

“Troubleshooting and Solving a Sour-Water Stripper Problem”

By Jeremy Ponting Fluor Ltd. Henry Z. Kister and Richard B. Nielsen Fluor Corp. Edited by Gerald Ondrey, *Chemical Engineering*, November 1, 2013

A recent book by Lieberman [1] stresses that to combat the environmental crisis that our planet is facing, it is essential to make existing units work adequately and efficiently. Equipment that malfunctions or limps along limits production and does not permit good energy and equipment utilization. This, in turn, leads to higher environmental degradation, not to mention plant downtime and lost production costs. Lieberman concludes that good troubleshooting and adequate repair of malfunctioning units is central for efficiently utilizing our resources.

Towers that strip components out of water (so this water can be re-utilized or disposed of) are common in the process industries. In petroleum refineries and gas plants, the main components stripped out are hydrogen sulfide and ammonia, and the tower is referred to as a “sour water stripper.” The technology for stripping sour water has been established for decades. It was an engineer, Beychok [2], who wrote the leading text on the subject as far back as 1967. Yet almost five decades later, there are many sour-water strippers that do not operate adequately and efficiently. Many “war stories” of sour water strippers that failed to achieve their design objectives are presented in Kister’s “Distillation Troubleshooting” book [3].

Read more:

<http://www.che.com/nl/YToyOntpOjA7czo1OiIxMTE3MSI7aToxO3M6Njk6InByb2Nlc3NpbmdfYW5kX2hhbmRsaW5nL3NlcF9saXF1aWRfbGlxdWlkX2FuZF9nYXNfbGlxdWlkL2Rpc3RpbGxhdGlvbii7fQ==/>

“General Electric's Billion-Dollar Fracking Bet”

By Justin Loiseau, *The Motley Fool*, March 2, 2014

General Electric Company (NYSE: GE) announced \$10 billion of clean energy investments, and fracking is front and center. With natural gas fracking at the forefront of energy and environmental debates, here's how General Electric Company expects to win big.

Fracking for the future

General Electric Company plans to pour \$10 billion into clean energy research by 2020, paving the way for the next generation of "Ecomagination" initiatives. This cross-company business initiative has already generated a whopping \$160 billion in sales since its 2005 launch, and

General Electric Company expects natural gas hydraulic fracturing, or fracking, to continue to play a pivotal role.

"Ecomagination is one of our most successful cross-company business initiatives," said General Electric Company Chairman and CEO Jeff Immelt in a statement. "Bold investments in Ecomagination research and development have resulted in strong returns for shareholders and improved cost and emissions savings for our customers."

General Electric hasn't said how much of the \$10 billion is headed toward fracking research specifically, but its goals are lofty. The company is partnering with Norwegian oil and gas company Statoil ASA (NYSE: STO) to potentially revamp water use in the fracking process.

Traditionally, hydraulic fracturing requires immense amounts of water to extract natural gas. Since 2011, nearly 40,000 oil and gas wells have guzzled 97 billion gallons of water, according to a report by the Ceres Investor Network. At current consumption rates, that means fracking sucks down as much water as around 60 cities with 50,000 residents each.

Nearly half of all wells are in regions with high or extremely high water stress, and over a third of all wells are in areas suffering from groundwater depletion.

Read more: <http://www.fool.com/investing/general/2014/03/02/general-electrics-billion-dollar-fracking-bet.aspx>

“Tight-oil Tightrope for U.S. Refiners”

By Scott Jenkins, *Chemical Engineering*, May 1, 2014

To take advantage of cost-advantaged crudes from shale formations, refiners must address a host of challenges associated with processing tight oils

North American production of crude oil, driven by a rapid increase in output of “tight oil” from U.S. shale deposits like Bakken and Eagle Ford, is surging. In many, but not all areas, petroleum refiners are incorporating an increasing amount of this cost-advantaged feedstock into their crude-oil-processing slates to capitalize on its discounted price, which is partly a result of a lack of sufficient takeaway infrastructure and a ban on exporting crude oil from the U.S.

