

Human Resources: The Missing Piece of the Energy Puzzle

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Foreword

Petroleum producing states often reflect upon the cyclical nature of the nation's oil and natural gas industry, falling to depths that cause bankruptcies and massive layoffs, only to rise from that despair when prices firm and then strengthen. The states see massive oil field unemployment, sagging tax collections and general economic anemia during the down cycle. They see robust job demand and increased tax collections during the price upswings.

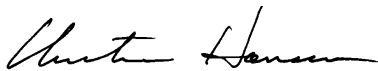
In early 1999, the IOGCC offered testimony before the U.S. Senate Energy Committee about the lack of national attention to the crisis in oil and natural gas producing states due to depressed commodity prices. Senators were told of the many oil field workers faced with layoffs or severe pay cuts. Those who leave these jobs often vow not to return to the industry.

The infrastructure of the industry was eroded with the loss of these employees. When oil and natural gas prices recovered, the infrastructure did not recover. Unlike the steel, agriculture and automobile industries, or even the makers of domestic corn brooms, government did not step in to slow the hemorrhage of job loss in the domestic petroleum industry.

This report documents a “missing piece” to the energy puzzle, so often ignored in discussions of national energy issues — people. America's petroleum industry is faced with a shortage of qualified personnel, from petroleum geologists to roughnecks. Today's oil and natural gas industry faces not only a current shortage of personnel, but bleak prospects for new workers coming up through college ranks to the vital petroleum science careers.

It is in the interest of the petroleum producing states and the nation to solve this problem. Dr. William L. Fisher has seen several deep cycles of the industry and makes thoughtful recommendations about needed steps to interest, recruit and train the next generation of the nation's petroleum professionals.

This report shines a spotlight on this “missing piece” to the energy puzzle. It is our hope that the information and recommendations in this report will spur public and private entities to work together to ensure a bright energy future for the United States.



Christine Hansen
Executive Director

Human Resources: The Missing Piece of the Energy Puzzle

I. The Human Resources Crunch

The United States' workforce is aging. Baby boomers are retiring earlier than previous generations, creating tight labor markets in most sectors of the economy. The domestic oil and natural gas industry is far from alone in facing the human resources crunch. A wide variety of other fields — nursing, construction and accounting, just to name a few — also are facing worker shortages.¹

What distinguishes the domestic petroleum industry from other fields is its role as a daily essential for consumers. Americans rely on oil to fuel their automobiles and natural gas to power and heat their homes, making it imperative that supplies of these natural resources continue to find their way to the market uninterrupted. According to President George W. Bush's national energy strategy, U.S. energy consumption will continue to rise even with needed conservation initiatives. The policy document predicts that over the next 20 years, "U.S. oil consumption will increase by 33 percent, natural gas consumption by well over 50 percent, and demand for electricity will rise by 45 percent."²

Meeting consumer demand despite a tight labor market is the challenge faced by today's executives. But the issue has grown too complex for the industry to resolve alone. State and federal policy makers must consider a tight labor market in shaping their energy conservation, production and consumption strategies. Solving the problem will require more than simplistic solutions aimed only at finding workers.

It is important to understand the state of the oil and natural gas industry today, and how it got that way, to find meaningful, long-term solutions to the human resources crunch.

[II. U.S. Energy in 2001](#)

Natural gas prices skyrocketed during the winter of 2000-2001. The sharp increase in price brought this energy sector back onto the national radar screen. Ensuring an adequate supply of natural gas to large consuming areas meant policy makers in regions normally uninterested in energy issues took stock of the situation. The governors of oil and natural gas producing states, through the Interstate Oil and Gas Compact Commission (IOGCC), first drew attention to the tight natural gas market through a national summit in Columbus, Ohio, on Sept. 19, 2000. Alaska Gov. Tony Knowles, IOGCC's 2000-2001 chairman, and Ohio Gov. Bob Taft warned consumers their heating bills could double. Energy experts from across North America discussed the various reasons behind the tight energy market, including the industry-wide shortage of qualified workers.

