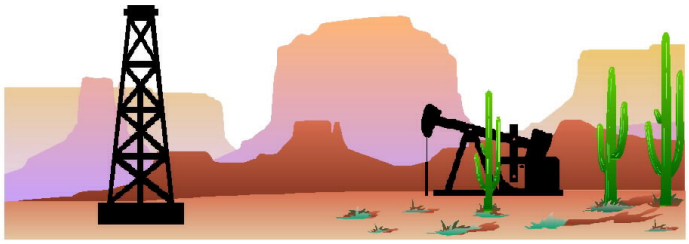
GEO Drilling Fluids, Inc.

Technical Services Newsletter

Volume IV, Number 2 June 20, 2011



MENISCUS

The meniscus is the curve seen at the top of a liquid in response to its container. The meniscus can be either concave or convex. A concave meniscus such as the one formed when there is water in glass, occurs when the molecules of the liquid are more strongly attracted to the container than to

Meniscus
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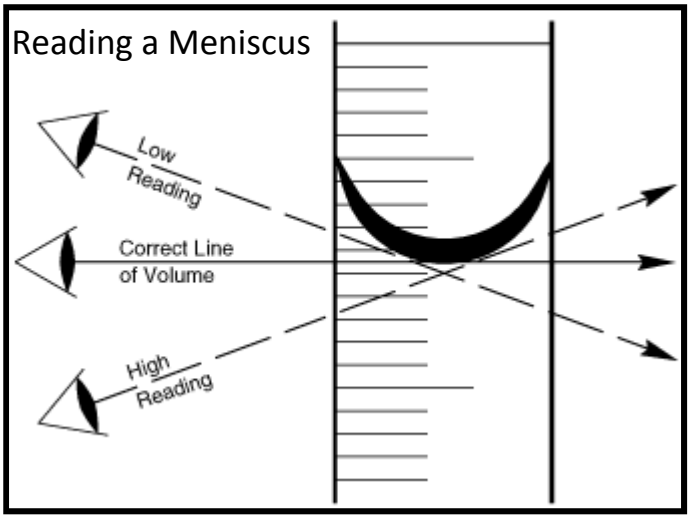

ACT AS IF WHAT YOU DO MAKES A DIFFERENCE. IT DOES.
William James
American Philosopher
1842-1910

WHAT DO *YOU* WANT IT TO BE?

1. The $_{d}50$ Cut Point of a 4" hydrocyclone (desilter) is: a) 200 mesh, b) 15-30 microns, c) 74 microns, d) 6-10 microns.
2. Which of the following does not belong in this list? a) PetroDrill, b) Black Magic, c) Stop Loss, d) PolyTeK^{+}.
3. "Dehydrated" mud after a trip means: a) water was lost to the atmosphere, b) mud weight is too low, c) water was lost to the formation, c) mud weight is too high.

ANSWERS ON PAGE 4

Protect Yourself From The Sun

Most of your duties as a Mud Engineer involve running critical mud tests and evaluating data in the cool comfort of your trailer on location. But every now and then, your presence is required out on the rig. The summer heat of the valley can take its toll on even the most seasoned veteran. Mental alertness and constant hydration are essential during the summer months. Along with the heat comes the increased exposure to the Sun. Along with drinking lots of water, plenty of rest and three square meals a day, you need to protect yourself from the Sun.

Skin cancer is the most common of all cancer

Sun Protection
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Safety ALERT
RESPONSE REQUIRED