At the annual meeting of the American Fuels and Petrochemicals Manufacturers (AFPM; Washington, D.C.; www.afpm.org), held in March in Orlando, Fla., Sam Davis, an analyst with Wood MacKenzie (Edinburgh, U.K.; www.woodmac.com), said “We have seen a definite shift in behavior on the part of petroleum refiners that is driven by tight oil — the crude slate is changing to lighter and sweeter feedstocks.”

U.S. Gulf Coast refiners are no longer processing imported light, low-sulfur crude oil; rather they are processing domestic light, sweet crudes, Davis said, and while East Coast refiners are still handling imported oil, an increasing amount of crude oil from the Bakken formation is making its way east.

While the discounted price of tight-oil crudes is attractive, the shift in crude slate presents petroleum refiners with a host of challenges. With a higher proportion of low-molecular-weight components, tight-oil crudes generate lower levels of vacuum gasoil (VGO) and heavy residual oils, which can result in diminished utilization levels in fluid catalytic cracking (FCC) and alkylation units. The underutilization of heavy-ends processing units parallels possible overstress situations in light-ends processing assets.

Read more:

<http://www.che.com/nl/YToyOntpOjA7czo1OiIxMTcyNCI7aToxO3M6NDoibmV3cyI7fQ==/>

“Clariant and Siemens collaborate on coal-gasification technologies”

By Mary Page Bailey, *Chemical Engineering*, May 28, 2014

Clariant AG (Muttenz, Switzerland; www.clariant.com) has announced that it has signed an agreement with Siemens Fuel Gasification Technology to cooperate in the commercialization of a new, jointly developed sour-gas shift (SGS) technology for coal gasification. The agreement appoints Clariant as the exclusive catalyst supplier for all Siemens gasification integrated SGS projects. While the collaboration covers all global projects, commercialization will focus on China – the region with the highest growth rate of coal-to-chemical projects.

The advanced SGS technology from Clariant and Siemens significantly decreases total capital cost for coal-to-chemical applications through optimization and simplification of total plant concepts. The entrained-flow Siemens Fuel Gasifier (SFG) is able to produce syngas from a wide range of fuels – even for low ranks of coal.

Read more:

<http://www.che.com/nl/YToyOntpOjA7czo1OiIxMTg1NyI7aToxO3M6MjM6Im9ubHlfb25fY2hlL2xhdGVzdF9uZXdzIjt9/>

“Democrats introduce aggressive coal ash bill”

By Bruce Henderson, *The Charlotte Observer*, May 29, 2014

Duke Energy would have to move the coal ash in its 33 ponds to lined landfills, without billing customers, under a measure introduced this week by House Democrats.

The bill is far more aggressive than an ash management plan Gov. Pat McCrory introduced in April, two months after a Duke ash pond dumped up to 39,000 tons of ash into the Dan River. It’s also likely to go further than a Republican bill expected to be filed in the next week or two.

The measure would close four “high-risk” ash ponds at Duke’s Riverbend, Dan River, Asheville and Sutton plants by 2017. Other ponds would be closed, depending on their risk levels, between

2019 and 2029. Ash would be buried in lined landfills on the same power plant sites where the ponds are located.

The state Utilities Commission would be barred from allowing Duke to recover from customers the ash pond costs it incurred after Jan. 1.

Duke has said the company will pay to clean up the Dan River spill, and that is now underway. But the company has said it will ask the state Utilities Commission to pass the cost of closing other ash ponds – estimated by Duke to cost up to \$10 billion – to consumers.

The bill bans construction of new ash ponds. Newly generated ash has to be buried in lined landfills or used for “beneficial” purposes such as making concrete.

