Midland College

PETROLEUM PROFESSIONAL DEVELOPMENT CENTER

To register and for more information, go to the Midland College PPDC Website: www.midland.edu/ppdc

Special Events

Midland College PPDC, SPE Permian Basin Section, Permian Basin Petroleum Association Present:
Horizontal Completions in Permian Basin Unconventional Reservoirs
Tuesday, November 20, 7:30 a.m. - 5 p.m.
$235; Out of State, $260
Join SPE and/or PBPA and come FREE! Those joining SPE or PBPA need to fill out applications at www.spe.org or www.pbpa .info and have proof of payment to waive fees. All attendees need to register on the PPDC Website: www.midland.edu/ppdc or call 432-683-2832
Midland College Carrasco Room, 3600 N. Garfield, Midland, TX

Ethics Luncheon for Engineers and Geoscientists: "Henry's Daughters"
Facilitator: Hoxie Smith
December 10, Mon, Noon - 1 p.m.; Buffet lunch is provided with the class fee (Served from 11:30 - 12:00 pm)
$50; Out of State, $75
Midland College PPDC Building, 105 W. Illinois

Courses

John M. Campbell & Company: C02 Surface Facilities
Instructor: Mr. Paul Carmody
November 27-30, Tue-Fri, 8 a.m. - 5 p.m.
$2,615; contact www.petroskills.com or call (800) 821-5933. Fee is paid directly to PetroSkills
Midland College PPDC Building, 105 W. Illinois

Basic Mathematics for Simulation Modeling: A Primer and Review
Instructor: L. Peter (Pete) Galusky, Jr., PH.D., P.E
November 28, Wed, 8 a.m. - 5 p.m.
$245; Out of State, $270
Midland College PPDC Building, 105 W. Illinois

Simulation Modeling: An Introduction to Basic Concepts and Simple Methods
Instructor: L. Peter (Pete) Galusky, Jr., PH.D., P.E
November 29, Thu, 8 a.m. - 5 p.m.
$245; Out of State, $270
Midland College PPDC Building, 105 W. Illinois

Petroleum Geology for Non-Geologists
Instructor: Paul H. Pausé
December 3-6, Mon-Thu, 8:30 a.m. - 4:30 p.m.
$1,295; Out of State, $1,320
Midland College PPDC Building, 105 W. Illinois

Well Control Drilling/Workover (WellCAP)
Instructor: Larry Chapman
December 3-6, Mon-Wed, 8 a.m. - 5 p.m.; Thu, 8 a.m. - Noon
$700; Out of State, $725
Midland College PPDC Building, 105 W. Illinois

On-Line Petroleum Land Management Certificate Program
Module 2: Chaining, Interpreting, and Curing Title
December 3, 2012 through December 29, 2012
Course# G072 122Q - Course Fee: $599 plus $50 Materials Fee (AAPL Land Reference Guide); Total Fee: $649
(If you plan to register for additional modules, the $50 materials fee is a one-time charge)
PLEASE NOTE: Each module is $599
Course# G073 122Q - This course number is only for students who have taken Module 1 and have the AAPL Guidebook
Course Fee: $599

PetroSkills: Well Test Design and Analysis
Instructor: Dr. John P. Spivey
December 3-7, Mon-Fri, 8 a.m. - 5 p.m.
$3,685; contact www.petroskills.com or call (800) 821-5933. Fee is paid directly to PetroSkills
Midland College PPDC Building, 105 W. Illinois

Oil and Gas Contracts - Effective Use
Instructor: Dr. Patrick Fitzgerald
December 5-6, Wed-Thu, 8:30 a.m. - 4:30 p.m.
$545; Out of State, $570
Midland College PPDC Building, 105 W. Illinois

Farmouts: Critical Concepts and Practices
Instructor: Dr. Patrick Fitzgerald
December 7, Fri, 8:30 a.m. - 4:30 p.m.
$300; Out of State, $325
Midland College PPDC Building, 105 W. Illinois

PetroSkills: Basic Reservoir Engineering
Instructor: Dr. George Slater
December 10-14, Mon-Fri, 8 a.m. - 5 p.m.
$3,635; contact www.petroskills.com or call (800) 821-5933. Fee is paid directly to PetroSkills
Midland College PPDC Building, 105 W. Illinois