Robert Allison, president and chief executive officer of Anadarko Petroleum Corp., noted the damage done to the domestic petroleum industry by the last oil price bust in 1998. "We're all facing a shortage of experienced people as we try to ramp up activity [natural gas and oil exploration and production]," Allison said. "A lot of bright geologists, geophysicists and engineers left the industry after the last downturn, and it's going to take time to bring up new people.

"Qualified rig workers also are in short supply. Without experienced workers, drilling contractors can't put idle rigs back to work for us," he added.³

Domestic oil consumption has not decreased. More than 6.8 billion barrels of oil were consumed in 1998.⁴ While oil prices have rebounded since historic low prices seen in 1996-1999, sales of gasoline-guzzling sport-utility vehicles (SUVs) continue to rise. In 2000, U.S. consumers "snapped up 3.5 million new SUVs domestically, up 9.3 percent from the 3.2 million sold in 1999," which translates to the sale of one SUV per every five new vehicles sold.⁵

Consumers want to heat their homes and drive their cars, but Americans also have a new favorite pastime — the Internet. While this new hobby has not noticeably increased the demand for electricity nationally, the thirst for newer, faster and better computers has. Energy consumption is up, thanks

largely to the huge servers required to run Web sites, Internet service providers, company networks and other “New Economy” technologies.⁶

“Every generation of microprocessors consumes more energy than the previous one, and server farms that power the New Economy are huge energy users,” says Mark Mills, co-editor of the *Digital Power Report*.

Nowhere has this increased use of electricity been more apparent than in California, where the power crunch demonstrates that more and more energy is needed to fuel today’s technology-heavy economy. According to energy experts, “peak electricity demand in Silicon Valley has grown roughly 6 percent since 1994; in contrast, demand has been flat in Los Angeles, which has far fewer [computer network] server farms.”⁷

Demand for electricity and natural gas will be increasingly linked as most new generating plants will be fueled by natural gas. In most energy sectors, the difference between supply and demand will be minimal. This means prices will be higher than in previous years when supply outpaced demand. Overall, a bright future exists for energy providers, assuming they can attract enough manpower to drill the needed wells.

The Industry’s Cyclical Nature

Longtime observers of the domestic petroleum industry are sure of one thing — prices will rise and prices will fall. It’s the classic boom and bust cycle the industry and producing states have endured for decades.

During the most recent oil price bust from 1997-1999, headlines screamed “Oil Price Slump Seen Continuing for Years,” “Oil Producers Fight for Survival,” and “U.S. Oil Imports at Record 25 Years after Embargo.” Thousands of jobs were eliminated during the three-year period.⁸ These job losses hit government budgets hard, as states lost nearly \$60 million in royalty revenue and suffered the economic effects of hundreds of millions of dollars in lost salaries.⁹

Domestic production slowed as producers fought to stay in business. Even as prices recovered and

the next boom cycle began, U.S. producers faced an uphill battle to increase production. The 10 largest U.S. oil companies laid off more than 38,000 workers in 1999, “as part of a trend that saw those companies eliminate 5.2 percent of their workforce annually for the past 12 years.”¹⁰ Many of these recent lost jobs can be attributed to mergers and consolidations within the industry. After so many job losses, companies found it difficult to fill positions once they became vacant.

Anecdotes abound regarding hiring in a tight labor market. One producer in Oklahoma desperate for workers recruited inmates at the prison gates. Producers in many states called former employees to beg them to return to work. More and more companies are looking to Mexico and other foreign countries to fill their needs.

However, company executives realize the cyclical nature of the industry makes some employees look for other lines of work. “It’s the same old story whenever you lay them off, hire them back, lay them off and hire them back — you can expect people will leave,” Ray Peterson of UTI Drilling said.¹¹

Overcoming the boom and bust cycle will play a key role in solving the industry’s human resources issues.