Read more: <http://www.charlotteobserver.com/2014/05/29/4941143/democrats-introduce-aggressive.html>

“Event showcases demonstration-scale system for cleaning hydraulic fracturing water”

By Scott Jenkins, *Chemical Engineering*, June 4, 2014

OriginOil Inc. (Los Angeles, Calif.; www.originoil.com), developer of Electro Water Separation (EWS), the high-speed, chemical-free process to clean up large quantities of water, announced today that CLEAN-FRAC 1000, its new demonstration-scale hydraulic fracturing water-treatment system, was shown to successfully remove oil and contaminants at a showcase for media, public officials and prospective customers.

Held at the headquarters of OriginOil licensee, Industrial Systems Inc. (ISI) on Colorado’s Western Slope, the showcase featured the CLEAN-FRAC 1000 system, which is designed to process frac flowback and produced water at a rate of up to 1,000 barrels per day, to the exact purity levels that customers require.

Read more:

<http://www.che.com/nl/YToyOntpOjA7czo1OiIxMTg2NyI7aToxO3M6MjM6Im9ubHlfb25fY2hlL2xhdGVzdF9uZXdzIjt9/>

“\$1.8B natgas-to-diesel plant planned in Cheyenne”

By Mark Wilcox, *Wyoming Business Report*, June 5, 2014

CHEYENNE – Wyoming leaders have long discussed ways to add value to Wyoming’s natural resources, but a pair of companies is following through on the premise with an agreement to build a \$1.8 billion gas-to-liquids (GTL) plant.

Denver-based Escalera Resources Co. Wednesday announced the deal that will make it a 10 percent owner of the massive plant alongside Wyoming GTL LLC, which appears to have sprung up around the project. The plant might become the first in the nation, since the five currently operating globally are all overseas. The Energy Information Administration said that the GTL industry faces challenges in the U.S., but the technology is gaining ground as the hydraulic fracturing revolution increases the price gap between dry natural gas and petroleum-based products.

As of February, the EIA said three similar plants had been proposed in the U.S. in Louisiana, Pennsylvania and Ohio. Shell, which operates two GTL plants in Qatar and Malaysia, backed out of plans to build a large-scale plant in Louisiana in December 2013, citing high capital costs and market uncertainty. That decision might have been ratified by massive spot price spikes in natural gas feedstock during cold winter weather.

According to the Denver Business Journal, the Escalera GTL plant, as it will be called, will start construction in 2015 and be in operation by 2018. It will take 5,000 construction workers to get off the ground and will permanently employ about 500 people. The paper went on to say that the plant would convert about 135 million cubic feet of natural gas per day into 15,000 barrels of diesel fuel. The conversion would make it worth seven times more than the raw natural gas at current prices.

Read more: <http://www.wyomingbusinessreport.com/article/20140605/NEWS/140609959>

“Enerkem inaugurates full-scale waste-to-biofuels plant”

By Mary Page Bailey, *Chemical Engineering*, June 6, 2014

Enerkem (Montreal, Canada; www.enerkem.com) has inaugurated its first full-scale municipal waste-to-biofuels and chemicals facility in Edmonton, Alberta.

“Our breakthrough technology uses garbage instead of fossil sources for the production of chemicals and liquid transportation fuels. We are proud of the inauguration of our first full-scale biorefinery facility as it is the culmination of more than 10 years of disciplined efforts to scale up our technology from pilot and demonstration, to commercial scale, said Vincent Chornet, President and CEO of Enerkem. The completion of this game-changing facility is by far one of the most significant developments the waste and biorefinery sectors have seen yet. We are thrilled that it is becoming a model for many communities and industries around the world.”

This facility, operated by Enerkem Alberta Biofuels, is among the world’s first commercial facilities to be built for the production of renewable chemicals and advanced biofuels. During its construction, more than 600 direct and indirect jobs were created for the modular manufacturing of the facility’s systems and their on-site assembly.

