic housing of the cartridge, approximately 5 meter above (see above figure).

The resulting flux of current is measured at each buttons and it is assumed to be proportional to the conductivity of the formation in front of the buttons. The last assumption works well when the pads are in full contact with the borehole and when the surrounding fluid is conductive. In reality the impedance of the buttons is the sum of two impedances in series.

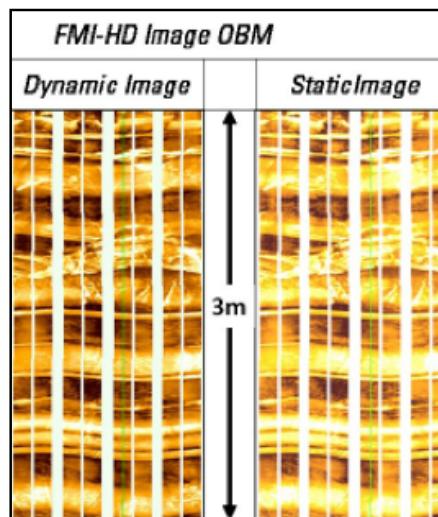
The above statement is what behind the reason of why the standard technologies wouldn't work in non conductive mud unless very specific environments where the formation resistivity is extremely high.

The new Formation Micro Imager High definition has proven to succeed in more formation resistivity environment logged in non conductive mud due to the following improvements:

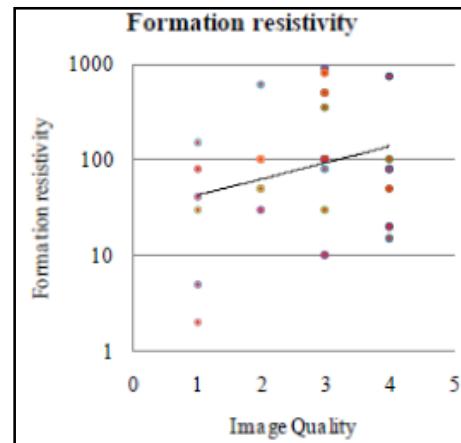
- Greater reliability.
- Simplified operation with reduced human dependency.
- Increased robustness of the measurement in high-salinity water-base mud.
- Increased definition and clarity of the image in high-resistivity formation logged in WBM.
- Increased definition and clarity of formation textural features having fine resistivity contrast.
- Improvement in the tool operating envelope for wells drilled with nonconductive oil-base mud.

Following some examples of images acquired with FMI-HD in non conductive mud system which are considered of very good quality and comparable to what we would obtain if the well was drilled and logged in water based mud.

The below image is essentially indistinguishable from those acquired in WBM. The image appears crisp and clear. All formation beddings are clearly visible including cross-bedding of subtle grain size variations within sand. All fractures can be recognized.



Overall, the result of the comparison of the image quality showed that the predominant factor affecting the performance of this new technology in non conductive mud is the formation resistivity. As the next graphic shows, the higher rating of image quality (4) is achieved in wells were the target formations had value of resistivity higher than 50 ohm.m. In formations with a lower resistivity value (below 50 ohm.m) the usual rating of the image would decrease towards 1 or 2.



It has to be kept in mind that the above mentioned value of 50 ohm.m for the formation resistivity cutoff cannot be considered as the only value. In fact good image quality results have been obtained also in formation resistivity as low as 2 ohm.m.

Another parameter that was investigated was the formation lithology: at present the majority of the jobs have been performed in carbonate reservoirs with an average image score of 3.0. For clastic reservoir, probably more data are required up to date to draw a more precise correlation.

Mud oil/water ratio was also considered in the parameters that could have an effect on the image quality and it was noticed that a negative correlation was observed between O/W ratio and image quality. Another factor that showed to have an impact is the bit size; as the bit size approaches 8 inches, the quality results of the image appear to reach a higher level. This makes sense if we consider that the standard curvature of the pads have an eight inch diameter curvature.

Concluding, with the high definition images from the new technology a great number of interpretation techniques can be confidently applied in wells drilled with NCM that would have otherwise been challenging using existing technologies. Fracture analysis, sedimentological analysis, facies classification and rock typing are among the application that benefits the most from improved high-definition images.

More of "Schlumberger New Technologies Applications in Reservoir Engineering" in Next Issue.

XPT

PressureXpress Tool

Hazem Mohammed Salah

Faculty of Petroleum and Mining Engineering



Latest technology measures high-quality pressure and mobility during the first logging run, Pressure profiles and mobility measurements to combine with petrophysical, seismic, and conventional log data to develop a static reservoir model.

Fracture stimulation design in formations targeted for multilevel or stage fracturing operations, also identification of depleted zones in a wider mobility range, delineation of uneconomic zones to avoid during fracturing and measurements of reservoir fluid density with gradients. The XPT gets Pressure measurements and fluid mobility in a fraction of the time required by multifunction formation testers. It increased survey efficiency with minimized setting and retracting times, it also saved time and cost with the elimination of additional wire line runs solely for acquiring pressure measurement data. It reduced the risk of sticking and it also reduced the overall expenditure for pressure testing.

Features:

- Combinable with Platform Express and most Schlumberger open hole wire line services
- Optimized pressure test quality and reduced time on station
- Enhanced pretest system for more accurate and precise control of pretest volume and rate than conventional hydraulic pretest systems
- Rapid confirmation of all measurements, if desired, without retracting the tool.

Fast and Focused:



The smooth profile and small OD of the pressureXpress tool minimize the risk of sticking.

The PressureXpress® Service brings new efficiency to the formation pressure testing process by significantly reducing both the time and risk involved with multifunction formation testers. Unlike conventional formation pressure test tools that take formation fluid samples, the streamlined PressureXpress tool obtains only pressure and fluid mobility measurements during the first logging run.

Using Data Right Away:

The PressureXpress tool quickly generates a survey that provides pressure data for connectivity analysis, a pressure gradient for fluid density and fluid contact information, and fluid mobility and permeability data to aid in sampling-point selection.

PressureXpress data are the basis for accurate pressure profiles and mobility measurements that you can integrate with petrophysical, seismic, and conventional log data to obtain a more complete picture of your reservoir. With a comprehensive static reservoir model you can fine-tune your simulation and ultimately improve productivity. This combination of expert data can also improve the design of multilevel or stage fracturing operations in low-mobility formations and help identify depleted zones, thief zones, and zones to avoid during fracture stimulations. A thorough understanding of fluid movement within the reservoir will help you characterize vertical and horizontal flow barriers, estimate permeability along well bore, individualize reservoir lenses and monitor fluid performance.

No More Weighing the Value of Pressure Measurements Against Their Cost:

Have you ever had to forego important reservoir measurements because acquisition would require another logging run or long times spent stationary in the well? PressureXpress service has changed all that. Designed to be part of the primary logging run, the PressureXpress tool makes reservoir pressure

and mobility measurements while stationary for less than a minute. PressureXpress service also lowers the overall expense of pressure testing by increasing reliability and operational efficiency. Its streamlined design greatly reduces the possibility of sticking and incurring subsequent replacement costs.