PetroSkills: Waterflooding A to Z
Instructor: Mr. Richard S. Henry
December 10-14, Mon-Fri, 8 a.m. - 5 p.m.
$3,685; contact www.petroskills.com or call (800) 821-5933. Fee is paid directly to PetroSkills
Midland College PPDC Building, 105 W. Illinois

Log Analysis of Shaly Sandstones
Instructor: Dr. George Asquith
December 11, Tue, 8 a.m. - 5 p.m.
$425; Out of State, $450
Midland College PPDC Building, 105 W. Illinois

Quick Guide to Carbonate Well Log Analysis with Flow Chart, Case Studies and Problems
Instructor: Dr. George Asquith
December 12, Wed, 8 a.m. - 5 p.m.
$425; Out of State, $450
Midland College PPDC Building, 105 W. Illinois

Photo courtesy Gulf Coast Green Energy

Capturing waste heat and turning it into electricity is the function of the Green Machine. Gulf Coast Green Energy president and CEO Loy Sneary says his company has installations in many regions of Texas and is looking to expand into the Permian Basin.

Geothermal 'Green Machine' turns waste heat into electricity

By Paul Wiseman
Special to the Oil Report

A device called the "Green Machine" is turning waste heat from generator exhaust, gas compressors, produced water and other sources into electricity across Texas and as far away as the island of Cyprus.

Loy Sneary, president and CEO of Bay City, Texas-based Gulf Coast Green Energy, which markets the device in Texas and other Gulf states, said the company is looking into the feasibility of capturing heat from natural gas flares as well, although they have not yet field tested that procedure.

The Green Machine was developed seven or eight years ago by ElectraTherm, headquartered in Reno, Nevada. The heart of the machine is its twin screw expander, which operates in reverse of a twin screw compressor commonly used in natural gas transmission, Sneary explained. The expander was developed and patented by City University London's Centre for Positive Displacement Compressors, which granted ElectraTherm the right to incorporate it into what became the Green Machine.

Its first test was conducted five years ago on boilers at SMU in Dallas. Originally set as a six-month test, the time period was extended to two years. Maria Richards, SMU Geothermal Laboratory coordinator, said the trial was extended for two reasons: It was deemed a success, and the school's engineering students were able to work with the machine, learn how it worked and experiment with improvements.

The university would have bought a machine for permanent use but when the trial ended in 2008, the banking bust was in full swing. That reduced enrollment, cut the value of endowments and pushed the school to put a moratorium on any capital expenditures, including the Green Machine, said Richards.

For the apparatus to collect heat, a hot liquid is run across a heat exchanger filled with a refrigerant with a boiling point of 53° F. In the process of transferring the heat from the liquid, such as produced water, to the refrigerant, the liquid is cooled. The heated refrigerant then turns the twin screws in the expander, operating a generator that creates electricity.

Because the Green Machine uses an induction generator it cannot operate on a freestanding basis — it must tie into an existing power grid, whether from a utility or from an array of diesel generators on site. With the grid in place, Sneary noted, connecting the Green Machine is simple. "An electrician goes out there and it takes about 30 minutes — it's three wires and a ground. He puts it into the main bus, and it just goes into the system."

On a well producing 3,000-4,000 barrels of water at 200-270 degrees F, a Green Machine could make 65 kw/hour of electricity, "enough to power 60 homes," according to Sneary.

The machine produces 480-volt three-phase power. Since most sites that use a Green Machine are in rural areas, the power mostly comes from cooperatives. These companies install dual meters on the pole, which monitor how much power is used and how much is generated onsite. Sneary said most sites use more power than the Green Machine can produce, so the producer pays the power company the difference.

While the payout period seems long at approximately four years, Sneary pointed out that the machine is designed to last 20 years and to be easily moved from site to site by a standard fork lift. He also recalled that the state's power grid is expected to be strained over the next several years due to population growth, so any power reduction will help existing resources last longer.

On sites with diesel generators, Sneary said the machine could use exhaust heat and jacket water from those compressors to make more electricity, with the effect of making those generators more efficient.