Meniscus

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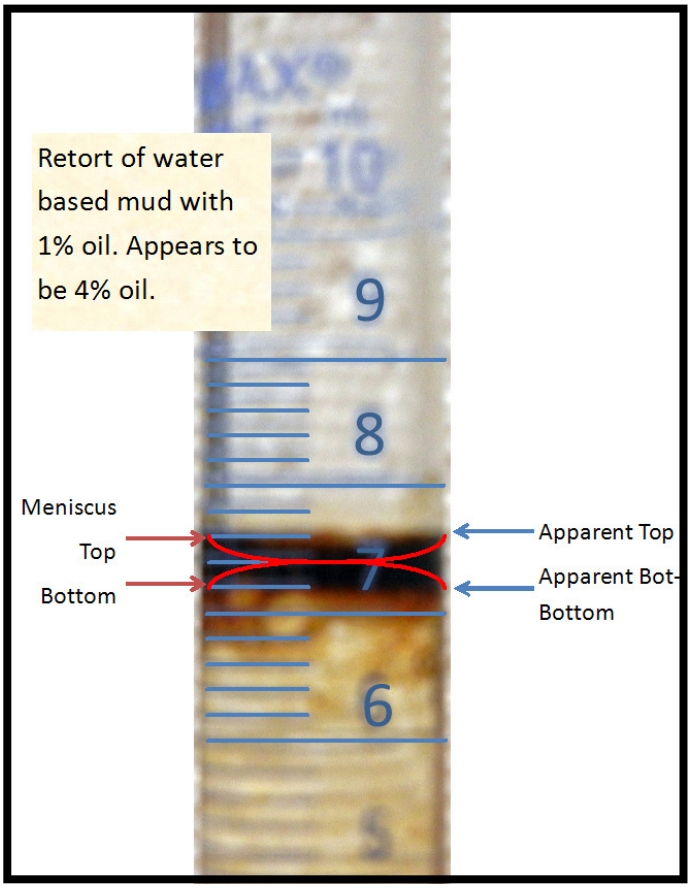
each other. A convex meniscus, such as with mercury in glass, is produced when the molecules of the liquid are more strongly attracted to each other than to the container. In some cases, the meniscus appears flat (e.g., water in some plastics).



When you read a scale on the side of a container with a fluid that has a meniscus, such as a graduated cylinder or volumetric flask, it's important that the measurement accounts for the meniscus. Measure so that the line you are reading is even with the center of the meniscus. For water and most liquids, this is the bottom of the meniscus. For mercury, take the measurement from the top of the meniscus. In either case, you are measuring based on the center of the meniscus." Source: www.about.com.

"When measuring liquid volume it is important to read the graduated cylinder correctly. Your eye should be level with the top of the liquid and you should read the bottom of the meniscus. "

The Molecular Science, 2005.

A mud engineer reading a 10 ml graduated cylinder should be accurate to the nearest 0.1 ml. As seen in this photograph of an actual retort from a water base mud with a small amount of oil it is easy to make a mistake of nearly 4% in the amount of oil.

The amount of water, whether from a retort or as a measure of filtrate, could easily be off by as much as 0.3 ml just by reading the meniscus wrong.

Electronic Mud Report

The third mud check is set up to control the hydraulics. If there is no 3rd mud report then the 1st report is used. The depth entry determines whether or not the 3rd report exists. So if you only have one report it should be the third and it won't work properly until it has a depth entered.

Newsletter

This Newsletter was supposed to be published on April 15th. Due to a rapid increase in jobs, wholesale changes to the electronic mud report for one customer, and a mud school with 7 soon to be mud engineers we have just been too busy to get this document finished. Hope you find something of interest here.

All GEO employees, please make sure you get out your employee handbook and read the section on Heat Illness Prevention.

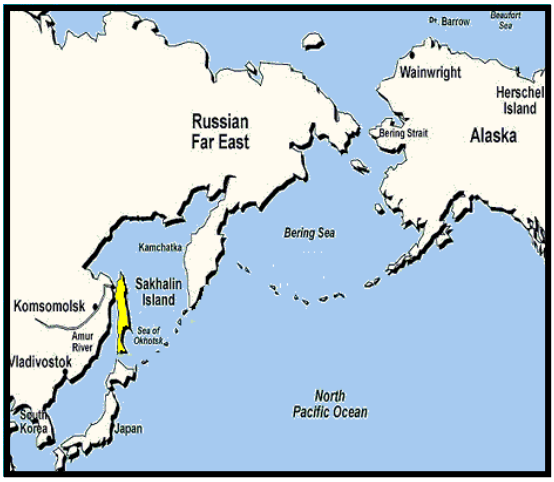
BIGGEST BIT

Varel International recently completed a massive 44 inch steel-toothed roller cone bit for the oil and gas industry. The bit weighs in at more than 6,000 pounds. The 44" diameter is more than 22% greater than any previous roller cone bit. It was built to specifications for Saudi Aramco.

EXTENDED REACH 7 MILES

HOUSTON, Jan. 28 -- Exxon Neftegas Ltd., operator of the Sakhalin-1 project, drilled the world's longest extended-reach well at Odoptu field, off Far East Russia, ExxonMobil Corp. said.