Chart 1. U.S. Average Rig Count Compared with Total World Average Rig Count



A Shortage of Personnel, an Aging Workforce and a Shrinking Industry

The IOGCC first called attention to the looming personnel situation in 1997 with its report “National Geoscience and Engineering Manpower Issues for the Petroleum Industry.” In the report, the IOGCC warned there was a shortage of personnel in the industry that likely would persist until the industry was able to attract a new generation of workers. The study also noted many of the workers laid off in the 1980s bust were World War II veterans who have since retired, taking their institutional knowledge with them.¹²

Companies must attract young workers who are ignoring the petroleum industry as they make their career choices. A study by the U.S. Department of Labor finds that “relatively few oil and gas extraction workers are in their teens or early 20s,” noting “over 65 percent of the workers in this industry are between 35 and 54 years of age.”¹³ On average, 40 percent of the industry’s workforce is expected to reach retirement age during this decade, according to the National Petroleum Council, in its December 1999 report, “Natural Gas: Meeting the Challenges of the Nation’s Growing Natural Gas Demand.”

In its landmark study on the effects of low oil prices, the IOGCC also noted that “despite layoffs, continued economic pressures on U.S. producers have resulted in tight job markets and a shortage of qualified professional as experienced employees permanently exit the industry.” The report cited the “boom and bust” nature of the domestic petroleum industry. In 1982, 1.9 million people were employed in the oil and natural gas industry.¹⁴ By 1999, that number had dropped to 1.44 million.¹⁵ The Department of Labor predicts industry employment will decline even more in the coming years, saying “overall employment in the oil and gas extraction industry is expected to decline 17 percent through the year 2008, even though worldwide demand for oil and gas is expected to remain strong.”¹⁶

Making the Grade

Enrollment in geology and petroleum engineering majors continues to decline. The industry downturn in the mid-1980s caused colleges and universities to drop courses in geology and petroleum engineering. According to the American Geological Institute (AGI), geology enrollment is tied to employment prospects in the petroleum industry. AGI said the “enrollment drop between 1983 and 1990 from 48,000 to 21,000 ... was the largest ever experienced in the geosciences.” Geology enrollments increased for the first few years of the 1990s because of increased employment opportunities in the environmental sector. However, AGI predicts enrollments will continue to drop.¹⁷ Chart 2 shows the number of students enrolled in petroleum degree graduate programs. Charts 3 and 4 illustrate the number and type of degrees earned in the United States for both geology and petroleum engineering.

Chart 2. Number of Students Enrolled in U.S. Petroleum Engineering Graduate Programs