Enhanced Pretest System:

The dynamically controlled pressure pretest system integrated in the PressureXpress tool enables precise control of volume and draw down rates in a wide mobility range. A pressure limit can also be set as necessary. The enhanced pretest system makes pressure testing possible in formations where conventional technology cannot function. Multiple pretests can be performed at a given depth to verify the accuracy of a pressure measurement without having to cycle the tool or they can be performed at multiple depths to produce a profile of pressure versus depth. A reservoir pressure gradient can be established if the zone of interest is sufficiently thick, mud supercharging effects are not present, and the flow regime is identified. The resulting profile can be converted directly to the density of the formation's continuous fluid phase for use in defining fluid contacts.

Data-Enhancing Software:

The PressureXpress pressure profile can be interpreted using proprietary software that provides various pretest analysis techniques and generates general and detailed pretest summaries.

PressureXpress Advisor pretest quality indicator uses real-time Platform Express data to determine which zones are good candidates for successful reservoir pressure and fluid mobility measurements.

A PD Plot interpretation can be performed specifically for pressure and gradient analysis. A concise PressureXpress well site report is generated, along with an optional display of other log data.

Superior Sensor Technology:

The typical PressureXpress measurement cycle (from set to retract) takes a fraction of the time required by conventional formation testers. This type of pressure measurement is made possible by the PressureXpress mechanical design and sensors that rapidly deliver high accuracy and resolution over a wide range of absolute pressure.

The PressureXpress tool integrates advanced versions of the CQG Crystal Quartz Gauge and the Sapphire pressure gauge, both of which provide superior accuracy and resolution compared with pressure sensors used in most other formation testers.

CQG and Sapphire sensors are equipped with a dynamic temperature compensation algorithm and redesigned packaging that provide faster stabilization times after sudden pressure and temperature changes.

Tool Design That Minimizes Sticking:

The PressureXpress tool is combinable with the Platform Express tool and most open hole services in the first logging run. This combinability means that pressure measurements do not require a separate run. The tool's OD and profile are designed to greatly reduce the risk of sticking.

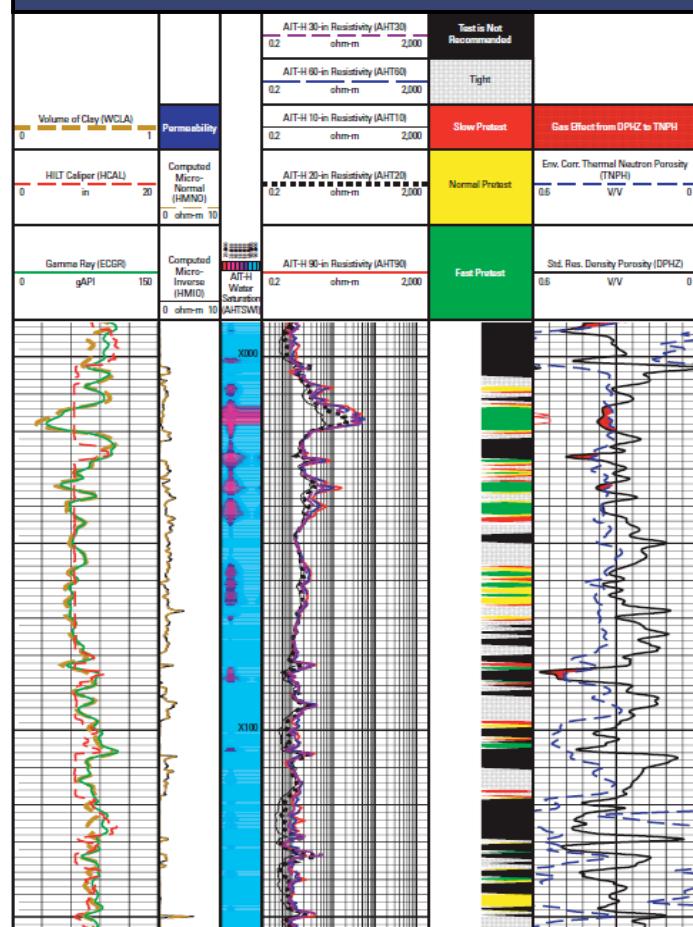
The short probe section has an eccentric 3 7/8-in diameter, and the remainder of the tool body has a diameter of only 3 3/8 in. The eccentric tool shape, combined with a slightly overbalanced setting force from the backup anchoring pistons, ensures an integral 1/2-in standoff from the formation during pretesting.

The smooth tool profile also minimizes mud cake scraping when the PressureXpress tool is run in the hole. There are no external tool angles over 20°.

PressureXpress Specifications

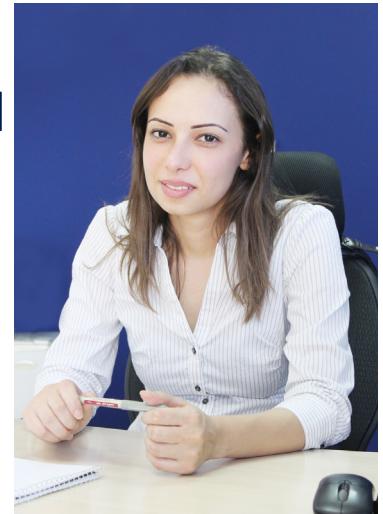
Length, ft.[m]	21.1 [6.43]
OD, in [mm]	Tool: 3.375 [85.73] Probe section: 3.875 [98.43]
Hole size range, in [mm]	4.75 to 15.40 [120.65 to 391.16]
Max temperature, deg °F [deg °C]	300 [148]
Max pressure, psi [kPa]	20,000 [137,900] With CQ Ggauge: 15,000 [103,420]
Max pretest volume, fl oz.US [cm3]	1.18 [34.9]
Pretest rate range, fl oz.US/min [cm3/min]	0.1 to 4.05 [3 to 120]
Max drawdown, psi [kPa]	6,500 [44,800]
Setting force, lbf [N]	5,127 [22,806]
Tension limit, lbf [N]	50,000 [222,411]
Compression limit, lbf [N]	22,000 [97,861]
Gauge accuracy, psi [kPa]	Sapphire gauge: ±5 [±34] CQG gauge: ±2 [±13.8] + 0.01% of pressure reading

The PressureXpress Advisor log generated in real time from Platform Express data grades zones according to their relative suitability for pressure testing. Green, Yellow, and red flags indicate fast, normal, and slow pretest conditions, respectively. A gray flag indicates a tight formation, and a black flag means that a pretest is not recommended.



Ms. Yousra Abou El-Naga

Operations Manager of DCS
Egypt, Syria, Jordan And Iraq
Schlumberger



Ms. Yousra, to those who don't know you well, could you share a brief background of your professional life with us like your college life, where did you graduate from, what was your major and what activities did you do in college?