At a natural gas compressor station the temperature of the gas, once compressed, often rises to 275° F, which is about twice the temperature allowed into the stream. By using a Green Machine, Sneary noted, a company would not only generate electricity, it would cool the gas down close to an acceptable temperature. They could then use the generated electricity to run the fans needed to cool the gas the rest of the way. Studies have shown they can reduce power used in this context by 80 percent. Gulf Coast is currently looking for a partner to let them test this procedure in the Permian Basin in a commercial application. Previous tests have been on a smaller scale.

Gulf Coast Green Energy has installations in the Eagle Ford Shale, is running a pilot project on a gas compressor station in north central Texas, and is looking to expand into the Permian Basin. The Basin expansion is the driving force behind the experiments with gas flares. To represent them in this area, the company has enlisted Dr. Richard Erdlac, a noted green energy expert.

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America's reign as oil king likely to be very short

Loren Steffy
Houston Chronicle

I want my Hummer back.

That might be the reaction to a report Monday from the International Energy Agency that predicts in eight years the U.S. will surpass Saudi Arabia as the world's largest oil producer.

The prediction is a stunning testament to energy companies' success in extracting oil that was previously unrecoverable, but it's the one bright spot in a report that otherwise requires highly selective reading to be called good news.

One paragraph above the prediction about the U.S. and Saudi, the IEA lays out a far more disturbing scenario, highlighted in boldface type: "The world is still failing to put the global energy system onto a more sustainable path."

It goes on to outline a future in which consumer demand continues to rise faster than production as nations fight for ever bigger pieces of the same pie.

Even its projection of U.S. oil dominance has an important qualifier. The IEA estimates the switch would happen "around 2020" but noted that the U.S. would remain the biggest oil producer only "until the mid-2020s." Our reign as the world's oil king, if it ever happens, probably won't last more than five years.

Some energy company executives already are questioning the forecast. David Roberts, the chief executive officer of Marathon Oil, which has extensive domestic drilling operations, told investors on a webcast Tuesday that IEA's findings may be too optimistic.

"I don't see it, in terms of this country matching Saudi Arabia," he said.

What's more, being the biggest producer would mean little to U.S. consumers. We won't be paying less at the pump because, as the IEA notes, "no country is an energy 'island' and prices for all fuel sources are increasingly global."

Rate of decline rising

"Policy makers looking for simultaneous progress toward energy security, economic and environmental objectives are facing increasingly complex — and sometimes contradictory — choices," the IEA wrote.

Taken as a whole, the report outlines a world in which we face a shrinking supply of oil, rising prices and a growing toll on the environment.

While U.S. production has been rising, topping 2004 levels, it remains well below our peak production of the early 1970s. Much of the increase is coming from hydraulic fracturing, an expensive technique that results in wells from which initial production declines more quickly than conventional ones.

"It is critically important to understand that the overall rate of decline in oil production from existing U.S. wellbores is going up, as an increasing percentage of U.S. crude oil production comes from shale oil plays, which have a very high decline rate," said Jeffrey Brown, an independent petroleum geologist who studies and writes about production data.

The result is that oil producers have to drill more and more wells just to stay in place.

So far, we've been able to drill more domestically in part because higher oil prices have made shale plays profitable. Even if we assume that we can maintain and accelerate the pace, even if we are miraculously exporting oil by 2030, it probably won't make gasoline any cheaper.

That's because the world's available net exports will remain little changed, Brown said.

We may reorder the ranks of the producers, but it will do little to change the results in the global market.

While conservation and efficiency in the U.S. is expected to reduce oil consumption, it will be offset by increases from emerging economies such as China and India, which in 2005 imported one barrel of oil for every 8.9 barrels of total exports available. By last year, that number had fallen to 5.3 barrels. If that trend continues, in 18 years, those two countries alone will consume all oil available for export in the world, Brown said.

A very real problem

In other words, who produces the most oil will have less to do with what we pay at the pump than who imports the most oil.

"We're not out of the woods," said Art Berman, a Sugar Land energy economist. "We have a very real problem with world supply, world price and the environment. None of this makes that go away. This shouldn't give people a license to squander fuel."

We'd all like to believe in the promise of energy abundance, but the global patterns of consumption and production are a reminder that the Hummers need to stay on history's junk heap.

Loren Steffy is the Chronicle's business columnist.