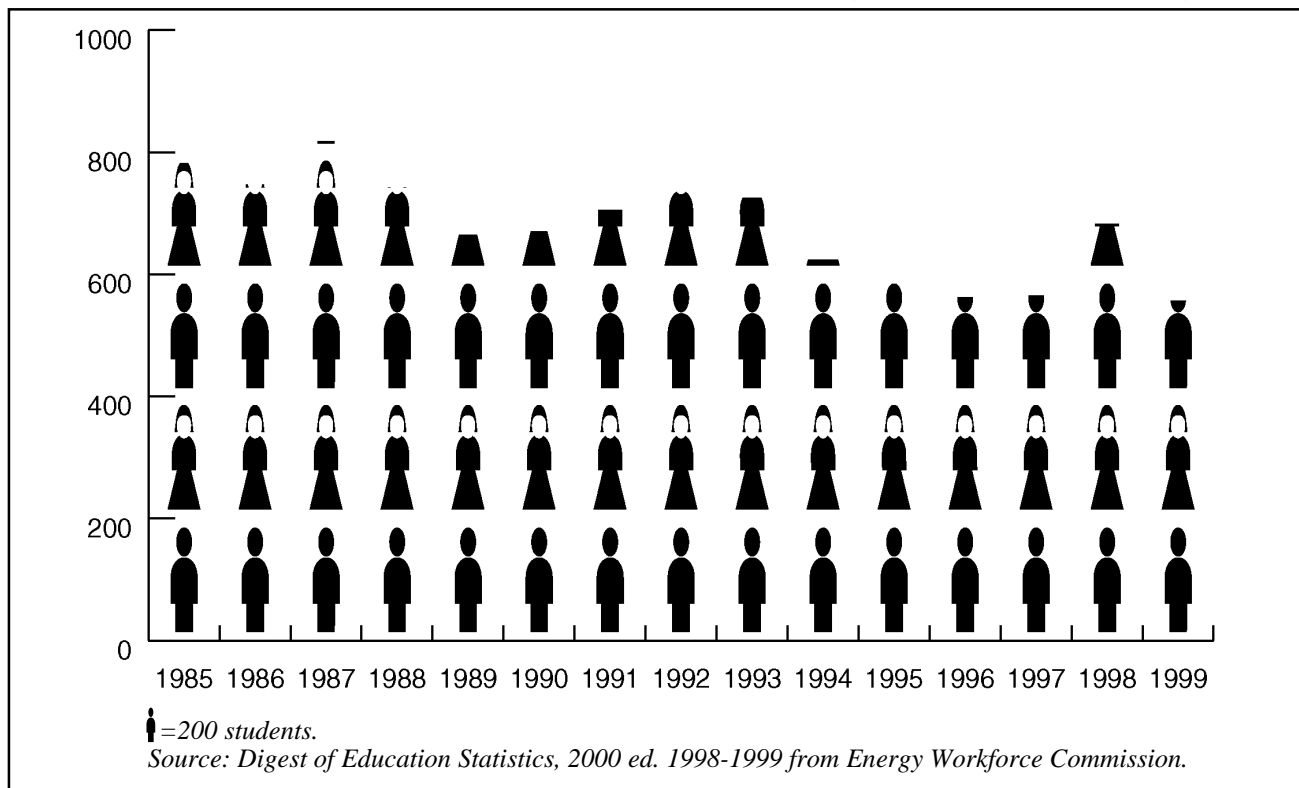


Chart 3. U.S. Earned Degrees in Geology by Type