Read more:

<http://www.che.com/nl/YToyOntpOjA7czo1OiIxMTg3MiI7aToxO3M6MjM6Im9ubHlfb25fY2hIL2xhdGVzdF9uZXdzIjt9/>

“Global Markets for Gasifiers”

PR Newswire (press release), June 6, 2014

INTRODUCTION

Gasification is a centuries–old thermochemical energy conversion technology that has slowly achieved modernity over the decades. The technology is undergoing its third evolutionary surge. Fuel shortages in WWII spurred widespread adoption for vehicle fuels. The oil crisis 1973 spurred a re–evaluation and renewed development. Rising oil prices, globally increasing fuel demand, and overwhelming scientific evidence of climate change have spurred this last leg to full industrialization.

The central concept of gasification is that by raising carbon–rich materials to high temperatures in an oxygen–deficient containment, the material will break down thermochemically instead of burning. If the same material is combusted (burned), it emits carbon monoxide and a host of pollutants, besides being incompletely consumed. If gasified, the products are hydrogen (H₂), carbon monoxide (CO) and carbon dioxide (CO₂). This is synthetic gas, simply called "syngas." It can be burned, captured, stored, or its molecules rearranged to form fuels and chemical feedstocks.

The process is moderately more efficient than incineration, has significantly fewer emissions and waste, and the syngas can be shaped into a myriad of products for power production, chemical industries, liquid fuels, and heat.

Feedstock for gasification can be coal, the organic components of municipal waste, industrial waste streams, chemical feedstocks, forestry residues, forest products and crop residues, medical waste, unrecycled plastic or, in the case of plasma gasifiers, almost any nonradioactive material.

A gasifier is the central component of a gasification plant. Surrounding it are the feedstock conditioning and delivery systems, oxygen, steam and air input systems, waste removal components, syngas cooling and cleaning systems, power plants, heat recovery units, Fischer–Tropsch molecule rearrangers, and so on. This report focuses on the markets for gasifier units that are in place and will be installed by application segment and geographic location through the year 2017.

Read more: <http://www.prnewswire.com/news-releases/english-releases/global-markets-for-gasifiers-261972721.html>

“These startups are eeking out extra energy for everything from cars to fridges to wearable gadgets”

By Katie Fehrenbache, GIGAOM, June 17, 2014

SUMMARY:

Nifty new materials are being used to capture waste heat and turn it into electricity. That could make both your gadgets and your cars, but also high-powered industry more energy efficient.

When you work with your laptop on your lap, you can feel it. When you touch the hood of an idling car, it's clearly there. What is it? Waste heat — a byproduct of processes that use, store, produce and transfer energy — and in recent years a growing amount of companies have been using innovations in nanotechnology to produce next-generation materials that can capture that waste heat and turn it into usable electricity.

These types of materials are called thermoelectrics and they employ the Seebeck effect to use the temperature difference between two semiconductors to produce a voltage. German physicist Thomas Seebeck discovered the phenomenon all the way back in the 1820s.

Fast forward almost two hundred years from the first discovery, and nanotechnology has started to break open this well-known effect, helping to deliver some novel products that can use energy more efficiently. Because semiconductors have different length scales for heat and electron transport, they can particularly benefit from nano-structured surfaces when being used for thermoelectric materials.

Read more: <https://gigaom.com/2014/06/17/how-startups-are-eking-out-extra-energy-for-everything-from-cars-to-fridges-to-wearable-gadgets/>

“Shale’s bounty ignites US petrochemical export boom”

By Collin Eaton, *Fuel Fix*, June 18, 2014

HOUSTON – Cheap, abundant U.S. shale gas soon will find its way to a new market: The flood of people moving from the countryside to the dense cities of developing countries.

In a few years, the gas will arrive in China, India and Latin America as resin pellets that will become plastic products like food packaging, a key component for urbanizing populations as consumers trade farming markets for preserved foods.

It’s a huge, hungry market.

Shortly after U.S. gas prices collapsed a few years ago, a half-dozen energy companies raced to build plants along the Gulf Coast that can break natural gas molecules into parts that can be molded into the building blocks of plastic.

