FEBRUARY/MARCH 2011

CAREER CURRENTS

EXPLORING TODAY'S ENERGY CAREERS WITH THE NEED PROJECT

IMAGE COURTESY OF BP

FROM GROUND TO GO

IN THE PETROLEUM AND NATURAL GAS INDUSTRY, THE TANK IS FULL OF POSSIBILITY

If you are interested in earth science and natural resources and are looking for a job that will provide opportunities to travel the globe, there are many careers in the oil and gas industry that might be of interest to you.

Petroleum has been used in some form or another since ancient times. As far back as 2000 BC the Chinese were refining crude oil for use in heating and lighting. Until the early 1900's the primary use of oil had been to produce kerosene used for heating. With the development and increasing use of plastics, along with the invention of the internal combustion engine, petroleum in its varied forms have taken on an increasing role. By 1920, with over 9 million automobiles in the United States, gas stations were opening, and with the ever-increasing dependence on automobiles, oil became our most used energy source.

Often found when drilling for oil, natural gas was once considered mainly a bother. When there were no uses or markets to sell natural gas, it was simply flared (burned off) at the wellhead. Today, however, natural gas ranks second in U.S. energy consumption by source. Industry is the largest consumer of natural gas to provide heating for manufacturing. Residential and commercial customers also use natural gas for heating spaces, water, and cooking.

After natural gas comes out of the ground, it goes to a processing plant where it is cleaned of impurities and separated into its various components. Approximately 90 percent of natural gas is composed of methane, but it also contains other gases such as propane and butane. During the 20th century demand for natural gas grew, along with production rates and the building

See PETROLEUM, page 3

SPONSOR SPOTLIGHT

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION

The Petroleum Equipment Suppliers Association is a longstanding partner of The NEED Project. PESA has worked with NEED for several years as a donor and partner in education. Founded in 1933, PESA is comprised of equipment manufacturers, wellsite service companies, and supply companies serving the drilling and production segments of the petroleum industry. PESA represents nearly 200 member companies, large and small. In addition to providing a range of services to its membership, PESA is active in education and outreach to students in K-12, college, and beyond, including members of the U.S. government's Foreign Service.

The partnership with NEED is a natural one given PESA's focus on education says Sherry Stephens, PESA President. "For many years, PESA's Executive Committee has focused a great deal of time and resources toward educating future generations. PESA's member companies are among some of the most technologically advanced in the nation, and will need thousands of educated and qualified engineers, geologists, scientists, and more to serve the world's energy requirements. Our partnership with NEED is an important part of bringing tomorrow's talent to the industry."

SOCIETY OF PETROLEUM ENGINEERS

The NEED Project is grateful for the support of the Society of Petroleum Engineers. In 2010, SPE and many of its local chapters donated over 2,500 copies of the Oil and Natural Gas book to NEED teachers attending workshops. The book, available from SPE on the Energy4Me website, provides students with lessons and activities about the exploration, production and use of oil and natural gas. NEED wants to thank SPE and the following local chapters:

- Alaska
- Amarillo
- Billings
- Delta
- Denver
- East Kentucky
- Four Corners
- Gulf Coast
- L A Basin
- Mid-Continent
- Midwest Gas Storage
- Pacific Northwest
- Wyoming Petroleum

A FEW PRODUCTS MADE WITH PETROLEUM AND NATURAL GAS

TOYS

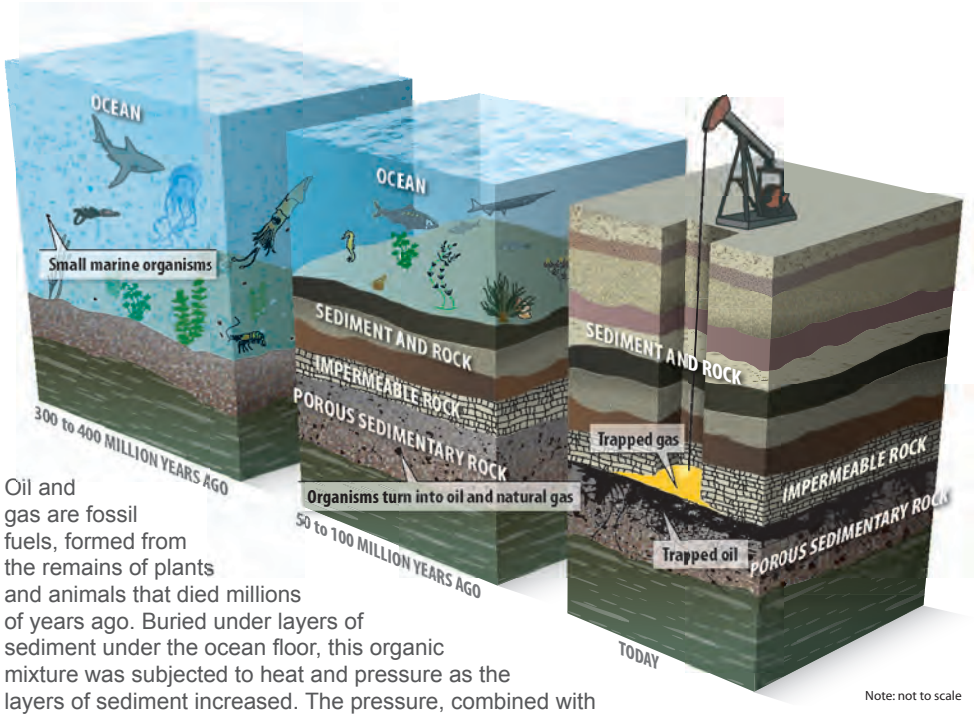
PLASTIC BAGS

PENS AND INK

LIP BALM

PAINT

Petroleum is used as more than just a transportation fuel. Thousands of products are petroleum and natural gas based.



