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The dominance of the US Oil and Natural Gas industry is in jeopardy. While possessing only about three percent (3%) of the world's proven oil and natural gas reserve assets, this country has been at the forefront of technology, expertise and knowledge provided to the global industry for years. The Oilfield Services, Equipment and Drilling industry is primarily headquartered in Houston, Texas, with a greater concentration of people, capabilities and technologies than anywhere else in the world. Over the next few years we would expect that dominance to shift out of the United States if something is not done.

The trend of higher commodity prices, higher hydrocarbon demand and increased cost/difficulty in producing these volumes has been moving up for the past thirty years. Over \$1 trillion worth of crude oil will be produced worldwide this year alone. In the US, \$120 billion worth of natural gas will be produced. While efforts will and should continue to develop technologies to reduce this country's dependence on crude oil and natural gas, the global economic development and accompanying hydrocarbon demand growth will keep the value of these resources high for years.

The rest of the world has placed a great deal of importance and focus on capturing part of this value chain while in the US, there has been a continuing decline in the number of people studying earth sciences and entering the industry. From 1982 to 1999, the US oil and gas industry lost 415,000 workers. A significant tranche of employment has already been lost. The high technology, high value added end of the industry that operates in the global market is the next tranche that could be lost. As a result of this potential decline, and combined with the hydrocarbon reserve potential in other parts of the world, the United States faces a very real threat of losing a globally dominant, high technology and critical industry representation.

The average age of a geoscientist in the oil industry today is 49 years old. He is a grandfather with two children. He will retire in 10-15 years, taking his expertise and knowledge into retirement with him, with few successors coming behind to maintain our leadership position.

The Society of Petroleum Engineers performed a demographics study showing that 61% of its members were 45 years of age or older and that only 15% were under the age of 34. Yet the challenges of producing ever-increasing amounts of crude oil and natural gas have never been higher. This is an industry that can now drill wells six miles down, through rock, to reach increasingly smaller pools of oil and gas, from ships operating in water two miles deep. The technical challenges itself and meeting these technical challenges could not have been imagined only a generation ago. And it is companies in the US that are providing most of the expertise and technology in order to make these efforts a reality.

The spirit and attitude of American capability is known around the world. When no one else could complete a task, it was the American company that provided the perseverance, know-how and technology to do so. This spirit, our educational system and the support of government, society and the industry all provided a stream of professionals that allowed this country to lead the rest of the world in the development of this industry.

But the negative implications of fossil fuel, the 1970's view of the industry and the expected promise of other industries have all contributed to the problem that we face today – a significant shortage of capable, motivated geo-science graduates to continue the tradition of excellence of the US in this industry.

Last year, over 43,000 lawyers graduated from US universities yet only 430 geology degrees were issued. In 1999, only 642 petroleum engineers graduated from US universities compared to 42,560 degrees in computer science. In 2002, according to the American Society for Engineering Education, only 279 students received bachelor's degrees in petroleum engineering. There were estimated to be 14,000 petroleum engineers working in the industry in 2002.

Like any industry, the oil and gas industry must try and populate its ranks with the best people it can. Graduating in geo-science disciplines in many other countries is still considered a path to a challenging, successful and well-paying career. Over time, these companies are likely to gravitate to regions where the best people are graduating in applicable sciences. This shift of business would have dramatic implications on US employment, revenue generation and psychology. The US would cede an area of expertise and intellectual dominance that it can ill afford to lose. But it is not just the geoscientists whose future this scenario impacts. There are over 500,000 people employed in crude oil and natural gas production in the US and tens of thousands US workers employed around the world. Oil and gas operations exist in some form in 34 of the 50 states, with almost $\frac{3}{4}$ of oil and gas operations occur in 4 states: Texas, Oklahoma, Louisiana and California.

Roustabouts can make \$47,000 per year. More specialized jobs such as Drillers make \$56,000 per year with Toolpushers and others in the \$75,000-\$100,000 annual range. As the core technical capability shifts away from the US to other areas of the world, these well-paid US workers will be replaced by other nationalities, compounding the impact to the US economy.

According to the Society of Petroleum Engineers salary survey, petroleum engineers in the US averaged right at \$100,000 per year. Entry-level salaries for petroleum engineers are among the highest of any engineering field. Without some stimulus, interest and participation in education in the geo-science disciplines will continue to decline. And with that decline, this country will see the loss of jobs, both direct and collateral, prestige, revenues and an industry critical to the future of our country and our world.

With over one-half of the entire world's drilling rigs operating in a country with only 3% of total worldwide reserves, there has to be a shift in capital, activity and focus. The intellectual capital in this industry is headquartered in this country. In order for this intellectual capital to remain in this country, efforts must be made to stimulate interest and participation in the industry and in educational levels across the spectrum. If not, the continued dominance of the US in the oil and gas industry would dramatically decline and the implications for US employment in the energy industry as well as other industries that rely on hydrocarbons as a product feedstock (medicine, plastics, textiles, etc.) would be quite negative.