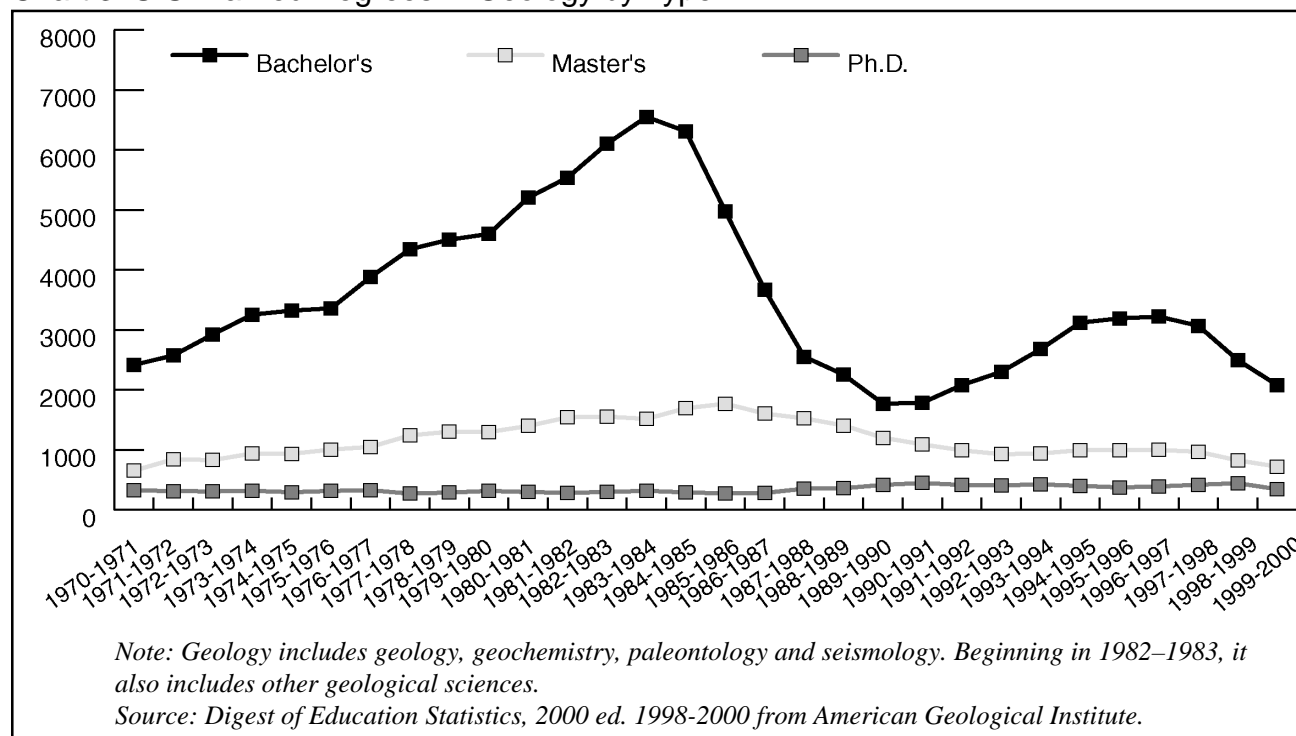
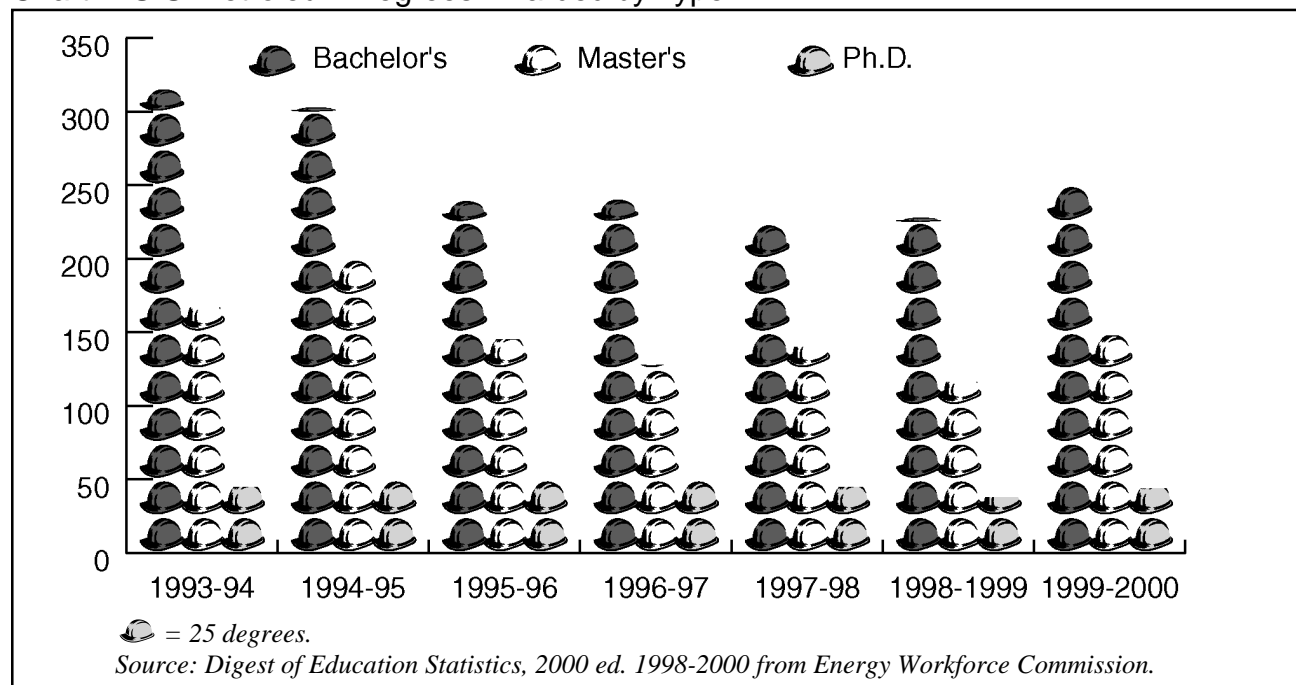