Note: not to scale

Oil and gas are fossil fuels, formed from the remains of plants and animals that died millions of years ago. Buried under layers of sediment under the ocean floor, this organic mixture was subjected to heat and pressure as the layers of sediment increased. The pressure, combined with the heat of the earth, changed this organic mixture into petroleum and natural gas.

PETROLEUM, continued from page 1

of pipelines and infrastructure. By 2000, natural gas consumption peaked at 23.3 trillion cubic feet. Though all fossil fuels release emissions into the atmosphere, natural gas is considered the cleanest burning. Compressed natural gas is considered a fuel that can be brought to market for transportation fuels, electricity generation, and other uses.

As well as being used to produce fuel for transportation and heating, oil and gas are used in the manufacturing of chemicals, plastics, and other products. Petroleum and natural gas exploration and production workers find sources of oil and gas and work for oil companies or for drilling contractors hired by oil companies. They drill underground or through the ocean floor to bring oil and natural gas to the surface. Petroleum is then shipped by pipeline, barge, or ship to refineries where it is processed into a variety of products. Natural gas is sent through pipelines to natural gas processing plants where its by-products are separated (butane and propane are taken out for example) and sent through more pipelines for distribution to consumers.

From geology to petroleum engineering there are many career pathways that relate to the production oil and natural gas. Jobs in the oil and gas industry include: mining, geo-science, seismology, earth science, environmental science, environmental engineering, agriculture, forestry, ecology, biology, meteorology, oceanography, marine science, geography, hydrology, hydrogeology, soil science, geotechnical/civil engineering, transportation, carbon management, waste management, sustainable development, electrical engineering, as well as a host of supporting service and supply industries.

There a career for YOU in the oil and gas industry.

Colleges and Universities with Petroleum Engineering Programs

- Colorado School of Mines
- Louisiana State University
- New Mexico Tech
- Pennsylvania State University
- Stanford University
- Texas A&M University
- Texas Tech University
- University of Alaska Fairbanks
- University of Houston
- University of Kansas
- University of Louisiana at Lafayette
- University of Montana
- University of Oklahoma
- University of Pittsburgh
- University of Southern California
- University of Texas at Austin
- University of Tulsa
- West Virginia University

For a complete list, visit www.energy4me.org

THE NEED PROJECT

The NEED Project
Putting Energy into Education

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The NEED Project is a 501(c)(3) nonprofit education association providing professional development, innovative materials correlated to the National Science Education Content Standards, ongoing support, and recognition to educators nationwide.

Career Currents provides educators and students with resources to introduce energy careers. Each issue focuses on a different sector of the energy industry. No single issue is meant to be all-inclusive to either the sector profiled or all careers in energy.

SHALE GAS

WHAT IS IT AND WHY WE SHOULD CARE

IMAGE COURTESY OF CHESAPEAKE/STATOIL

The sun sets behind a drilling site operated by Chesapeake in the Appalachian Mountains.

Natural gas is a domestic energy source, and the Energy Information Administration estimates that at the current rate of consumption there are enough natural gas reserves to last 110 years. Shale gas is a major component of the known reserves. Advances in horizontal drilling and hydraulic fracturing have made production of natural gas from shale plays economical. The Annual Energy Outlook projects that by 2035, production of shale gas will make up 45 percent of the U.S. natural gas supply.

WHAT IS SHALE GAS?

Shale gas is natural gas that is trapped in shale formations. Shale is essentially a common form of sedimentary rock. It is formed by the compaction of silt and clay-size mineral particles. Shale formations are found all over the world. Shale formations containing natural gas are called "shale plays." The shale is both the source and the reservoir for the natural gas.

SHALE GAS PRODUCTION

HORIZONTAL DRILLING A vertical well is drilled to the formation that has been identified as a natural gas reservoir. Then the drill bit can be turned up to a 90 degree angle so that the well parallels the natural gas reservoir. This allows the maximum amount of natural gas to be recovered.

