The Workforce of the Future... Are We Ready?

ASSE Session #664
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June 26, 2013
Based on the report by the National Academies of Science, National Research Council.
Emerging Workforce Trends in the U.S. Energy and Mining Industries

Conducted by the National Research Council’s Committee on Emerging Workforce Trends in the U.S. Energy and Mining Industries

Sponsor
National Energy Technology Laboratory,
U.S. Department of Energy

Overseen by the Board on Earth Sciences and Resources and its standing Committees on Earth Resources and the Board on Higher Education and Workforce
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Overview of the Study

- Analysis of oil, natural gas, coal, geologic carbon sequestration, nuclear, geothermal, solar, wind, and nonfuel minerals industries.
  - Skilled labor at entry and senior levels.
  - Industry, government, academia.

- Examine trends in size, growth, demographics; labor market characteristics.

- Future demand for and supply of workers, including foreign labor.

- Education and training opportunities.

- Health and safety impacts.

- Data sources.

**GOAL:** To provide recommendations to meet future labor requirements.

*Note: Also included electric grid (including Smart Grid); industry, federal gov’t, and educational workforce needs; focus on upstream.*
What do these sectors have in common?

- High risk
- Dependent on a skilled workforce
- Fundamental to the security and economic success of U.S.

“The United States has built and maintained a high standard of living and its role as a world leader, based largely on mastery of technology and innovation and firmly on access to energy and mineral resources.” (p. 12)
To set the stage...

- Energy Information Administration (EIA) predicts a steady increase—domestic and international—in demand for energy through 2035.
- Minerals are necessary to build energy infrastructure and produce goods.
- Success of energy and minerals sectors depends on a skilled workforce.

Source: EIA, 2012
• The present and future are bright for energy and mining jobs overall.

• Demand for workers at all levels will remain strong for the foreseeable future.

• These jobs will continue to pay well.

However...
• Baby Boomers (those born between 1946 and 1964) make up one third of the working U.S. population.

• Boomers are retiring and taking with them the knowledge, skills, and occupational wisdom they have gained over their careers.

• It takes an estimated 8-10 years for a worker to develop specific expertise in an industry.
The HR Fantasy

"What we are looking for is somebody about twenty five with forty years' experience."
The Great Crew Change

TALENT & TECHNOLOGY

Loss of Experienced PTPs

2009 Actual Flow Out Flow In 2014 Forecast

82,000 21,800 16,800 77,000

-5,000

The Petroleum Industry

Source: Rousset et al. 2011
The Great Crew Change

Nuclear Industry Employment Distribution by Age
2009 Survey

Total Employment:
- 2009 - 57,200
- 2007 - 55,900
- 2005 - 57,900
- 2003 - 58,400

Source: 2009 NEI Pipeline Survey Results, Contractors not included
The Great Crew Change

MEDIAN AGE OF US and MINING LABOR FORCES by YEAR

Source: Department of Labor, Bureau of Labor Statistics.
“The direct job skills required in the wind power industry are, to a significant degree, the same as skills in other large sectors of the workforce...heavy construction, power plant development, and the communications and utility industries.” (p. 119)
Workers in every sector we studied are aging, and preparing to leave at a time when every sector is also anticipating growth in hiring. Will we be able to meet this demand for new workers?
Every sector included in the study reported the need for workers who are STEM competent. Jobs and equipment to perform them require a more technologically trained workforce.
Gulf Coast P-16 education pipeline and 2008 median wages. SOURCE: Schott (2011)
The Hard Facts

• Of every 100 students entering 7th grade in the Gulf Coast, only 15 will graduate from college.
• About 7000 students drop out of high school every day in the U.S.
• In 2011, only 25% of graduating seniors met or exceeded the college readiness requirements for science, math, reading and English.
Overall Finding #5:

The current pipeline of STEM-capable students and workers is inadequate to meet workforce needs....Students mostly do not stay in STEM courses in K-12 that would prepare them for STEM postsecondary education or employment.
A Recommendation

“...the Committee recommends that industry pursue efforts to attract nontraditional workers (who are predominantly minorities and women) into the energy and mining fields.” (p. 85)
So what does this have to do with safety?
Let’s take a look at some representative industries
Percentage Growth in U.S. Workforce 2000-2020

Source: U.S. Census Bureau
Older and younger workers are injured and killed much more often than other workers.
Fatal Injuries in Oil & Gas Extraction

Source: Bureau of Labor Statistics Census of Fatal Occupational injuries (CFOI)
O&G Fatality Rates - OSHA calculated using CFOI fatality counts and employment data from the BLS Quarterly Census of employment and Wages.
Fatalities and Catastrophic Injuries by Length of Employment
2001 to Oct. 2010

- 31% of Total in First Three Months
- 66% of Total in First Year
- 90% of Total in First Five Years

Source: Texas Mutual Insurance
Fatalities per 100,000 Miners

Source: Ismail & Haight, 2010
Percentage of Injured/Ill Miners Over 45

Source: Fotta & Bockosh, 2000
February, 2006

The Bin Laden Tape: What's His Game?

The Future of Work

Forget Retirement—Older Workers Are Now the Key To National Prosperity
“The overall fatal occupational injury rate is higher for Hispanic/Latino workers than for all workers.”