Among them was Exxon Mobil Chemical Co., which will announce Thursday it began constructing a massive ethane cracker and two polyethylene plants at its existing facilities near Houston last month, soon after regulators gave it the OK. Exxon Mobil did not disclose the project’s cost.

“A big breakthrough in the petrochemical industry was when the Saudis decided to harness the ethane from natural gas to create petrochemicals,” said Steve Pryor, president of Exxon Mobil Chemical, in an interview with FuelFix on Wednesday. “They really have been the low-cost producers, the fastest-growing exporters, the major export force in the petrochemical world since then. Now, because of shale energy, the U.S. is joining the Middle East.”

Largest US investment

Exxon's planned ethane cracker in Baytown, 25 miles east of Houston, will have an annual capacity to make up to 1.5 million tons of ethylene feedstock from ethane. Its two polyethylene processing units, now under construction at its Mont Belvieu plastics plant, 30 miles east of Houston, will be able to produce 650,000 tons a year of the plastics components. It's the chemical company's largest U.S. investment.

Read more: <http://fuelfix.com/blog/2014/06/18/shales-bounty-ignites-us-petrochemical-export-boom/?shared=email&msg=fail>

“Top court mostly upholds Obama bid to curb carbon emissions”

By Lawrence Hurley, *Reuters*, June 23, 2014

(Reuters) - The U.S. Supreme Court on Monday largely upheld the Obama administration's authority to curb greenhouse gases from major emitters like power plants and refineries in a ruling that nonetheless exempted some smaller sources from the regulation.

On a 7-2 vote, the court rejected an industry-backed argument that most emitting facilities should not be regulated for greenhouse gases under one particular air pollution program of the U.S. Environmental Protection Agency (EPA).

But industry could claim a partial win because the court ruled on a 5-4 vote that some facilities the government had wanted to regulate will be exempted. Some landfills, pulp and paper facilities, electronics manufacturing plants, chemical production plants and beverage producers are among the small industrial sources likely to be exempted, an EPA spokesman said.

"It bears mention that EPA is getting almost everything it wanted in this case," Justice Antonin Scalia, who wrote the majority opinion, read from a statement in court.

The ruling brought an end to what started out as a broad legal challenge to the Obama administration's first suite of greenhouse gas regulations issued in 2009 and 2010. The administration won on every count except in the mixed ruling announced on Monday.

The case focused only on the "prevention of serious deterioration" or PSD program, which requires any new or modified major polluting facility to obtain a permit before any new construction is done if it emits "any air pollutant."

Read more: <http://www.reuters.com/article/2014/06/23/us-usa-court-climatechange-idUSKBN0EY1L920140623>

“Babcock & Wilcox, Ohio State University to design clean coal power plant”

By Chuck Soder, *Crain's Cleveland Business*, June 23, 2014

A Babcock & Wilcox research team in Barberton is working with Ohio State University to design a coal power plant that captures carbon dioxide.

The two organizations received a \$2.5 million federal grant that they'll use to come up with a design for the plant, which would use a chemical process to extract energy from coal while capturing a concentrated stream of carbon dioxide.

Such a technology could be valuable: The U.S. Environmental Protection Agency is about to start regulating carbon emissions from power plants in an effort to fight climate change.

Ohio State's College of Engineering already has built a small, indoor power plant that uses the so-called coal direct chemical looping process.

The plant, which has been tested for more than 680 hours, generates about 25 kilowatts of thermal energy. The new design would be for a much bigger plant that could generate 550 megawatts of electricity.

A larger plant using the chemical process should be able to produce affordable energy: An analysis by Babcock & Wilcox Power Generation Group said it should be able to capture at least 90% of the carbon produced by the process without raising costs by more than 35%. Those are goals set by the U.S. Department of Energy, which awarded the money.

Here's how the technology works, according to news releases from both organizations:

Read more: <http://www.crainscleveland.com/article/20140623/FREE/140629930/babcock-wilcox-ohio-state-university-to-design-clean-coal-power>