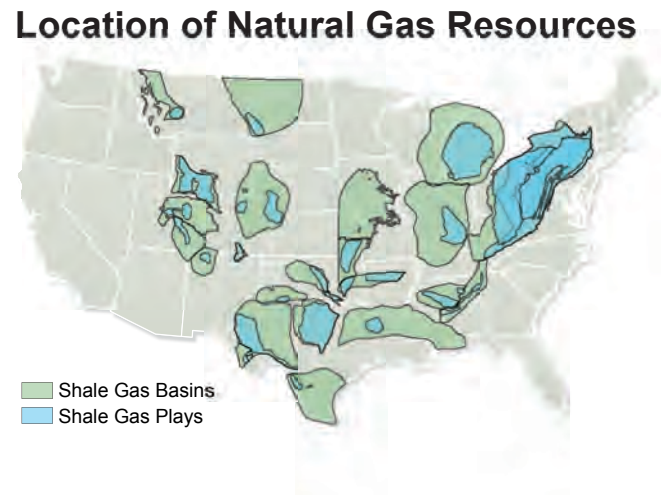
HYDRAULIC FRACTURING Hydraulic fracturing, or "fracking," uses water, silica (sand), and chemical compounds piped several thousand feet below the Earth's surface, creating cracks or fissures in shale formations. This allows natural gas to be released and flow into the well. Hydraulic fracturing can be used along with horizontal drilling. Once the shale area is reached, the water, chemicals, and sand are pumped in to unlock the hydrocarbons in the shale.

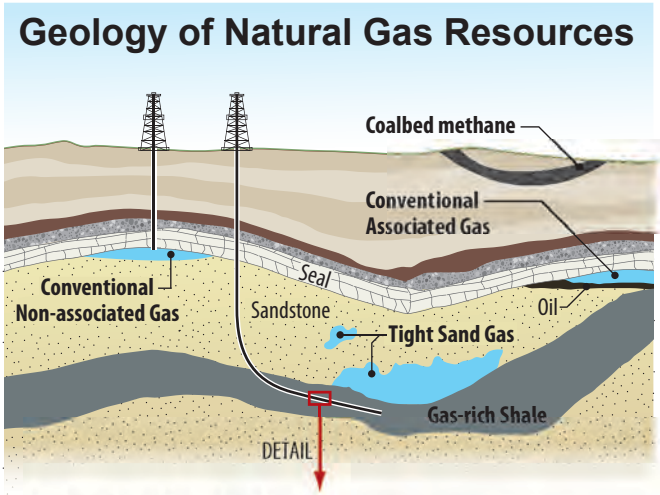
BENEFITS AND CHALLENGES

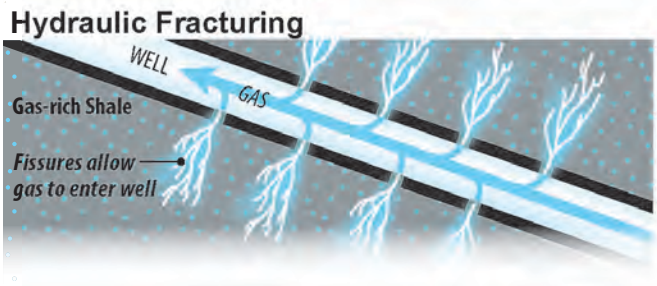
There are benefits and advantages of developing production and extraction of shale gas. It is a natural gas, cleaner than coal or oil, and releases fewer pollutants. Advancements in drilling and fracturing techniques have made the extraction of shale gas more viable as a means to meet the demands for natural gas.

The main challenges in producing shale gas involve the use of water. Millions of gallons of water are required for hydraulic fracturing. Water from wells that are primarily to meet community water needs are not intended to also meet the production needs of the shale extraction. The other main challenge is how to dispose of the large amounts of waste water after the drilling and how to avoid contaminating the ground water and drinking water.

Shale gas promises to be an important part of the United States' energy future.



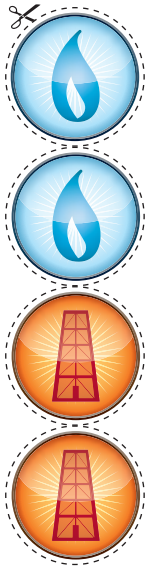




OIL AND GAS CAREER GAME

Imagine you are a drop of oil or a molecule of natural gas. Cut out the game pawns to the right and roll a die to follow the path from the ground to market. Along the way, you will meet many people who help you on your journey.

PAWNS



START

GEOLOGISTS explore the nature and structure of rock layers in order to determine the best possible places to drill for oil and natural gas.

GEOSCIENTISTS AND HYDROLOGISTS study the composition, structure, and other physical aspects of the earth to analyze the composition of earth, rock, and water.

PETROLEUM GEOLOGISTS gather, process, and analyze seismic data and well data to locate drill sites.

PETROLEUM ENGINEERS formulate the general plan for how the extraction operation will go. They help design the general structure of the well and the most efficient method of extraction.

EXPLORATION

Geologists conduct many tests gathering information, such as seismic data, to determine if the geology holds oil or natural gas.

ENVIRONMENTAL ENGINEERS ensure that well sites meet federal, state, and local regulations. They also plan reclamation projects when extraction is complete.

ROTARY DRILL OPERATORS supervise the crew and operate machinery that controls drilling speed and pressure.

ROTARY-RIG ENGINE OPERATORS are in charge of engines that provide the power for drilling and hoisting.

DERRICK OPERATORS work on small platforms high on rigs to help run pipe in and out of well holes and operate the pumps that circulate mud through the pipe.

ROUGHNECKS guide the lower ends of pipe to well openings and connect pipe joints and drill bits.

DRILLING & PRODUCTION

Wells are drilled deep into the ground to bring oil and natural gas to the surface.

