

THE STUDENT PIPELINE TO
THE OIL AND GAS INDUSTRY

by

BENJAMIN ALLEN PECK

A THESIS

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ABSTRACT

This research investigates recruitment strategies, techniques, and trends that can benefit the oil and gas industry in hiring engineering graduates. Engineering occupations are rising in demand within the oil and gas market. This is due to a workforce nearing retirement age and the industry's ongoing efforts to establish new technologies that maximize the earth's energy resources. With the creation of new positions, employers like URS-Washington Division are competing for employees from a diminished workforce pool. This research helped to establish proactive strategies that companies use to interest students in the industry.

The approach to exploring oil and gas recruiting was carried out in two phases, industry and academic. The first of these phases sought input from industry professionals, which helped in formatting a questionnaire and survey. The second phase involved development of a second questionnaire that targeted students, faculty, engineering career service directors, and URS-WD employees hired within the last two years. All the information gathered from the surveys and telephone interviews were analyzed to establish recommendations which can be made to the industry. What was found is that employers are targeting a new generation of engineers that have differing priorities and needs than the generations preceding them.

DEDICATION

This thesis is dedicated to my parents. They have always loved and supported me no matter what the situation.

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I would first like to thank my committee chair, and advisor Dr. Ed Back for his advice, suggestions, and support. He has given me the opportunity to continue my education and without his efforts and those of the University faculty, it would have not been possible.

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CHAPTER 1

INTRODUCTION

Background

A major factor in the continued growth and health of the United States economy is the condition of the oil and gas industry. While the 2008-2009 recessions have had an effect, the oil and gas market is projected to rebound. By the year 2013, the United States oil and gas market's value is expected to reach \$840.3 billion, a slight decrease from the pre-recessionary period (Oil & Gas in the United States: Industry Profile 2009). This industry is facing several hiring challenges beginning with replacing an aging workforce and increasing its technology base to maximize oil production capabilities (Ghalambor, 5: 3-4, 11). These challenges to the industry offer opportunities for graduating engineers looking for employment. Employers are seeking to hire graduating engineers to replace the aging workforce along with new positions created in an attempt to maximize resources to meet domestic and foreign demand. Opportunities in the industry are available for all forms of engineering and design disciplines. Petroleum, chemical, mechanical, civil, geotechnical, industrial/process and numerous other specialties are required to serve the industry. The problem for the oil and gas industry is the demand for graduates exceeds the supply interested in pursuing a career in this particular field ("Recruiting Problems Ahead" 18). This leads to competition between companies over students with experience transferable to a work environment (Deveau, WK1).

These issues led the Washington Division of URS Corporation (URS-WD) to form a partnership with the University of Alabama. This partnership was used to explore an effective means of improving student interest and recruitment within the oil and gas industry. Former Washington Group International, URS- Washington Division increased their abilities in exploration, production, pipeline services, and downstream environmental issues. With over 6,000 oil, gas and chemical professionals located globally and 80 years of experience serving the oil and gas industry, URS-WD has a vested interest in insuring the future of the industry they serve (“Oil & Gas Services”). The recommendations in this paper will benefit not only URS-WD, but the general industry and academic institutions.

Objectives

The objective of the research is to identify an effective recruitment strategy for the Oil and Gas industry. The overall outcome from the research will help align ideas specifically in job preparation so that industry and academic institutions benefit. The research includes recommendations for recruiting strategies and how companies can best represent themselves on campus. Industry receives new hires, while engineering colleges place students in viable careers. The goal of any engineering college should be to see its students enter the work force and successfully apply knowledge gained through completion of their engineering program. It is not the responsibility of universities to simply get graduates hired but to transfer knowledge which makes them desirable employees. The objective of this thesis was as follows:

- Determine how the oil and gas industry can effectively market employment opportunities and attract new college graduates.

- Identify shortcomings within the curriculum, student programs, and campus events so that industry and institutions are more successful in presenting the product of an oil and gas career. Careers can vary from exploration, production, refining, transportation, construction, marketing, and many more.
- Identify information on improving student interest in oil and gas careers from the earliest stages of their college career.
- Offer recommendations that help not only industry but universities succeed in maximizing the effort placed into new college graduates.