My name is Yousra Abou El-Naga, I'm currently the operations manager of DCS "data and consulting services" for Egypt, Syria, Jordan and Iraq. I'm an AUC graduate and my major was construction engineering and you know this is totally different from what I'm doing today, but in Schlumberger we hire all types of engineers because we believe that we can give you all the technical knowledge that you need; we only need the potential and the brain. And regarding activities I was very active, in school I was the head of my school student union, and in college I was very active I was in CIMUN "Cairo International Model of United Nations", CIMAL "Cairo International Model of Arab League" and along with the student union I was also in the ISLC "International students Leadership Conference" and that what helped me to be what I am today, all management, personal and leadership skills are all due to my extracurricular activities. I started from being a VIP usher in the first year and I was leading the organizing committee in the last year for the ISLC and Vice President of the student union and this what made my comment about SLB interview it was easy, those activities are like real life brought to you in advance.

Tell us please about your experience as a female field engineer.

Well it was really very hard because when I started, I started in Australia and there was the challenge because you have to adapt to the different culture and perform at the maximum level and this what we call in SLB the geographic exposure. It was very tough and I started in Ramadan "I remember that very well" and we were in the desert and everybody was eating and drinking and I was fasting but it was good because you were sent of the protective environment here in Egypt to be alone in the desert, this what makes you get tougher, then I was sent to Indonesia where I had a lot of fun. Females were about 75% of the working force so we were the majority then to Oman then to Al-Yamane then to Egypt; the main challenge was in the culture difference which was to convince the family that I'm going to be alone in the desert. Even in Egypt there was a challenge as it was hard to convince the clients that a female can think and can do the job well, but once you have experience and can tell the client how you perform your job you gain his respect.

You have had a rapid career advancement. Do you think that would happen if you were not in SLB and can you tell us about it?

Definitely not, because Schlumberger is a meritocracy company in which your career depends

only on your merit; the more you give the more you get back; not depending on how much you spend in the company like what the situation in other companies is. Something also that needs to be mentioned that in SLB they give you the training all the time; they don't let you be on your own. There is a lot of mentoring and training and that what keeps your performance improving and keeps you advancing. But to be mentioned that what I've done is not that great thing to be mentioned; I've a lot of role models in this company, for e.g. there was a guy who was VP North America when he was only 27 years old.

ferent people and cultures. It is such a small world in Schlumberger.

Some employees in DCS say that it is the brain behind all other Schlumberger segments. Do you agree?

We do all the studies for all other segments in here. We have the model, we do the dynamic model and determine all needed stuff like where the oil is, where to drill then we get the logging data and do our studies about the reservoir in here. All other segments execute the job and then all studies are done here.

So where do you see yourself five years from now?

Well, probably in the same segment DCS, "So what's next after Operation manager?" hmm... Vice President "We wish you best of luck" ... We in Schlumberger every three years have what we call COR...Career Orientation Review so I might switch back to personnel, I like that much. Through COR you are like working for many companies within the umbrella of Schlumberger, you don't need to resign and reapply and start over and this is the beauty of Schlumberger.

".... Even in Egypt, there was a challenge, as it was hard to convince the clients that a female engineer can do the job well, but once you have experience, you can tell the client how you perform your job and you gain his respect."

You mentioned that your major was construction engineering. Was it hard to advance in a petroleum company?

Not at all, as I've mentioned that in Schlumberger we give you very intensive courses in the first year with a passing grade of 75%. You can only fail once throughout the whole year and if you are a good caliper, we can make you a petroleum engineer in one year. And also to be mentioned that construction engineering was helping me as I was fracturing engineer but I really didn't need that as I learned in Schlumberger all that I needed to do my job. Also you need to know that in this year you forget about your life this whole year.

Do you see a difference between Schlumberger in Egypt and Schlumberger in any other part of the world; speaking as you have seen a lot throughout your life?

Not at all, we work in over 80 countries and still you only know you have changed countries when you only get out of Schlumberger office, we have the same setup and same disks and everything everywhere, but only you see dif-

Some segments of Schlumberger are more active than others in other countries so what do you think of DCS in Egypt?

If you are talking about a market share, we have like the highest market share out of Schlumberger business in Egypt as we are linked to wire line and it has 70% so we have this percent as well but there are more opportunities we can take, so yes and we are working on it.

As the operation manager of DCS what is your plans to improve the segments performance in the near future?

I am working on making DCS the technical leader and partner of the client and Schlumberger as well. That's on the business side but on the side of the employees; I am working on developing the future generation of the Egyptian managers. I can see that we don't have good supply of people from DCS that can be managers. That is my main role, to get more people to be able to manage the segment that may be through training or recruiting or even by exposure, we are sending people to UK, far east, Qatar... so they get the international experience and come back here.

We are almost done, so what advice you give to us as future generation of new engineers?

Mainly, get to know well about your technical education, but get as much as you can in extracurricular activities. You can write anything in your resume but we can easily know if you were really into those activities or not, get more into activities and work on your soft skills, presentation, communication, get to watch people, read a lot of books; that's what helped me to be what I am today and get to understand the economy and politics.

What is the advice you give to us as the activities initiatives in our college?

Well mainly to tell you we don't hire a 4.0 GPA student, you are doing the right thing, you just need to have a balanced life. If you do that you have granted your future, and to be honest with you, try to get into more activities that bring to you different environments like models and AIESEC and charity so you can deal with people from different points of view. I personally liked CIMUN, CIMAL and ISLC so try to be into more diverse activities.

Tips for Effective Training

Amr Abd El-Aziz

Completion Engineer, Halliburton

Teaching Assistant, American University in Cairo



There is no doubt that internships, summer training and field trips are some of the most important issues for students of nearly all branches of undergraduates' studies. This article gives an overview about benefits you should be interested in, upon both technical and non-technical levels. Also how to avoid being depressed and disappointed with your training in addition to some tips to maximize the benefits of it. Also, I'll share with you some situations I've been through during my own experiences which might be useful.

Benefits of Training:

First, don't listen to the saying that academic life and the industry are completely different stories. This is not so accurate. Academic study provides the essential basics of field operations. Field experience alone in most cases would make you like a very experienced "technician" in only specific branch but not a creative engineer. However, field experience would allow you to see and feel what you have studied. Actually many subjects require tedious work and great effort to understand them theoretically but with field experience they become very simple and you start to realize them more deeply and without further need of memorization. It just inspires your theoretical knowledge just like reviving the dead. Therefore, academic study and field experience complement each other. However, what might be meant by the gap between them are the skills required and the differences between both environments. Industry environment is different and need more skills, mostly soft skills.

Moreover, field experience provides you with some more important benefits that go beyond the technical issues. For example, suppose that you have perfect technical knowledge and you have a keen teacher. He will never tell you what to do when you are the man in charge in a super rig and you need an urgent load of diesel or water. How should you response when someone in your crew does not obey safety regulations during a given operation? Or if you are a member in a reservoir study team, how would you arrange the work with different team members or how to induce other members to do their best if you are the team leader? What would you do if someone didn't do his task? What will be your response when your boss asks you to do a task that you don't have any idea about? All these and more essential skills are not being taught usually rather being gained only by experience and they contribute in building your personality. Actually a major part of a job interview focuses on this type of questions and evaluating such skills, leadership skills, communication skills, presentation skills and time management skills. Now, the good news is that you will gain many of these skills automatically without paying much attention. Your mind learns them unconsciously. But you should put this in your mind to maximize the benefit. So never say that I'm not benefiting from this training because you actually do.