ELECTRICIANS maintain and repair the electrical and electronic equipment and systems that keep the facilities up and running.

MACHINISTS install, maintain, repair, and test rotating mechanical equipment and systems.

ROUSTABOUTS are general laborers that do general oilfield maintenance and construction work, such as cleaning tanks and building roads.

INSTRUMENTATION TECHNICIANS maintain, calibrate, adjust, and install measuring and control instruments necessary to ensure the safe, efficient operation of equipment.

REFINING & DISTRIBUTION

Crude oil and natural gas are refined into many different products and shipped to consumers.

CHEMICAL ENGINEERS design chemical plant equipment and develop processes for manufacturing chemicals and products like gasoline, detergents, and plastics.

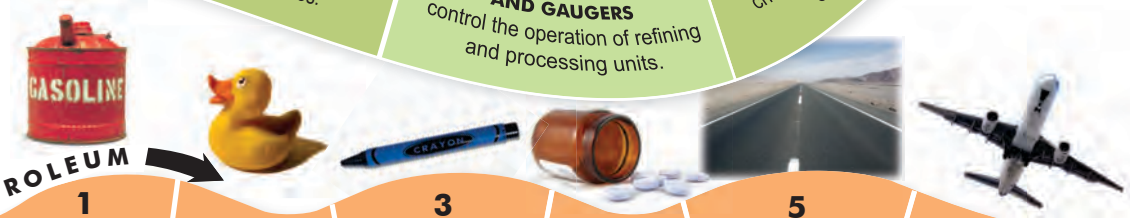
ENERGY TRADERS buy and sell oil and gas in the U.S. and international markets.

PROCESS PIPING OR PIPELINE DRAFTERS prepare drawings used in the layout, construction, and operation of oil and gas fields and refineries.

PUMP SYSTEM OPERATORS, REFINERY OPERATORS, AND GAUGERS control the operation of refining and processing units.

STOP!

Roll the die one last time to find out what kind of product you will become. If you are a drop of oil, follow the petroleum path. If you are a molecule of natural gas, follow the natural gas path.



PETROLEUM

1. You are refined into gasoline for use in cars and trucks.
2. You are made into plastic and become part of a toy.
3. You are processed into the wax that becomes a crayon.
4. You are part of medicine that helps save a person's life.
5. You are used to make asphalt, which paves a new highway.
6. You are refined into jet fuel and travel the world in first-class.

FINISH

NATURAL GAS

END-USE PRODUCTS

1. You are sent to a house and used to cook dinner on a stove.
2. You are used as fuel in a power plant that generates electricity.
3. You are compressed and used as an alternative fuel in a city bus.
4. You are piped to a factory where you help make cars.
5. You are a raw material used to make paint.
6. You are sent to a house and used for space and water heating.

FINISH

NEED GETS TO KNOW INDUSTRY PROFESSIONALS

PAT BOND

Pat Bond is the Vice President of Sales for Drilling Tools and Remedial (DTR) at Schlumberger. Before and after graduating from The University of Texas with a B.S. in Petroleum Engineering, Mr. Bond spent years in the field working on rigs and running tools, building his understanding of the business literally from the ground up. That, along with his engineering degree, led to a technical career where he travels the world giving technical support and presentations.

HOW DID YOU DECIDE TO GO TO WORK IN THIS FIELD?

Growing up in Houston I was always around people in the energy business. I found the people to be daring and entrepreneurial (also known as "Wildcatters") as they were taking risks and either hitting it big and driving fancy cars or going broke trying. That swashbuckling attitude was what first attracted me to the industry. From there I got hooked on the whole process of oil and gas extraction. We all use and depend on petroleum products so I figured the long term career prospects were good.

WHAT IS A TYPICAL DAY AT WORK LIKE FOR YOU?

Every morning I wake up thinking about how to get more business for my company. That includes calling on customers, evaluating new tools and processes that will assist our sales people, meeting with internal partners to discuss delivery, people, training, finances, and legalities. Fundamental questions we ask ourselves every day are "What do our customers need? What keeps them awake at night?" If you can solve those questions, and prove it, then sales will come.

HOW HAS YOUR FIELD CHANGED IN THE LAST 5-10 YEARS?

We are running tools in markets that did not exist 5-10 years ago. These new tools and markets now make up a large part of our annual revenue. The trick is adjusting to those needs and markets in time to capture a significant part of the business. If you stay still you will get run over in this industry. I think of it as—there are people who run the business and people who change the business. We always need a proper balance of people running today's tools in today's markets while we have people looking ahead at new tools and new markets.

WHAT IS THE MOST REWARDING PART OF YOUR JOB?

Like most competitive people I like to win. Gaining enough trust from our client so that they reward us with business is a fantastic feeling. Mentoring young or new team members is also very gratifying.

WHAT ARE SOME IMPORTANT ATTRIBUTES ONE MUST HAVE FOR THIS JOB?

Knowledge of the subject area and learning the art of public speaking have helped me tremendously in my role today. Obviously you never stop learning as I continue to take technical and leadership training classes to this day. I also have a personal objective on my annual performance review to take a certain amount of training classes every year.