Chart 4. U.S. Petroleum Degrees Awarded by Type



III. Current Steps

The energy events of 2001 likely will keep attention focused on the industry. In previous years, the attention has been mostly negative, with consumers wondering aloud about the high cost of oil and natural gas, policy makers accusing the industry of price-fixing and the industry defending itself for turning a profit. Attracting new employees to the industry will require policy makers and the industry to put aside old beliefs and tired rhetoric and work together.

Before developing new recommendations, it is important to assess the programs already in place. Industry associations, professional groups and government policy makers have not turned a blind eye to the industry's plight. Several have developed programs designed to attract new and younger employees.

The American Association of Petroleum Geologists (AAPG) has created the Visiting Geologists Program, which gives college students an opportunity to meet practicing geologists and to discuss career options. AAPG developed the program in 1974 and geologists have since spoken to more than 200 colleges and universities.¹⁸

DOE's Office of Fossil Energy also has developed a program designed to expose students to the petroleum industry. The Office of Fossil Energy recruits minority students who are studying areas related to fossil fuels and provides summer internships in those areas. Through these internships, students gain hands-on experience and professional opportunities. The Office of Fossil Energy also encourages these students to consider working for the federal government following graduation.

The private sector has worked to address the issue as well. Companies such as Schlumberger Ltd. offer student scholarships and assist students with their homework. BP is increasing its efforts to recruit college graduates and creating a mentoring and training program for new employees.¹⁹

Marathon Oil Co. recently created a new position, manager of talent acquisition and retention, within its human resources department. "We're going out into a tight labor market and trying to recruit the best and the brightest, but we're also recognizing that you have to look at both components – recruiting and retention," said Zeb Strong, Marathon's new talent acquisition manager.

“You want talented individuals who are looking for a career, not just a job, and who can see upward mobility in your company.”

Apache Corp. has turned to recruiting on college campuses for the first time, recognizing that hiring experienced employees is increasingly difficult.²⁰

IV. Recommended Actions

These existing programs provide an effective springboard for new and innovative approaches. As is the case with other complex energy issues like the development of a national energy policy and assessing the cost of environmental compliance, IOGCC member states have an opportunity to lead the way. The following recommendations should not be interpreted as a comprehensive solution. Rather, the ideas are intended to stimulate discussion among state leaders, industry members and scholars to draw attention to the existing and future human resources challenges facing the industry.

- **Create a blue-ribbon task force to study the personnel situation and develop ways to combat the effects the industry’s cyclical nature has upon the workforce.**

Personnel issues facing the industry are complex. Determining specific, long-term strategies to cope with them can best be accomplished by the creation of a blue-ribbon task force comprised of governors, state regulators, scholars and industry members who will be charged with making specific recommendations on what state policy makers, educators and industry members can do to attract new, younger employees.

The task force would take into account long-term trends such as the decline in geosciences enrollment and the increase in efficiency that enables the industry to do more with fewer workers. Company mergers also play a part in these long-term trends as companies cut costs by laying off workers while striving to please Wall Street and investors through announcements about the synergies these actions create.

While there is no way to eliminate the cyclic nature of the petroleum industry, the task force may

be able to recommend ways to even out the up and down cycle. As a matter of public policy, efforts could be made to provide a more stable supply environment, in such areas as land access, environmental regulation, and research and development. Companies, increasingly tied to quarterly earning statements and stock price, need to take a longer view in hiring and retaining skilled workers and professionals. With the industry ever more dependent upon technology and technology application, it needs to be able to attract the best and the brightest. A stable employment market is necessary to assure that.