As mentioned, there are some differences between university and field environments. In the field, you'll find yourself responsible for all staff. You'll never get someone who tells you about what should you do and absolutely there is nothing like university lectures or classes. Most of your supervisors will be busy doing his/her assigned tasks which means that you'll have to work very hard to get the knowledge and information you need. Trainees usually get disappointed because they feel that they are not benefiting from the training while in fact they do as this difficulty itself gets you closer to the work environment. The only trick is that you should expect what I've described above before you start your internship. If you do so you could then use it to teach yourself how to cope with this and get more familiar with work environment.

Finally, I would like to share with you some situation I have been through during field trainings I attended.

First Experience was a visit to Belayim Petroleum Company fields located at Abu-Rudais – Gulf of Suez region. After getting brief safety induction, I went to the drilling rig EDC5. It was a land rig drilling directional well targeting an offshore reservoir. As it was my first time, I didn't know what to do and I spent much time just waiting but nothing happened. When I asked the company man for help, he advised to take tour at the rig and mud system then to read the drilling program of the well which consists of all details about the well and explains step by step how to drill the well in addition to a brief about many problems expected during the course of drilling.

Whenever you visit a rig you should take a look at the drilling program, ideally you should do the following:

- Read drilling program as soon as possible,
- Discuss briefly the well and current operation with company man.
- Take your tour around the rig, at rig floor, mud system and different units. Take notes.
- Return to company man office; discuss your watches and notes with him.
- Repeat the cycle as more questions arise.
- Always that you have to be positive, search for information as it won't come by itself.

Second Experience was with Wetherford workshops where I was involved extensively in many activities even paper work. Maintenance of tools, assembling and disassembling, loading and unloading, and even inventory process. It was very useful and I strongly recommend you to get yourself engaged in as many operations and activities as possible. Also it was first time where I was committed to arrive and leave at certain times. If you are late you get salary deduction and so on. This is useful to familiarize you with work environment.

Third Experience was a three day field trip to Agipa Petroleum Company. I wrote a detailed report that may be a good help to those who had no training experience.

First day:

It seemed to be like a routine. When we arrived at the site at Meleha base in Matrouh at 1 pm we had our lunch then met HR head. Then we got some safety induction and had our PPEs. Although it may seem like a routine action, it was very important and should be expected as soon as you arrive at any operations' site. By the evening we went to the accommodation building, socialized with some people there, had our dinner, visited different places to get familiar with and finally went to sleep.

Day two:

First we met production engineers at the production office, we had some discussion then we went to the process plant at about 9 am. Tour was very useful and we had a chance to observe the inside of a heater treater that was opened for maintenance.

After that, we had a short tour at water injection plant for about one hour till 12 pm. After lunch, a bus was supposed to transport us to the production workshop but there were no buses, instead of wasting more time we decided to walk. Trip took about 25 minutes. Note that nothing goes ideal at the field, try to be flexible as much as possible, be active, positive and do not just wait for help.

Upon arriving at the workshop, we observed tools and components of various models of sucker rod down hole pump. After Al-Asr pray, we were involved in assembling a down hole pump and testing it, also we participated in disassembling old one. Note that you should always ask for participation in activities and operations whenever available and safety wise accepted and remember that in most cases no one will offer you to do so. According to the program, it was the end of the day, but it still 5 pm, so we decided to visit the work over rig earlier and we did actually. We met co-man, had a tour with the tool pusher, Discussion about the operation with co-man. The well was shut-in upon decreased production and increased water cut, Tbg wash-out was suspected and the current operation then was POOH. We were told that the new completion installation would start next day evening. Regardless of the benefits of tour and discussion, this piece of information was quite useful since we decided upon this to modify the plan to visit the drilling rig first then work over rig in order to have a chance to watch assembling and installing a new completion instead of just watching RIH with Tbg.

Day three:

Meeting at 8 am with HR head to discuss modification of the trip program. Postponing work over rig visit till evening and replacing it with drilling rig visit. Modifications were approved.

Moved to drilling rig Wetherford 92 at 8:30 am.

Upon arriving we had meeting with co-man, system tour with the driller, rig floor tour , current operation was drilling ahead 8.5" phase, observed rig equipment, driller's panels, BOP system...etc., then we had a meeting with MWD engineer and carried out a discussion about the job, watched mud pulser at workshop. After El-Gomaa pray and having lunch, we had a discussion with company man about the drilling operation during which the rig crew performed a fire drill which is conducted periodically to ensure the ability of firefighting and prevent any miss behavior by any the crew in case of fire. It was a good chance to attend such event.

Useful Training Tips

- Write your time sheet through first moment.
- Be friendly, and make sure that you leave good impression and be keen in building good relations with people.
- Always introduce yourself at the beginning.
- Show your interest when the other side starts introducing himself.
- Spend some time socializing with people to break the ice before any technical discussions. This could be achieved by conducting short conversation about any general topics.
- You may ask some general question to initiate discussion such as: what is the main current activity of the company? What is the current operation? What are the name, type and current phase of this well? What are main tasks of this unit, department or of yours...etc.
- Ask about all things you see even if they seem not interesting.
- Always ask "What if..." questions.
- Whenever at operations' site, watch closely safety regulations and obey them carefully.
- At the rig, spend most of your time on the rig floor, mud system, different units around the rig and with technicians and keep the time you spend in company man's office at minimum.
- You should visit all of the following when available: mud logging unit, mud engineer, Geologist, Directional drilling unit, cement unit, wire line unit and any other services units available at rig site. You may want to spend a day with each of them.
- At the rig, visit mechanic, electrician, welder and all personnel involved in activities which may seem not related to your specialization.
- Some companies will give you a poor training program, try to overcome this and realize the fact that you don't have to stick to such programs 100% , you do have a great deal of flexibility in the field.
- As I've mentioned, not all people are helpful, don't get depressed or disappointed and never give up because many others will be so.
- Be smart in picking right time for discussions and note that some critical operations stress people. Don't overstress them when they are tensioned during such operations. Try to take notes as much as possible for future discussion.
- Always draw schematic for all things you see. This eliminates the necessity of memorizing.
- Use the chance to strengthen your communications network.
- Try as much as possible to engage in operations and/or projects even with little rule, ask your supervisor to assign you tasks whenever it is available and safe.

Fluted Nozzles

Mohammed Sherif Mahrous

Second Runner-up in SPE North Africa Sub-Regional Paper Contest

Faculty of Petroleum and Mining Engineering



Introduction:

Fluted nozzles are a type of drilling bit nozzles of particularly a special design patented to Vortexx Group Incorporated®. The new design gives the interior surface of the nozzles a unique geometry which produces pressure distribution and turbulence of the flow resulting in a higher rate of penetration (ROP), longer bit life, and cleaner holes compared to conventional (standard) nozzles.