WHAT CHALLENGES DO YOU FACE IN THE INDUSTRY?

Government regulations and negative public perceptions are constant challenges. In the after math of the oil spill in the Gulf of Mexico, these challenges have been magnified and of course in some ways justifiably so. But, regardless of perceptions and regulations the world still needs cars, trucks, planes, trains, ships, plastics, fertilizers, electricity, pharmaceuticals, cell phones, etc, made possible by petroleum products. I always wonder if the people who are down on the energy business know how much we contribute to society. And as a side note—I'm not sure how much more organic you can get than oil and gas—it comes from the EARTH.

WHAT ARE SOME BENEFITS TO WORKING IN THIS INDUSTRY?

Besides working with technology that rivals the space industry, there is camaraderie in this business that makes the whole thing fun to be in. On the technology side—think about drilling where the working platform is on water 2 miles above the sea floor and drilling a hole that is another 5 miles in length and hitting a target that is the size of a football field while dealing with all the challenges of pressure, temperature and mechanical issues. The level of technology is actually quite, amazing and really should be seen to understand.

WHAT ADVICE WOULD YOU GIVE TO YOUNG PERSON WHO IS INTERESTED IN WORKING IN THE OIL AND NATURAL GAS FIELD?

I understand that there are some negative feelings about the energy business and relatively few people outside of the business truly understand what happens to get oil and gas out of the ground. I would say to anyone to take some time to understand the process and technology of oil and gas extraction and make up your own mind—don't let outsiders who don't know the business influence your decision.

Many people in the oil and gas industry, such as Mr. Bond, begin their careers in the field working as roughnecks or roustabouts before moving their way up through the company.

For those who are interested in a career in the energy industry there are plenty of opportunities for high energy people with or without a college degree. If in college, focus on math and science and take job shadowing and internships. These experiences and relationships will only help your career. If college is not in your plans, that's OK. Be flexible on where you want to live and work. There are oil and gas basins all over the world and all of them need good solid people to bring the oil and gas to surface, process it and get it to market.

For any person interested in a career in the oil and gas business I would say keep your integrity. It's really the only thing anyone really has. Who wants a smart person that you can't trust? Say what you are going to do, then do it. This business is all about trust. There are always safety and financial risks in this business and trust is a necessity for a successful career.

ANY OTHER COMMENTS ON CAREER OPPORTUNITIES IN THE OIL AND GAS FIELD?

After nearly 30 years in this business I still wake up excited about my job. There are always new technologies, new markets and challenges that keep this a very dynamic industry. On top of that, the industry is very social with plenty of technology conferences, industry associations, ties to universities and affiliations with charitable associations that constantly bring you in contact with customers and peers. I obviously have a very biased opinion, but I honestly don't see how people work in any other industry.

Q&A

NEED GETS TO KNOW INDUSTRY PROFESSIONALS

ADAM BELL

Adam Bell is a Technical Engineer at Schlumberger. He started out as a Field Engineer Trainee with a Bachelor's degree in Chemical Engineering. Schlumberger develops their Field Engineers through several steps of operational and technical schools combined with field work in advance. He participated in a Co-Op/Internship program in college which he felt was especially useful in preparing for this challenging field.

TELL US A LITTLE ABOUT YOUR JOB AND WHAT YOU DO?

I focus on developing our laboratories, facilitates , and engineers in the Horseheads, NY district. I began my career working on field crews in South Texas, and moved into managing daily operations of well stimulation crews in Arkansas, Oklahoma, and New York. That included hiring and developing field crews, coordinating people, materials and equipment, and interfacing with clients both in preparation and following up on completed treatments.

HOW DID YOU DECIDE TO GO TO WORK IN THIS FIELD?

I have always been interested in math and science from a young age, which led me to wanting to become an engineer.

WHAT IS A TYPICAL DAY AT WORK LIKE FOR YOU?

When I worked in the field, I was at work before 5 a.m. preparing paperwork and then briefing the crew on the days job. From there I would lead a convoy of up to 20 trucks to a well-site where we would rig up the equipment, pump the job, rig the equipment down, and move to the next well-site. All of this would happen before 7 p.m. that same day. Now, my day begins at the office at 8 a.m. and usually ends around 7 or 8p.m.

COULD YOU DO YOUR JOB ANYWHERE IN WORLD?

The majority of well cementing and stimulation is performed on the oil and gas wells drilled in the United States. This covers a significant portion of the U.S. from California, the Rocky Mountains, Texas, Arkansas, Oklahoma, Louisiana, all the way to the Appalachian Mountains.

WHAT IS THE MOST CHALLENGING PART OF YOUR JOB?

The "24/7" nature of this fast-paced industry pushes everyone involved to their limit. To ensure that risks are managed and the correct decisions are made to perform the job safely and correctly is a constant challenge. In the Northeast part of the United States, one of the key challenges is to educate the public about our industry as well as ensure that all operations are conducted in accordance with established best practices in order to justify the public's trust.

ANY ADVICE FOR YOUNG PEOPLE CONSIDERING A CAREER IN THIS INDUSTRY?

Be ready to work harder than you ever thought was possible. You will always continue to learn in an industry that will always be challenging and changing at a dramatic pace—you will never be bored. If you are considering a career in this industry you cannot be afraid to get your hands dirty!