BLS, 2013
% Distribution of Fatal Occupational Injuries, Hispanics vs. All Oil & Gas Workers, 2003-2008

<table>
<thead>
<tr>
<th></th>
<th>Hispanic</th>
<th>All Workers</th>
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<tbody>
<tr>
<td>Transportation</td>
<td>40%</td>
<td>25%</td>
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<tr>
<td>Contact obj/equip</td>
<td>30%</td>
<td>25%</td>
</tr>
<tr>
<td>Fire/Explosion</td>
<td>15%</td>
<td>10%</td>
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<tr>
<td>Exposure to subs/envir</td>
<td>8%</td>
<td>6%</td>
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<tr>
<td>Falls</td>
<td>5%</td>
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SAFETY SOLUTIONS International, Inc.
So what can we do?
The face of the workforce is changing.
Gender Diversity

Did you know...according to one study, the average man uses about 7000 words a day, while the average woman uses 20,000?
What does this mean?

- Women tend to “check in” more with family, friends and co-workers.
- Relationships are often more important than accomplishments.
- Defusing conflicts through negotiation or compromise is a part of working successfully.
- Worker satisfaction is a key focus.
Generational Diversity

Traditionalist
Born 1925-1945

Baby Boomer
Born 1946-1964

Generation X
Born 1965-1981

Generation Y
Born 1982-2002
“People resemble their times more than they resemble their parents.”

Arab proverb
Look at Expectations and Preferences

<table>
<thead>
<tr>
<th>Traditionalists</th>
<th>Baby Boomers</th>
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<tbody>
<tr>
<td>• Not computer savvy</td>
<td>• Want to be included in decisions</td>
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<tr>
<td>• Don’t like profanity/slang</td>
<td>• Want their opinions, contributions to be valued</td>
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<td>• Want experience to be valued</td>
<td>• Interact personally with them</td>
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<tr>
<td>• Rewards include plaques, certificates</td>
<td>• Rewards include promotion, appreciation, recognition</td>
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<tr>
<td>• Expect leader to be fair, consistent, logical, organized</td>
<td>• Expect leaders to be democratic, personal, open to input</td>
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## Look at Expectations and Preferences

<table>
<thead>
<tr>
<th>Generation X</th>
<th>Millennials</th>
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<tr>
<td>• Skeptical, distrustful of authority</td>
<td>• Need mentors, coaches, supervisors who will teach (especially Boomers)</td>
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<tr>
<td>• Give as much flexibility as possible</td>
<td>• Like to multi-task</td>
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<td>• Love technology and not afraid of it</td>
<td>• Use ability to work with high-tech</td>
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<tr>
<td>• Keep rules to a minimum</td>
<td>• Need to work on interpersonal skills</td>
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<tr>
<td>• Rewards include free time, new experiences, high-tech toys</td>
<td>• Rewards include awards, certificates, other evidence of ability/credibility</td>
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<tr>
<td>• Expect leaders not to be micro-managers, or too bureaucratic.</td>
<td>• Expect leaders to be consistent, organized, value their technical savvy</td>
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<td>• Leaders must walk the talk, focus on results, not process</td>
<td>• Won’t respond to leaders who are condescending, cynical, sarcastic, or</td>
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<td>treat them as if they are too young to be valuable</td>
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Ethnic and Religious Diversity
Regional Diversity
Power Distance...
the degree of inequality in culture

Hofstede, 1997
• **Low Power Distance** = more equality between members
  – Individuals can earn power through education or by performance
  – Children are treated as equals

• **High Power Distance** = well-defined rules for who can do what
  – Individuals are born to power and wealth... or not
  – Children are taught obedience
<table>
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<tr>
<th></th>
<th>Malaysia</th>
<th>Mexico/Arab Countries</th>
<th>South Korea/Greece</th>
<th>USA/Canada</th>
<th>Austria</th>
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Why does this matter?

Stop Work Authority
So how do you lead such a diverse group of workers?
Meet Josh

• 24 year old oil field driller
• The youngest guy on the crew
• First line supervisor and in charge of safety on the rig floor
How does Josh lead a team that has...

- Different generations
- Different national origins
- Different regional cultures
- Different genders
“Companies should train supervisors and managers in how to lead a diverse workforce... (which) would include such things as effective communication, communicating across cultures, building multigenerational work teams, understanding adult learning styles, and motivating diverse work teams. Leadership training should also include topics such as risk management, development of safety cultures, and disaster management.” (p. 194)
Recommendations

• S&H training should meet a minimum standard, be provided by industry knowledgeable trainers, and include strategies to effectively communicate with a diverse workforce.
Recommendations

• Undergraduate engineering programs preparing future leaders in these industries should include safety and health as required curriculum.
• Companies should create a “wisdom library” by capturing the occupational wisdom of retiring workers and using it to help train new workers.
• Companies should consider retaining older workers to act as trainers and mentors to inexperienced workers.
Recommendations

• Companies should make efforts to attract and retain non-traditional workers.
Recommendations

• To increase retention, especially when relocating workers to remote work areas, companies should provide much stronger social support than they have received in the past.
We have a moral and legal responsibility to protect the safety and health of workers. The Great Crew Change is happening... we have a new generation of workers in the workplace with different skills and experiences. Are we ready?
DANGER
DO NOT TOUCH
Not only will this kill you, it will hurt the whole time you are dying.