The new fluted nozzles have been extensively field tested in several locations around the world with a total drilled hole of more than 250,000 ft. (76,200 m) over 4,000 hours. This includes a combination of vertical, directional, and lateral well bores in more than a dozen different formations.

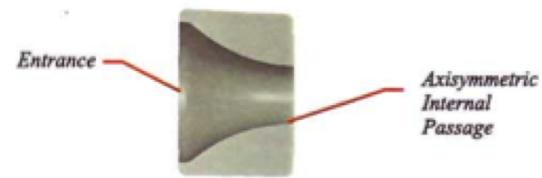
Bit Nozzle Designs:

Enhancement of the nozzle design is the major hydraulic design improvement in drill bits in general, as all nozzle designs aim towards attaining better bit hydraulic functions and minimum pressure losses at the nozzle, as about 60% of the mud pressure losses occur at the bit nozzle. So, in few simple words, improved nozzle design means improved bit hydraulic functions which in turn mean better bottom hole cleaning, thus increased ROP and longer bit life.

Design and Hydraulic Improvements:

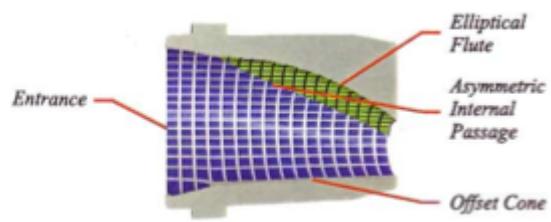
The interior design of any conventional bit nozzle does not contrast much with the one shown in the figure below; a large inlet area with a smooth axisymmetric internal passage ending with a smaller outlet area. This design gives the fluid outflow its 1D (one-dimensioned) flow model, which employs:

- A constant outlet pressure.
- Constant parallel velocity vectors.
- Constant shear stresses.
- No angular momentum associated with the flow.



However, the interior design of the fluted nozzles (shown below) has managed to satisfy the bit hydraulic functions to a greater extent due to its characteristic asymmetric internal passage that includes a fluted channel with sharp interior edges. This new design turns the fluid outflow into a 3D (three-dimensioned) flow model with improved hydraulic features:

- Pressure variation over the outlet area
- Velocity vectors vary in both magnitude and direction over the outlet area
- Shear stresses vary with location over the outlet area
- The outlet flow has angular momentum with respect to the inlet's 1D flow axis



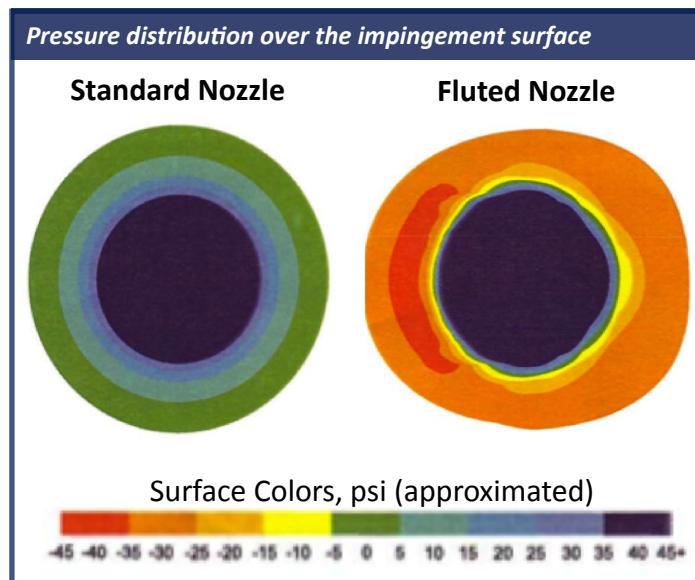
Insights:

It is possible to gain more insights into the flow differences between the updated fluted nozzle and standard nozzle by examining the pressure distribution over the impingement surface for both types of nozzles (opposite figure). While the conventional axisymmetric nozzle produces only regions of positive impingement pressure, the fluted nozzle, owing to its asymmetric internal passage, produces regions of both positive and negative impingement pressure. In the negative pressure regions, the fluted nozzle causes suction or less than hydrostatic pressure, to be developed on selected regions of the impingement surface. This distinctive "negative-pressure" aspect of fluted nozzles was explained and demonstrated with experimental tank tests in water. It was also verified by computational fluid dynamics studies, forming the basis for the first patent issued on this technology.

It was initially speculated that the negative impingement pressure was the main reason for improved bit performance as standard nozzles were replaced with the fluted nozzles, however further studies have proved that fluted nozzles provide additional hydraulic benefits as a result of its 3D flow patterns. These benefits are summarized in:

Increase in local entrainment: Experimental measurements showed that the local entrainment of recirculating fluids increased up to a factor of four, which in turn, may help cool the drill bit while assisting in cuttings removal.

Double the hydraulic horsepower (HHP): The hydraulic horsepower - that a nozzle imparts to its fluid - is one of the most important drilling hydraulics aspects. For fluted nozzles, the net power imparted to the fluid is higher because the outlet flow is 3D. This causes the non-parallel velocity components to interact with the shear stress to create additional power not present in the standard nozzle, in which there are only parallel velocity components.



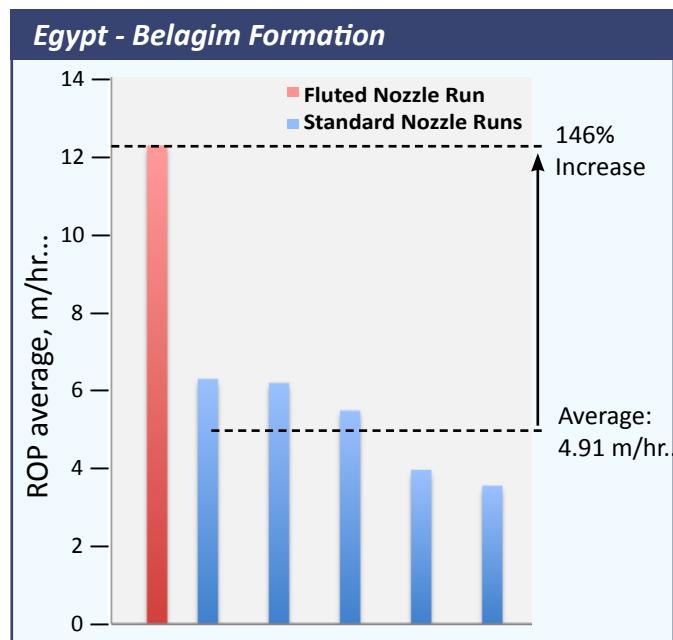
Increase the hydraulic impact force (HIF): A secondary drilling hydraulic aspect of similar importance is the impact force that the fluid applies perpendicularly on the impingement surface. Using computational fluid mechanics, it was found that the impact force provided by fluted nozzles is greater than that of conventional nozzle by about 10 to 20%. This was also attributed to the 3D outflow of the fluted nozzle. Since the flow is 3D, the exiting velocity has two tangential components as well as one perpendicular to the exit area. To have the same flow rate, the fluted nozzle has the same average normal velocity component as the standard 1D nozzle, however the fluted nozzle also has an average tangential velocity component that is not present in the conventional nozzle. Thus, the resultant velocity vector -used in the impact force calculation- has a larger magnitude in the fluted nozzle than in the standard nozzle, resulting in greater impact force.