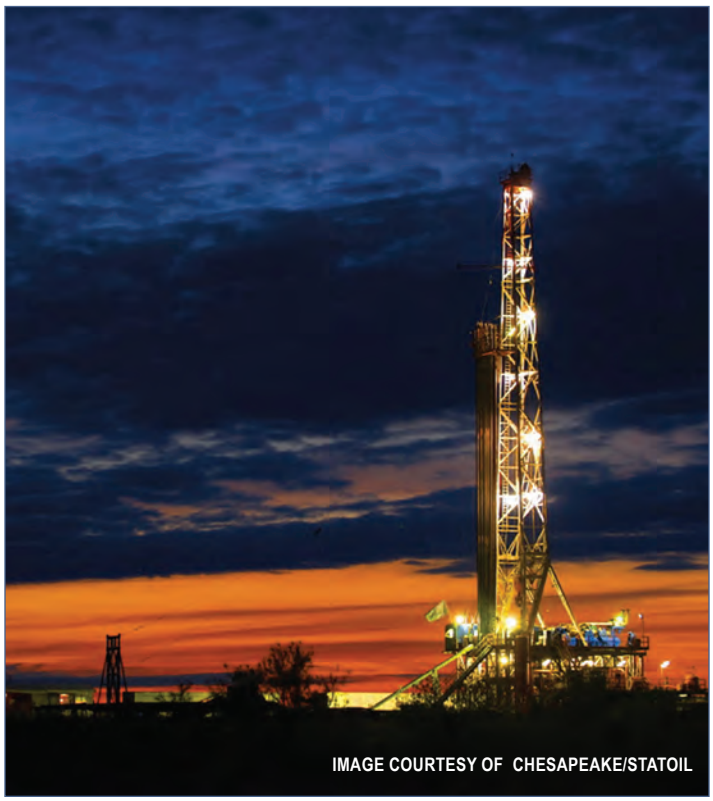


IMAGE COURTESY OF CHESAPEAKE/STATOIL

I have been able to see the sun rise and set across the countryside of America …

ANY OTHER COMMENTS ABOUT PURSUING A CAREER IN THIS FIELD?

I have been able to see the sun rise and set across the countryside of America and have been able to work with an incredibly diverse multi-national workforce. Abundant energy resources have enabled dramatic improvements in quality of life and advances in technology can never be predicted and should not be underestimated. Ensuring safe, reliable, and affordable energy for future generations is not only one of the greatest engineering challenges of today but also of primary concern for our society's future.

Q&A

NEED GETS TO KNOW INDUSTRY PROFESSIONALS

GALEN COBB

Galen Cobb is Vice President of Industry Relations for Halliburton and is responsible for the company's industry relations and global activities. As a graduate of Oklahoma Christian University with a degree in business, Mr. Cobb has been with Halliburton for over thirty-five years. Mr. Cobb serves on numerous industry, trade association, and civic boards throughout the industry, and was recently awarded the Spindletop Don E. Waggener-Butch Griffin Award.

TELL US A LITTLE ABOUT YOUR JOB AND WHAT YOU DO?

After working for Halliburton for almost 35 years I have had many different positions with the company. Currently I have broad responsibilities that include managing the company's industry relations, energy trade policy issues, executive client relations, and trade organizations oversight. Really my position is all of these things rolled into one. I am also very involved in our education component, which allows me to work with many K-12 schools and improve our relations with the future of our industry.

HOW DID YOU DECIDE TO GO TO WORK IN THIS FIELD?

Thirty-six years ago I was out of college, looking for a job and found Halliburton. I started as most people do in this industry, at an entry level position doing field service work, export shipping, then working up to export sales. I have had various executive management positions in operations, marketing, and sales and business development. I was also the Director CIS and China with oversight in establishing Halliburton's presence and operations in these emerging markets. Later I was named Director of Executive Sales and Business Development with expanded responsibilities for the worldwide development and promotion of Halliburton's services and products.

WHAT IS A TYPICAL DAY AT WORK LIKE FOR YOU?

There is a lot of variety in my daily work schedule. Serving on 15 Boards and 32 Industry Committees I find myself traveling a lot, and doing many breakfasts, luncheons, and dinners that are all related to our industry. I have been fortunate enough to be able to spend a lot of time in Houston, Texas where I reside as well as traveling extensively throughout the world. I also spend many days working with schools and educations programs to improve our educational institutions as well as our industry.

WHAT IS THE MOST REWARDING PART OF YOUR JOB?

The opportunity to meet such a wide variety of people is very enjoyable. I also feel that getting to know the different industry trade issues and working through those with various different people makes my job exciting. Another very enjoyable part of my job is focusing on enhancing our education programs. The future of our industry is in our youth, and educating them to be successful not only in their careers but to make a difference in their country.

WHAT CHALLENGES DO YOU FACE IN THE INDUSTRY?