Odoptu, one of three Sakhalin-1 Project fields, is 5-7 miles off northeast Sakhalin Island, see map.



The Odoptu OP-11 well reached a measured total depth of 40,502 feet and a horizontal displacement of 37,648 feet. Exxon Neftegas completed the well in 60 days.

ExxonMobil said the project involves "one of the most challenging sub-arctic environments in the world." The first Sakhalin well was drilled in 2003, and the project has drilled six of the world's 10 record extended-reach wells. The specially designed Yastreb rig has been used throughout, see below.

WILLISTON BASIN

HOUSTON, Feb. 16 -- The Bakken Play in the Williston basin of North Dakota and Montana could become the world's largest discovery in the last 30-40 years, a senior manager at Continental Resources Inc. said.

Ultimate recovery from the overall play is now estimated at 24 billion bbls of oil, compared with US reserves of nearly 20 billion bbls. The Bakken is continuous under nearly 15,000 square miles.

The 24 billion bbl figure is five times the US Geological Survey's 2008 estimate and dwarfs the 151 million bbls the survey put forth as recently as the mid-1990's.

Close to 2 billion bbls of the 24 billion will come from the underlying Three Forks formation, which Continental helped prove to be a separate reservoir.

The increases resulted as technology evolved over a 20-year span from marginal or uneconomic vertical wells to open hole stimulations in single, dual, and tri-laterals, to liners with staged fracs that are resulting in 50% increases in rates of return today. The industry also began drilling into the Middle Bakken dolomite, which is more porous and permeable than the upper and lower Bakken shale source rocks.

Production exceeds 400,000 bbls/day including Montana and North Dakota. So recovery of that volume of oil will take years. The industry has completed 2,750 horizontal wells since 2000. There are 165 rigs drilling about 1,800 wells in 2011. Production could reach 1 million bbls/day within a few years. If the production rate remained constant and we could actually recover all the oil, it would take 67 years to drain the reservoir.

The play's numerous operators are drilling wells with measured depths of 18,000 to 21,000 feet. Each well includes a lateral of about 9,500 feet with 18-30 frac stages in each well.

AND MORE LONG WELLS

Saudi Aramco reported that a recent well in Manifa oil field, drilled to 32,136 feet TD, set a new length record for wells drilled in Saudi Arabia. This length surpassed the previous 30,850 feet in an earlier Manifa well.

SAFETY COMMUNICATION

Who Do You Work For?

In the February 26 Technical Services Newsletter there was a piece about putting a picture in vehicles to help to remind the driver about his loved ones so that he might pay more attention to the business of driving. Within minutes of posting the Newsletter on line I began receiving notes that informed me that it is illegal to hang things from the rear view mirror as they obstruct the driver's view. Thank you to all who made this observation. We haven't come up with a good alternative but are working on it. We would still like a picture to include in whatever format we come up with.

There was a question that referred to an article about coming home safely so that your loved ones will still have you. Most respondents got the right answer by citing "My family", "My kids and my wife", "My wife, 2 children and grandchildren" and so on. But some answered with "GEO Drilling Fluids", "My customer" or "The company man and tool pusher". I would argue that while they employ you or give you directions, it is hoped that there is more to your life than just getting the job done.

Even if you no longer live with your family, there are often children or grandchildren out there who would miss you if you got hurt. And even the most alone, often have a pet who is an important companion and who would be devastated by the loss of its master.

Heart Attack

There was another question that was either unclear or was answered without having carefully read the article. The question was "Chest pain is {not always} {always} a sign of a heart attack." While it

Safety Communication
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MUD REPORT 2.0

Recently I received some comments on the new electronic mud report.

> Andy, I am writing in reference to the new Excel mud program we are using.
> At first I was hesitant to adopt the new program. It seemed complicated. Too many pages, too much different information (i.e. TVD, MD, volume below bit, etc.) that would seem to make things more difficult. But the first outing with this new format was actually pretty easy. Navigation was easier than I thought. Everything to do is easily accessible and the program actually works FOR you. It does a lot of calculating for you which I think helps speed up completing your mud report. I especially like the inventory page. Just enter what you have and it tells you what you used.
> It's much easier to track inventory and more accurate. This is a good program and I'm glad I started using it.
> Carl Jackson

Other comments:

"Just start at the first tab on the left and work your way across. It has everything you need right there."