➤ **Improve the public's image of the industry.**

A significant portion of the industry's inability to attract new employees can be attributed to its poor public image. In most areas of the United States, oil companies are perceived as exploitative of the land and its natural resources. Rarely does the industry receive credit for its environmental protection efforts and role as energy provider.

Improving the industry's image, and thereby making it a more attractive career option, is a necessary component of solving the human resources crunch. A significant step toward achieving this would be the creation of a national energy education program that would allow companies and independent producers to voluntarily pay a small assessment on their crude oil and natural gas sales. The funds generated could be used for public outreach, education and advertising programs.

The first state level program was created in Oklahoma in 1994. The Oklahoma Energy Resources Board (OERB) has restored more than 2,400 abandoned oil field sites and has spent millions of dollars to improve the industry's image. OERB developed an education program in which geologists, engineers and other industry professionals visit local classrooms to teach students in elementary, junior high and senior high schools. Other states, including Ohio and most recently Illinois, have followed suit.

Previous efforts to create a national program failed, but OERB Executive Director Mike Terry believes the time is right to try again. In a recent speech to the American Petroleum Institute, Terry pointed to the success of the public and student education programs in Oklahoma.

“More than 200,000 students have been exposed to our classroom programs and hundreds of

Oklahoma science teachers have gone through the training,” Terry said. “They are beginning to understand the importance of energy, where it comes from, and how it impacts their lives.

“Independent research studies have shown that the general public has been paying attention to the OERB’s public awareness campaign. Six years ago, we were hardly on the radar screen. Today, the oil and gas industry is considered the most important industry in our state, with 75 percent saying the industry is either very or extremely important. In addition, 27 percent of the respondents think the image of the industry is either much or somewhat better than 5 years ago. These results clearly show that once people become more educated about the industry, their eyes are opened to its importance.”

Terry believes many Americans are cynical toward the industry because they simply don’t understand the supply and demand issues or the implications of a commodity that is traded worldwide. Development of a national energy education program could be the first step toward bridging that knowledge gap and improving the public’s opinion of the industry.

The governors of the IOGCC also understand the importance of public education. The IOGCC passed a resolution at its 2001 Midyear Meeting urging President Bush and Congress to include an industry-funded public education program in its national energy policy. The resolution advocates creation of a public education program designed to increase awareness of the industry and educate the public about the industry’s importance. At the same time, oil and natural gas producing states should encourage the development of similar energy education programs in their own backyards.

➤ **Encourage the industry to implement job-shadowing programs for students, and professional and student mentoring programs.**

Job shadowing is a popular way to increase student awareness of a particular field or industry. National organizations such as Junior Achievement put together programs each February to expose students to a variety of career options.

Job shadowing helps students make the connection between what they learn in the classroom and how they can apply it in the workplace. It also builds partnerships between the industry and the com-

munity, creating a spirit of goodwill and giving students an accurate picture of the industry.²⁰

Career awareness presentations to schools and universities also can be an excellent recruiting technique. Teachers enjoy bringing in guest speakers, providing another link between the material they are teaching and the “real world.”

Increasing awareness of career opportunities in a given field need not be limited to students. Employees already in the workforce should be made aware of the various career paths open to them. Many corporations and organizations offer professional mentoring programs for employees. For example, Phillips Petroleum has implemented the Phillips Mentoring Program at locations worldwide. In some locations, the program helps recently hired employees fit into their new role while programs in other areas focus on career development opportunities for existing employees.²¹ Other oil and natural gas companies and organizations have developed similar programs.

The challenge lies in creating mentorships and partnerships with students, something some professionals shy away from because of time constraints and security issues. However, advances in technology mean face-to-face meetings are no longer required for successful mentoring relationships. A high school student with an interest in geology can correspond with a petroleum geologist working in the Middle East through e-mail. Connecting students who have an interest in science with practicing professionals can debunk popular misconceptions and attract young students to the industry.