".... So, in a few simple words, improved nozzle design means improved bit hydraulic functions which in turn mean better bottom hole cleaning, increased ROP and longer bit life."

Site Records – Belagim Formation:

To aid in assessing the improved performance of this new design of the fluted nozzle, an extensive search of site records was carried out to locate off-set runs for PDC bits with the same IADC code, run in the same formations, and run with and without the new fluted nozzles. One offset comparison group for 8 ½ inch PDC bits where five standard nozzles runs and one fluted nozzle run were found for the Belagim formation in Egypt (opposite figure). The fluted rate of penetration (ROP) was 12.1 m/hr. while the average of the standard runs was 4.9 m hr., which represents about 146% increase in ROP.

However, searching the site records did not yield the auspicious ROP increase only. A common complaint found in most records is the awkward orientation of the fluted nozzles, as it requires that its primary direction of flow must be optimally oriented relative to the bit cones and any type of improper orientation - even the slightest - can negate the benefits of the fluted nozzle. So, to overcome confusion about field orientation, each fluted nozzle is now manufactured with an arrow etched on its top surface, indicating the flow direction.



Eng. Ali Faramawy

Corporate Vice President, Microsoft Middle East and Africa President

By Mostafa Mohsen Gaafar

Faculty of Petroleum and Mining Engineering



You've probably seen his face or heard his name before; he's the renowned Microsoft VP who went on to be a national figure synonymous with success. He is currently one of five executives who manage all Microsoft worldwide operations.

Ali Faramawy graduated from the Faculty of Engineering at the University of Alexandria, majoring in Computer Science and Automatic Control. He then obtained an MBA in Strategic Marketing from the University of Hull in the UK. He was initially recruited by Microsoft in 1997 as the General Manager of Microsoft Egypt, when he was no older than 33. He later became the Regional Manager for East Mediterranean Region, then Regional Sales, Marketing and Services Director for Middle East and Africa. In April 2004 he became President of Microsoft Middle East and Africa, which is one of Microsoft's most challenging and dynamic markets.

Only months ago, in September, he was named Corporate Vice President of Microsoft Corporation. The promotion recognizes his strong leadership and contributions to helping to fuel growth across the region. It also underlines the growing role of MEA as an area contributing to the overall success of Microsoft. He is also a member of the international leadership team that is responsible for the company's global strategy.

In his role at Microsoft, he has pioneered new types of partnerships that focus on market development and fostering the local software economy. He built deep partnerships with governments, businesses and communities that accelerated Microsoft's growth in the region, like the partnership with the Egyptian government to leverage public education.

Listening to Ali Faramawy speak, one can't help noticing is his unmistakable Alexandrian accent, his conspicuous Egyptian sense of humor, and his neatly structured mind as if he's reading from Microsoft PowerPoint bullets. And just like most of us, he rediscovered his love for his country after the revolution, and his pride has gone up and up.

Here are some pieces of wisdom from Faramawy, that testify to the manner of thinking that propelled him up the ranks of one the world's most esteemed companies.

- **Leadership:**

He believes a leader should be one who's capable of four things; strategic thinking and formulating a long-term vision for the future, assembling an exceptional team, executing his plan and observing the results, and finally he must be able and willing to communicate with his subordinates and partners.

- **Happiness at work:**

Faramawy believes that happiness at work is the product of being able to express your views and be who you are. That is the advice he gave his son 6 months into his first job.

- **Technology and education:**

He is convinced that information technology has transformed the student from a passive receiver of curriculum from his teacher, to a proactive seeker of knowledge and that it also facilitates teamwork and collaboration. And this can have great impact on his work and even on society in general.

- **Perspective on the Middle East:**

He describes the region with two words; diversity and potential. Diversity because it's a region that has some of the world's richest countries along with some of its poorest, and potential because the youth represent about 60% of the region's population.

- **Thoughts about Egypt's future:**

"A lot of us want better. This will come if we join hands, show our love to our country and our faith in tomorrow through sustained positive actions and behavior. Yes, from time to time we will get hit, fall back and become frustrated, but positivity and genuine passion will make tomorrow seem more pleasant"

I can't think of a better conclusion than Faramawy's own words;

"Egypt, in the coming phase, needs all of us, with the best of us. Each one of us must do his best."

The Mission and Vision

Faculty of Petroleum and Mining Engineering Suez Canal University

The Vision of the Faculty:

The Faculty of Petroleum and Mining Engineering is looking forward to occupying a prominent place among the institutions of higher education and contributing to the community development including the best methods to enhance the role of services offered by the faculty.

The Mission of the Faculty:

The faculty of Petroleum and Mining Engineering at the Suez Canal University aims at graduating professional engineers in various fields of oil and mining industries to meet the national and global needs. The faculty is also concerned about the education and research process in the areas of its specializations.

Also one of the faculty objectives is to graduate engineers being conversant in not only the basic science but also the various engineering skills that are in line with the international standards, and at the same time suiting the local and international market needs. Furthermore, preparing engineers with a scientific base of engineering that enables them to make postgraduate studies (Diploma- Masters-PhD) is one of the major objectives of the faculty.

The faculty is also interested in engineering and applied science and introduces consultancies, field trials and tests in the petroleum and mining fields.

The Scientific Degrees Granted by the Faculty:

1- Bachelor's degree in one of these specializations:

- Petroleum Engineering.
- Petroleum Refining and Petrochemicals Engineering.
- Metallurgical and Materials Engineering.
- Mining Engineering.
- Geological and Geophysical Engineering.
- Petroleum Exploration and Production Engineering Program.

2- Postgraduate diploma in one of these disciplines:

- Petroleum Engineering (Drilling Engineering- Petroleum Production Engineering- Petroleum Reservoirs Engineering).
- Petroleum Refining and Petrochemicals Engineering (Refining Engineering-Petrochemicals- Gas processing Technologies).
- Metallurgical and Material Engineering (Corrosion and protection of Metals-Plumbing and Welding Engineering-Formation of Metals and Heat Treatment).
- Mining Engineering(Mining Technology- Processing of Raw Materials-Mines areas)
- Geological and Geophysical Engineering (Geophysics Engineering- Geological Engineering).

3- Joint diplomas in one of these specializations:

- Engineering of transportation and storage (Petroleum Refining and Petrochemical Engineering-Engineering Sciences)
- Groundwater (Geological and Geophysical Engineering- Petroleum Engineering-Mining Engineering)

4- Master's degree in:

- Petroleum Engineering
- Refining and Petrochemical Engineering.
- Metallurgical and Material Engineering.
- Mining Engineering.
- Geological and Geophysical Engineering.
- Energy Engineering.