The biggest challenge I face in our industry is the mindset and perception of the oil and gas industry. It is very important that we keep the price of our resources at an affordable range for our country. The oil and gas industry really affects our economy, which in turn has a huge influence on the future. We are very big fans of renewable energy sources, and work with those industries as well. Everyone that is associated with energy is on the same team, and we enjoy working together. Oil and gas is not something that can go away quickly, and it is something in which the U.S. is the leader. Focusing on needing every energy source and producing them in a clean manner are the biggest challenges we face.

WHAT ARE SOME BENEFITS TO WORKING IN THIS INDUSTRY?

Our industry has some tremendous benefits. The oil and gas industry is going to be very strong throughout the next 30, 40, even 50 years. The upward mobility of this career path is endless. If you have talent and a willingness to learn and get better, you will advance very quickly. No matter what specific part of the energy industry you work in, if you are willing to do what it takes, you will have wonderful personal, financial, and industrial benefits.

WHAT ADVICE WOULD YOU GIVE TO A YOUNG PERSON WHO IS INTERESTED IN WORKING IN THE OIL AND NATURAL GAS FIELD?

Pay your dues. Be willing to get dirty, start in the field, and work your way up. The industry is always looking for leaders that are looking to manage parts of the job, and increase their knowledge and duties. For a very fast payback on your education, a technical degree is the best. Getting your engineering degree and being willing to learn 4-5 years of technical work, you will really be set in a wonderful career in a great industry. I would also like to encourage young people to give the oil and gas industry a fair evaluation and not exclude it from the decision of a career. The demand for young people in our industry is huge, and it is like that every year. I believe Halliburton hired close to 15,000 people last year and are going to need even more in the next year or so.

ANY OTHER COMMENTS ON CAREER OPPORTUNITIES IN THE OIL AND GAS FIELD?

Halliburton has started some Petroleum Academies in Houston area schools. This takes juniors and seniors interested in this industry and allows them to earn advanced credits to apply to college when they graduate high school. This also gives students the opportunity to receive mentoring from professionals. In the summer they spend 3 weeks at Halliburton and other companies and get to see a live look at the industry, career outlook, and physically get to work in the field and simulate all aspects of this career.

Q&A

NEED GETS TO KNOW INDUSTRY PROFESSIONALS

ASHLEY LANTZ

Ashley Lantz is an Operations Engineer for Encana in Colorado. She graduated with a Bachelor of Science in Petroleum Engineering from the Colorado School of Mines.

TELL US A LITTLE ABOUT YOUR JOB AND WHAT YOU DO

I work for our exploration team as an Operations Engineer. In our exploration group, operations engineers are involved in all aspects of well planning for new areas. We work with state and local officials to plan well locations, design and complete wellbores, and evaluate well performance when the wells begin producing. I spend one to two weeks per month in the field and at the well site during the drilling and completion phases. Field work is critical to the success of projects and the development of my engineering skills.

WHAT IS THE MOST REWARDING PART OF YOUR JOB?

I enjoy being involved in both the project planning and execution phases. It is exciting to be able to start with designing a project on paper and to also have the opportunity to implement designs and actually see the work take place.

WHAT IS THE HARDEST PART OF YOUR JOB?

One of the biggest hurdles is to anticipate future challenges and successfully design projects that mitigate or avoid those potential issues.

COULD YOU DO YOUR JOB ANYWHERE IN THE COUNTRY?

Our industry has both location and work schedule flexibility and as a result, engineers have many career path choices. Depending on the company, operations engineers typically have the opportunity to work from either corporate or field offices. Operations engineers also have flexibility in work schedules such as rotational work within the United States and throughout the world.

WHAT TYPE OF TRAINING OR EDUCATION IS REQUIRED?

Obtaining an engineering position at Encana required a Bachelor of Science degree; specifically I received a Bachelor of Science in Petroleum Engineering from the Colorado School of Mines. Even though I pursued a degree specific to the energy industry, engineers of other disciplines also qualify for various positions. In addition, many engineers elect to pursue graduate degrees; however, that is not required in most engineering disciplines.

While in college, I took advantage of the many internship opportunities our industry provides. I was fortunate to work three different summer internships in college. This was an excellent way to gain experience and find employment after college. My internships helped me secure a full time position with Encana early in my senior year of college.

Much of Ashley Lantz's time is spent in the field at drilling sites.

Q&A

NEED GETS TO KNOW INDUSTRY PROFESSIONALS

WILLIAM PIKE

Dr. William Pike is currently a consultant within NISC, an IBM company, and works under contract in the National Energy Technology Laboratory (NETL), a division of the U.S. Department of Energy. Dr. Pike holds a Ph.D from the University of Aberdeen. He has contributed to several books on oil and gas technology and energy economics and has authored technical papers on offshore drilling and production.

TELL US A LITTLE ABOUT YOUR JOB AND WHAT YOU DO?

I am an employee of IBM. I work under contract to the National Energy Technology Laboratory (NETL), a division of the U.S. Department of Energy. The Department of Energy conducts and funds research and development for the oil and gas, and other energy, industries through NETL. My work is undertaken, primarily, for the Strategic Center for Natural Gas and Oil (SCNGO) within NETL. SCNGO's mission is to conduct research that contributes directly to the enhancement of the nation's oil and gas supply in an environmentally safe manner.

HOW DID YOU DECIDE TO GO TO WORK IN THIS FIELD?