The inventory report allows you to select the date range. Make sure that it is set to cover all the days you want. See the two blue cells at the top left of the page.

ANSWERS TO WHAT DO YOU WANT IT TO BE?

1. b) 15-30 microns
2. b) Black Magic is not a GEO Drilling Fluids product.
3. "Dehydrated" mud has increase solids surface area giving the appearance of too little water.

$$n = \left\{ \sum_{1}^{6}\left[w_i \log(\dot{\gamma}_i)\right] \sum_{1}^{6}\left[w_i \log(\tau_i - \tau_0)\right] \sum_{1}^{6}\left[w_i \log(\dot{\gamma}_i)\right] \right\}^2 - \sum_{1}^{6} w_i \sum_{1}^{6} w_i \left[\log(\dot{\gamma}_i)\right]^2 - \sum_{1}^{6} w_i \sum_{1}^{6}\left[w_i \log(\dot{\gamma}_i) \log(\tau_i - \tau_0)\right] \Bigg\}$$

HERSCHEL-BULKLEY HYDRAULICS CALCULATION

A key component of Mud Engineering is Hydraulics. The calculations provide us with Annular Pressure Loss (used to calculate Equivalent Circulating Density or ECD), Slip Velocity (used to calculate net bottoms up for cuttings) and Critical Velocity. The formulas for calculating these values have changed over the years. We have employed the Power Law model which is very complex by 1960's standards, but pretty simple by 21st century standards.

The calculations all depend on an index number called "n". In the Power Law model "n" is usually described as 3.32 times the ratio of the 600 rpm dial reading to the 300 rpm dial reading. 3.32 is the log of the ratio of 600 to 300. By extension "n" can also be calculated at other rotor rpm's to more closely approximate the downhole conditions.

The formula for "n" in the Herschel-Bulkley model is far more sophisticated. It takes into account more dial readings and as can be seen at the top of this page requires a lot of higher math. This new formula will be incorporated in our mud report program in the not too distant future.

Using more sophisticated calculations can provide a more precise understanding of the flow of fluids in a well bore. At extreme depths and with narrow loss/flow/fracture tolerances the accuracy can help determine the effect of changing jets and pump rate. But drilling 26" hole still requires very high Yield Point and whether "n" is 0.65 or 0.70 it is still going to be hard to keep the hole clean.

The Power Law uses the 600 and 300 readings to draw a straight line. The Modified Power Law adds the 3 rpm reading and draws a curve. The HB uses multiple points to select a curved line that best fits the readings.

Safety Communication

(Continued from page 4)

is true, as some said in their response, that chest pain is a "classic sign" of a heart attack, it is not always present, especially among women.

"One third of women who have heart attacks have no chest pain, however, and may have milder symptoms such as nausea, vomiting, dizziness, and jaw pain. Some women experience unusual fatigue, sleep problems, indigestion, and anxiety up to a month prior to a heart attack."

Life style has a profound effect on your health as well. Among the activities that can be controlled are moderation in the use of tobacco, alcohol and food and following your doctor's orders if you have a health issue like heart disease or diabetes.

Sun Protection

(Continued from page 1)

types. More than 2 million skin cancers are diagnosed each year in the United States. That's more than all other cancers combined. The number of skin cancer cases has been going up over the past few decades. The good news is that you can do a lot to protect yourself and your family from skin cancer by catching it early enough so that it can be treated effectively. Most skin cancers are caused by too much exposure to ultraviolet (UV) rays. Much of this exposure comes from the Sun, but some may come from man-made sources, such as indoor tanning lamps. Finding possible skin cancers doesn't require any x-rays or blood tests – just your eyes and a mirror. If skin cancer does develop, finding it early is the best way to ensure it can be treated effectively.

Ultraviolet radiation has 3 wavelength ranges:

· UVA rays cause cells to age and can cause some damage to cells' DNA. They are linked to long-term skin damage such as wrinkles, but are also thought to play a role in some skin cancers.

· UVB rays can cause direct damage to the DNA, and are the main rays that cause sunburns. They are also thought to cause most skin cancers.