➤ **Increase research opportunities for students who are interested in the petroleum sector by creating meaningful internship programs.**

The Department of Energy has created a myriad of research opportunities for students across the United States. Students can intern at the six national laboratories or other DOE-funded research sites. DOE even has a program aimed directly at attracting community college students, a group sometimes overlooked by other internship programs.²² The individual states also should consider funding similar programs and expanding funding to university research projects.

Companies in the oil and natural gas sectors also are conducting significant research projects.

Exposing a high school or college student who possesses an interest in science to some of these research projects could encourage them to consider working in the petroleum industry. At the very least, summer internships will give students hands-on experience to supplement their classroom learning and nurture their interest in science.

Education experts also promote internships as a solid way to prepare students for entering the workforce. According to the Center for Occupational Research and Development (CORD) in Waco, Texas, internships provide a necessary link between academia and the workplace and also help shape the highly skilled workforce required by 21st Century employers. CORD encourages companies to establish “work-based learning partnerships” with schools in their area, creating opportunities for both educators and students. Creating research opportunities for teachers also can be a sound method for attracting students to the industry, as teachers will share their summer experiences with students.²³ The states themselves can play a crucial role by increasing funding for research at universities.

➤ **Create a Web site that includes career tips, salary information, education and skill requirements and other information students consider before deciding which career to pursue.**

Today’s Internet-savvy students are adept at using technology to research everything, from the latest Hollywood gossip to possible career options. Reaching out to this technically proficient generation will require a different approach, and creating a Web site that showcases where a petroleum engineering or geosciences degree can take them could be one way to stimulate their interest in the oil and natural gas industry.

Students are interested in learning how much money they could make and what types of skills would be required to succeed. Today’s youth are considering career options in middle and junior high schools, much earlier than in previous generations. Some states require a career investigation class or seminar to determine which academic track the student should pursue. For example, eighth grade students in Texas study various career options in such a class.

Capitalizing on students’ heightened awareness of career options could be useful in both educating

students about energy and attracting more students to the industry.

V. Conclusion

The current human resources situation facing the domestic petroleum industry should be treated as a crisis. States, businesses and educators must work quickly to develop specific strategies to attract both young and experienced talent to the industry ranks. Competition for quality employees is intense, as other industries vie for the attention of not only today's students but also experienced employees who possess valuable skills.

The United States needs energy to fuel the economy and maintain the American lifestyle. Increased supplies of oil and natural gas will be required, placing a strain on the ever-tightening labor market within the industry. Meeting this challenge will require strengthening existing partnerships between state and federal policy makers, industry and educators, and developing new ones focused on creating educational and research opportunities within the gas industry for students.

Taking the personnel problem and its underlying causes seriously and developing concrete and realistic solutions to overcome them will be the first steps in ensuring an energy-rich future for the United States.

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About the INTERSTATE OIL and GAS COMPACT COMMISSION

The Interstate Oil and Gas Compact Commission (IOGCC) represents the governors of 37 states — 30 member and seven associate states — that produce virtually all the domestic oil and natural gas in the United States. Five international affiliates have been accepted into the IOGCC in recent years.

The organization's mission is to promote the conservation and efficient recovery of domestic oil and natural gas resources, while protecting health, safety and the environment.

Since its creation in 1935, the IOGCC has assisted states in balancing a multitude of interests — maximizing domestic oil and natural gas production, minimizing the waste of irreplaceable natural resources, and protecting human and environmental health — through sound regulatory practices. The IOGCC plays an active role in Washington, D.C., serving as the voice of the states on oil and natural gas issues and advocating states' rights to govern the resources found within their borders.

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North Dakota (1953)
Ohio (1943)
Oklahoma (1935)
Pennsylvania (1941)
South Dakota (1955)
Texas (1935)
Utah (1957)
Virginia (1982)
West Virginia (1945)
Wyoming (1955)

Associate States

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Idaho (1960)
Missouri (1995)
North Carolina (1971)
Oregon (1954)
South Carolina (1972)
Washington (1967)

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