5- A PhD in engineering in one of the fields mentioned in the masters section.

US Apache Corporation to Expand Egypt Investments by \$1 Billion in 2013 – Kuna

U.S. oil and gas producer Apache Corp. (APA) has reached a deal with Egypt to expand its oil and gas investments in the North African country in 2013 by \$1 billion, Egypt's Minister of Oil Abdullah Ghorab said, according to the Kuwait state news agency, or Kuna.

In a joint press conference with Apache Chairman and Chief Executive Officer G. Steven Farris, Ghorab said that Apache officials have presented to Prime Minister Kamal Al-Ganzouri a plan to pump \$1 billion into oil and gas exploration and production projects in Egypt in 2013, Kuna reported. The minister said the American



company has several projects in Egypt's western desert, and is one of the biggest energy companies operating in Egypt, Kuna said. The U.S. oil and gas company has operations in the United States, Can-

ada, Egypt, the U.K.'s North Sea, Australia and Argentina.

Apache has spent over \$1 billion on oil and gas exploration in Egypt over the past decade, Farris said, adding the Egypt government's revenues from Apache projects amounted to \$10 million per day. The Houston-based company had earlier in the month said it remained bullish on its operations in Egypt and the U.S. Gulf of Mexico, where it also plans to increase spending this year, despite concerns the company has too much exposure to both areas, which saw significant regulatory changes last year.

Iran Stops Oil Sales to Britain & France

Iran has stopped selling crude to British and French companies, the oil ministry said on Sunday, in a retaliatory measure against fresh EU sanctions on the Islamic state's lifeblood, oil. The European Union in January decided to stop importing crude from Iran from July 1 over its disputed nuclear program, which the West says is aimed at building bombs. Iran denies this. The mounting sanctions are aimed at putting financial pressure on the world's fifth largest crude oil exporter, which has little refining capacity and has to import about 40 percent of its gasoline needs for its domestic consumption. Iran's oil minister said on February 4 that the Islamic state would cut its oil exports to "some" European countries.

The European Commission said last week that the bloc would not be short of oil if Iran stopped crude exports, as they have enough in stock to meet their needs for around 120 days.

Aramco to Invest \$90 Billion in Boosting Refining Capacity

Saudi Aramco will invest \$90 billion in the next five years to increase refining capacity by 50 percent to 6 million barrels a day. Most of the capacity to be added to the five-year target will be at refineries in Asia, with the bulk of that in China, said Khalid Al-Falih, Aramco's CEO. Moreover, the company has a \$200 billion spending program which it plans to implement over the coming decade with a heavy focus on China and Indonesia, Oilprice.com reported. "The company plans to boost its global refining capacity to 8 million barrels a day in 10 years, including projects yet to be announced," Khalid Al-Falih was quoted as saying in mid-January.

Aramco seeks to tap increasing consumption in China, Asia's biggest energy user, by forming joint ventures with local partners.

According to Frost and Sullivan, a growth partnership company, Saudi Aramco's growth plans are clearly aligned with the diversification objectives of the Kingdom of Saudi Arabia.

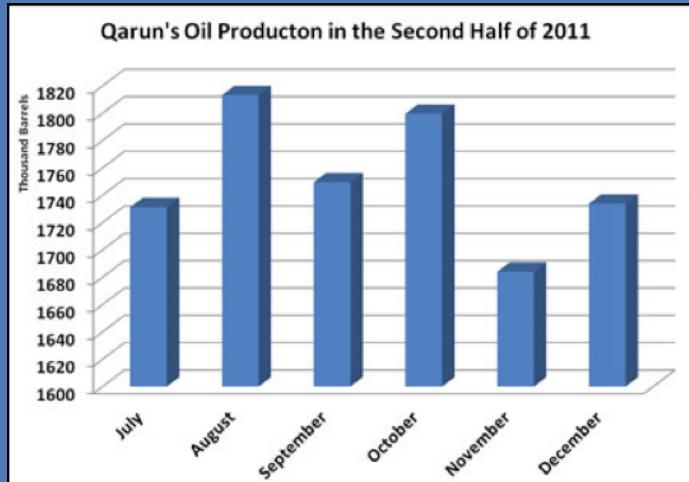
Saudi Aramco, through its joint ventures such as PetroRabigh, Sadara Chemical Company and Satorp is introducing a whole new array of products which were not previously produced in the Gulf Cooperation Council (GCC).

These chemicals not only add more value along the petrochemical chain, but also open investment opportunities in the downstream sector and create more job opportunities for the local people.



Qarun Petroleum Boosts Western Desert Crude Output

According to the analytical report conducted by Egypt Oil and Gas to gauge the performance of Qarun Petroleum, the company's production rates of crude oil have been consistent during the past six months. Conversely, the company's production of natural gas is almost non-existent within the same timeframe. Reports also indicate that Qarun's production level reached 1733802 barrels of oil during December 2011. The graph below illustrates the company's crude output over the previous two quarters.



Bapetco to Spud New Wells in the Western Desert

Badr Petroleum Company (Bapetco), a joint venture company between the EGPC and Royal Dutch Shell, has announced plans to drill two new wells, which are part of the company's declared development plan for the fiscal year of 2011/2012. The first well, OBAJS-1X, is an exploratory oil-producing well. It is situated in Alam El-Shawish West Block in the Western Desert. The well, currently under evaluation, will be drilled using the EDC-55 rig to a vertical depth of 6480 feet, with drilling investments totaling \$2 million. The second well is located within the same concession area. NEAG JG-17 is a developmental crude-producing well. The cost of its drilling has averaged \$3.5 million. It was operated using the EDC-51 rig reaching a depth of 11319 feet. The company's target for the fiscal year 2011/2012 is to drill 44 wells, which is 10 wells more than last year's target. Badr Petroleum is a joint venture company between the EGPC and Royal Dutch Shell.

Syria's Homs Refinery Pipeline Attacked



A major oil pipeline near a large Sunni Muslim district in the Syrian city of Homs has been attacked, causing a fire, according to reports. The pipeline runs from the Rumeilan fields in the Eastern Syrian Desert to the Homs refinery. It is not clear what caused the explosion. The authorities have accused "terrorist saboteurs" of hitting the pipeline while opposition activists said the military, which began firing shells, mortar rounds and rockets into Baba Amro on 3 February, has been hitting it by mistake, Reuters reported.

Mozambique: a New Giant Natural Gas Discovery



Eni announces a new giant natural gas discovery at the Mamba North 1 prospect, in Area 4 Offshore Mozambique, encountering a mineral potential of 212.5 billion cubic meters (7.5 tcf) of gas in place. This new discovery, in addition to the Mamba South discovery from October 2011, further increases the potential of the Mamba complex in the Area 4. It is estimated that the total volume of gas in place reaches now about 850 billion cubic meters (30 tcf).

The Mamba North 1 discovery, located in water depths of 1,690 meters, reaches a total depth of 5,330 meters and is located approximately 23 Km north of Mamba South 1 discovery and 45 Km off the Capo Delgado coast. The discovery well encountered a total of 186 meters of gas pay in multiple high-quality Oligocene and Paleocene sands.