· UVC rays don't get through our atmosphere and therefore are not present in sunlight. They are not normally a cause of skin cancer. UVA and UVB rays make up only a very small portion of the sun's wavelengths, but they are the main cause of the damaging effects of the Sun on the skin. UV radiation damages the DNA of skin cells. Skin cancers begin when this damage affects the DNA of genes that control skin cell growth. Both UVA and UVB rays damage skin and cause skin cancer. UVB rays are a more potent cause of at least some skin cancers, but based on current knowledge, there are no safe UV rays.

The amount of UV exposure depends on the strength of the rays, the length of time the skin is exposed, and whether the skin is protected with clothing or sunscreen. Skin cancers are one result of getting too much sun, but there are other effects as well. The short-term results of unprotected exposure to UV rays are sunburn and tanning, which are signs of skin damage. Long-term exposure can cause prematurely aged skin, wrinkles, loss of skin elasticity, dark patches (lentigos, sometimes called age spots or liver spots), and pre-cancerous skin changes (such as dry, scaly, rough patches called actinic keratoses). The Sun's UV rays also increase a person's risk of cataracts and other eye problems and can suppress the skin's immune system.

The UV Index

The amount of UV light reaching the ground in any given place depends on a number of factors, including the time of day, time of year, elevation, and cloud cover. To help people better understand the intensity of UV light in their area on a given day, the Environmental Protection Agency (EPA) and the National Weather Service have developed the UV Index. The UV Index number, on a scale from 1 to 11+, is a measure of the amount of UV radiation reaching the earth's surface during an hour around noon.

The higher the number, the greater the exposure to UV rays. The UV Index is given daily for regions throughout the country.

How do I protect myself from UV rays? It isn't possible or practical to avoid sunlight completely, and it would be unwise to reduce your level of activity to avoid the outdoors because physical activity is important for good health. But too much sunlight can be harmful. There are some steps you can take to limit your exposure to UV rays.

Some people think about Sun protection only when they spend a day at the lake, beach, or pool. But Sun exposure adds up day after day, and it happens every time you are in the Sun.

Cover up

When you are out in the Sun, wear clothing to protect as much skin as possible. Clothes provide different levels of UV protection, depending on many factors. Long-sleeved shirts, long pants, or long skirts cover the most skin and are the most protective. Dark colors generally provide more protection than light colors. A tightly woven fabric protects better than loosely woven clothing. Dry fabric is generally more protective than wet fabric. If you can see light through a fabric, UV rays can get through, too. Be aware that covering up doesn't

Sun Protection

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Sun Protection

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block out all UV rays.

Use sunscreen

A sunscreen is a product that you apply to your skin for protection against the Sun's UV rays. But it's important to know that sunscreen does not provide total protection against all UV rays. Even with proper sunscreen use, some rays get through, which is why using other forms of sun protection is also important. Sunscreens are available in many forms – lotions, creams, ointments, gels, wipes, and lip balms, to name a few. Read the labels. When choosing a sunscreen product, be sure to read the label before you buy. Many groups, including the American Academy of Dermatology, recommend products with a Sun protection factor (SPF) of at least 30. The SPF number represents the level of protection against UVB rays provided by the sunscreen – a higher number means more protection. The UV rays become more intense in the spring, even before temperatures get warmer. People in some areas may get sunburned when the weather is still cool because they may not think about protecting themselves if it's not hot out.

Resources can be found at American Cancer Society: site: www.cancer.gov

Review the Heat Illness Prevention Program,

CUT HERE - Return Lower Portion

GEO Drilling Fluids, Inc. ● P.O. Box 1478 ● Bakersfield, CA 93302
Telephone (661) 325-5919 ● FAX (661) 325-5648 ●1-800-GETSGEO ● geodf@geodf.com

SAFETY COMMUNICATION

I have read the safety bulletin covering **Protect Yourself From The Sun**
in the GEO Technical Newsletter of **June 20, 2011.** VOLUME XV NUMBER 2

Print your name:_____

Signed:_____

Date: _____

Comments:

_____

_____

_____

1. Exposure to UV rays comes from _____ _____.
2. Lentigo is the medical name for a condition commonly called_____ _____.
3. I have reviewed the Heat Illness Prevention Program, Appendix L in the Employee Handbook.

Signed:_____

Please answer the questions, sign, date and return to Andy Philips, Safety Coordinator / Technical Services Manager within one month of publication date. Any comments would be appreciated. E-mail response accepted.
Thank You.