This field of work found me. A friend called to ask if I knew anyone who might be interested in the job. After he described it, I determined I was. The job allows me to bring my 20 odd years of experience in oil and gas exploration and production, plus a number of years as editor of technical publications, to bear on research and development that I believe is vitally important for our nation.

WHAT IS A TYPICAL DAY AT WORK LIKE FOR YOU?

In a typical day I will work at three to four tasks. These generally revolve around assessing research and development programs, enlisting acquaintances in the industry to review NETL programs, advising NETL on various issues and managing an outreach program to inform the industry and the public of the accomplishments of the NETL research and development program. To do this, I spend a good deal of time on the telephone and on e-mail.

Some of Dr. Pike's work with NETL focuses on researching new carbon capture and storage technologies.

WHAT TYPE OF TRAINING OR EDUCATION IS REQUIRED?

The job I do requires at least a bachelor's degree, preferably in engineering or the geosciences. More importantly, it requires a great deal of experience on the ground in the technical sector of the oil and gas industry.

WHAT IS THE BIGGEST CHALLENGE THAT YOUR INDUSTRY FACES?

I face the same challenge that everyone in our industry faces - the provision of energy to sustain and build the nation's economy and infrastructure in a prudent, safe and environmentally friendly manner.

WHAT ARE THE BIGGEST BENEFITS TO WORKING IN YOUR INDUSTRY?

The primary benefit of working in the upstream oil and gas industry is getting to work with people you like and respect. The upstream industry is global but the workforce is not large by most industry standards. Over the course of your career, you make lasting friendships around the globe. The second benefit that I have found in this industry is the knowledge that what you are working on is important to the entire global community.

WHAT ARE SOME OF THE OPPORTUNITIES YOU HAVE HAD THROUGHOUT YOUR CAREER?

Some opportunities that I have had include the ability to work at jobs I enjoy, the opportunity to advance in these jobs, and most importantly to me, the opportunity to live in foreign countries with my family and travel a good bit of the globe.

ANY OTHER COMMENTS OR ADVICE FOR THOSE INTERESTED IN A CAREER LIKE YOURS?

Despite a lot of rhetoric floating around today, the oil and gas industry will be a healthy industry for many decades to come. If you are interested in working in the industry, the first key to success is education. The technologies we use are extremely sophisticated. A bachelor's degree in a technical subject related to the industry is the entry card for a successful career. Past that, creating a successful career requires a lot of flexibility. There will be a lot of moves, a lot of travel and a lot of 16-18 hour days as you build your career in the industry. In the end however, it is worth it!

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WHAT'S NEW AT NEED?

MARK YOUR CALENDARS FOR THE YOUTH AWARDS FOR ENERGY ACHIEVEMENT

Don't forget that April 15, 2011 is the deadline for submitting your Youth Awards Project for the 31st Annual Youth Awards for Energy Achievement! Schools, student groups, and school districts should complete the application and portfolio to submit to NEED for review at the state and national level. Award winners participate in the National Recognition Ceremonies in Washington, D.C. June 24-27, 2011. To register, to download the application, and for more information visit http://www.NEED.org/Youth-Awards. Questions? Call NEED at 800-875-5029.

WORKSHOPS BEING ADDED EVERYDAY!

Watch the NEED calendar at http://www.NEED.org/calendar for workshops near you! NEED's sponsors and partners have provided resources for training, kits and great experiences for teachers in many communities.

GET INVOLVED!

Want to expand your involvement in NEED? Do you have the time and expertise to facilitate NEED workshops? Apply today for Facilitator Training July 17-21 in La Quinta, CA. This training program will prepare teachers to facilitate NEED workshops, in content and in process. To learn more or apply visit http://www.NEED.org/facilitatortraining.

WONDERING WHAT TO DO THIS SUMMER?

The 2011 Energy Conference for Educators brings together educators from around the country who are passionate about bringing energy education to their classrooms. In five interactive days in Denver, CO, the conference provides teachers with the most up-to-date information on all aspects of energy including the science of energy, sources of energy, transportation, consumption, electricity, efficiency and environmental and economic impacts. NEED's National Energy Conference for Educators is in Denver, July 11-15. Register today! http://www.NEED.org/summertraining

iSTEM INSTITUTES

NEED is already planning for an exciting week as part of the Idaho National Laboratory and Idaho Department of Education's iSTEM institutes in July 2011. DaNel Huggins, featured in the 'Teacher Talk' segment of the December/January issue of *Energy Exchange*, is a facilitator for iSTEM and the INL Energy for Educators program. INL and the IDE have long supported teacher professional development and the development of teacher leaders. NEED is honored to have INL and IDE support and the involvement of great teachers like DaNel.

IN THIS ISSUE

Careers in the Petroleum and Natural Gas Industry

The petroleum and natural gas industry is as expansive as it is necessary for modern living as we know it. There are possible careers in almost every field, from geology to engineering, and from commodities trading to marketing. This issue of *Career Currents* focuses on the plethora of opportunities in the petroleum and natural gas industry.

For related classroom activities and lessons visit www.NEED.org and download the *Liquified Natural Gas* and *Fossil Fuels to Products* curriculum guides.