During the production test, the first performed at offshore Rovuma, the well produced high quality gas with flow rates, constrained by surface facilities, of about 1 million cubic meters a day and minor volumes of condensates. In a final production configuration, estimated gas production per well is expected to reach over 4 million cubic meters a day. During 2012, Eni plans to drill at least other five wells in nearby structures to assess the upside potential of Mamba Complex.

CHAPTER NEWS



The diversity by which SPE SCU SC has always approached its targets, providing technical and moral support whenever and wherever needed, is what ultimately led to the status we are in at this moment, as the best Chapter in Egypt and the recipient of the golden standard status award, for the second time in a row. Here is a quick overview of some of the efforts that took place in the last few months.

Children's Cancer Hospital Visit



Believing in the significance of our duty towards our society, a group from SPE SCU SC visited 57357 hospital in an effort to help a pioneering national organization outreaching towards the welfare of children donating money and blood and enjoying the day with the to be well soon children. Children's Cancer Hospital is considered to be a leading institution in cancer awareness, treatment and prevention not only in Egypt but also in the Middle East Region.

Reservoir Club

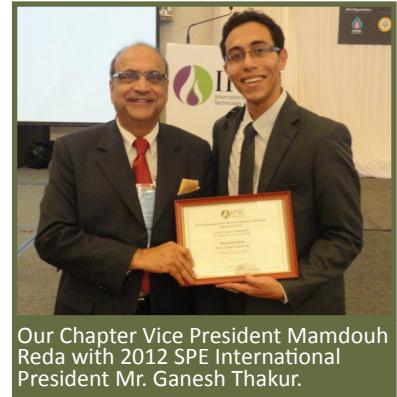
Providing a timelined school for reservoir was the highlight this season so far, inducted by prof. Mahmoud Tantawy and combined by a Reservoir Engineering Course. Through cooperation between Schlumberger Egypt and SPESCUSC, SPE had organized a forty hour course divided into fifteen hour Eclipse software and 25 hour Petrel software workshop.

SPE Paper Contest

In the annual North Africa sub-regional paper contest, the participants representing our faculty dominated the competition securing the first and third places in the contest with technical presentations concerning "Shale Oil" and "Fluted Nozzles." The SPE paper contest offers the chance for the students to present technical papers to the industry experts and compete against other students from their region.

International Petroleum Technology Conference

SPE SCU SC participated in IPTC 2012, the international petroleum conference held in Bangkok, Thailand from February 7 to February 9. The participation was through our Vice President Mamdouh Reda taking part in the IPTC and the simulation educational week as well. It was a source of pride that our representative landed down the second position in the group projects in the educational week. His project was concerned about the CO₂ enhanced oil recovery and its implementation techniques considering the economic analysis.



Our Chapter Vice President Mamdouh Reda with 2012 SPE International President Mr. Ganesh Thakur.

North Africa Technical Conference



As always a team of SPE SCU SC was available in North Africa Technical Conference attending session and was assigned the task of organizing; as they were the press officers facilitating the entrance and work of press in the conference, also they were responsible for media coverage and it was a good opportunity for approaching sponsors from the highest callipers present in the industry.

O&G Simulation Educational Week

SPE Egypt O&G Simulation Educational Week is preparing the students to be qualified graduates with practical field sense, through practical field simulation. In the educational week, students will be divided into groups representing companies. Each company will be responsible for developing its field to achieve better progress.

Objectives:

- Transferring technical experience from Young Professionals (YP) to students.
- Enhancing students' sense and experience through introducing undergraduates to the real field life.
- Sharing the industry's full picture with students.
- Sharing knowledge and enhancing cooperation between YPs and Students.

Assignment:

Each group will work as an O&G Company in operations, technical issues, and business considerations. This work will be done under the supervision of a technical committee.

The students will simulate the companies in a time scale of 5 full days. While working, on developing the field they will face operation problems, crises and technical issues to give them the ability to react with the real industry life.

Technical Committee and Mentors:

The technical committee consists of YPs along with advisors from different companies in the oil sector. Technical committee and mentors are from many companies such as GUPCO, BP, RASPECTO, PICO, BAPECTO, Schlumberger, IEOC, Lufkin, PetroAmir, Al Mansoura, Qarun, Agiba, Halliburton, Baker Hughes and Enventure.

Cementing Session by Weatherford



In this session, a complete overview for the cementing operation was discussed. Eng. Saeed Zaki, marketing manager at Weatherford, also discussed all the latest technologies used in the industry nowadays, plus mentioning the common problems in cement jobs and their remedy techniques.

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Egypt Oil & Gas is the only Egypt-based and Egypt focused oil & gas information provider, offering timely, accurate and useful oil & gas information to the Petroleum Sector

Who We Are

Kuwait Energy Company was established in 2005 and is one of the fastest growing, independent, oil and gas exploration and production companies in the Middle East.

Headquartered in Kuwait, the Company's regional offices include: Cairo, Sana'a, Baghdad, Basra, Ukhta and Kiev, overseeing operations in eight countries namely: Egypt, Iraq, Yemen, Oman, Ukraine, Latvia, Russia and Pakistan. Its participation interests range from 15% to 100% across its exploration and producing assets, providing a balance of risk diversification with significant upside exploration potential.

Kuwait Energy since 2005, has successfully:

- Demonstrated its ability to grow production year-on-year
- Been profitable every year
- Increased its operatorship of assets and demonstrated operator capability
- Established an experienced and qualified management team
- Developed an extensive contact network within regional governments and the industry
- Grown technical expertise and headcount - a function of success



Our Team

Kuwait Energy's management compromises a team of highly qualified individuals, each holding over 25 years of experience in the oil and gas industry.

Kuwait Energy currently employs 500 employees and is in the forefront of employing local workforce wherever it operates.

Health, Safety, Sustainability and Environment

Kuwait Energy's HSSE policies and processes are developed to meet its own internal HSSE requirements as well as industry/regulatory requirements as an international operator of oil and gas fields.

Kuwait Energy's subsidiaries; Rudis Drilling Company, Ukraine and Balin Energy, Latvia, are both ISO 9001:2008 Quality Management Systems and ISO14001:2004 Environmental Management Systems certified.

Kuwait Energy aims to obtain ISO 9001 certification, a Quality Management System Certification in its Head Office by year end 2011.

Our Outlook

- To be the preeminent Middle East based independent oil and gas company.
- To achieve production of 75,000 barrels of oil (boe) per day and proved and probable reserves of 400 million boe by year end 2015;
 - Production of 30,000 boe per day to come from 2010 existing assets and the remainder from exploration success, business development and acquisitions.
- The Board remains focused on ensuring that any growth transaction meets strict financial targets, is complementary to its existing asset base and operations and provides value to shareholders.
- Kuwait Energy continues to actively pursue potential growth opportunities in Iraq and also the Yemeni gas sector where there is significant scope to study power plants, industry and the domestic market.