Methodology

The idea to explore the condition of industry needs, academia's output and how the two align was the product of URS: Washington Division's director of marketing/proposals and the University of Alabama research team. The Alabama graduate research team for the study on oil, gas and chemicals was Dr. Ed Back, Clay Ingram and Ben Peck. At the University of Alabama, the team was under the direction of Dr. Ed Back, who serves as the director of the construction engineering program. Also consulted at the university due to his experience and background in the oil and gas industry was Dr. Philip Johnson. The team also sought guidance, direction, and feedback from URS-WD contacts Todd Frank, and Emily Williams, college recruiter for the southeast. By combining the efforts and resources of both institutions, valuable information was gathered to help promote the hiring of qualified professionals.

Phase One: Industry Perspective

The research was divided into two distinct phases, industry and academic perspectives. Phase one, known as the industry perspective, began during January 2009. To gain insight into the oil and gas industry, industry professionals with experience in varying sectors such as engineering, construction, and owner organizations were interviewed. The experience levels of the interviewed group ranged from 10 to 30 years, with all being engineering or human resource (HR) managers. The strategy for setting up interviews was to establish an understanding or perspective to aid in the formation of a telephone questionnaire and an email based survey. These two tools would later be used to gather information from a larger more diverse group within oil and gas careers.

Phase Two: Academic Perspective

Phase two, known as the academic perspective, began in June of 2009. The goal was to incorporate materials and information obtained from the industry perspective to aid in formation of an initial academic questionnaire. The initial academic perspective questionnaire was adapted from phase one documents with participation from URS Washington Division contacts and the University of Alabama research team. The academic questionnaire was implemented to career service directors from around the country. Engineering career service directors work specifically with companies for co-ops, internships, and full time hires. Also, career service directors' involvement with career fairs, sponsorships and student events, made them an ideal group for knowledge pertaining to student interaction with oil and gas companies. Thus, career services was the ideal group to gather feedback for the formation of a survey that was distributed to new hires. A new hire was defined as those being hired out of college within the last three years to

limit variable conditions such as variances in the economy. After establishing the method for approaching the subject of oil and gas; efforts of survey distribution were determined.

Delivery Methods

The method of delivery for the study was to incorporate telephone and email resources to reach the surveyed audience. Contacts provided by colleagues outside of school helped establish discussions with oil and gas professionals. Once again due to the research teams work environment outside the classroom, the Engineering and Construction Contracting Association (ECC) - Future Leaders program became interested in the results of the study. The ECC is comprised of high level managers and engineering professionals, whose activities and products serve the interests of process, refining, pharmaceutical, and power industries. Many of the sponsors of the group are directly affiliated with the oil and gas industry such as: URS, Dow, Shell, BP, KBR, Exxon Mobil, Conoco Phillips, and many more. The ECC contact was Abbey King, who is affiliated with Kellogg, Brown and Root (KBR). With her assistance, a slightly modified industry survey was emailed to nearly 50 members of the ECC organization.

Delivery for the second phase of the project was widespread across portions of the United States for the telephone interviews. Telephone interviews were chosen over email distribution because there was only a small group of directors to be contacted. Furthermore, telephone interviews allow for a more detailed discussion than if the participants had to fill out surveys. Although email based surveys have their place and were utilized later in the research process. Phase two began during the summer months which posed major limitations that affected data collection. Due to personnel in career services being out of the office, only a limited number of subjects actively participated. Due to this difficulty, the interview forms were set up to retain

quality rather than quantity. The URS Washington Division southeast’s college recruiter first provided a contact list of universities throughout the southeast and also provided some listings from fellow recruiters in different geographic regions. A general email was sent to all the contacts explaining the purpose of the study, benefits and possible contact dates. The universities that responded to the initial email were the first group to be interviewed via telephone. After the initial southeast group was interviewed, select locations around the U.S. were the next to be targeted. Universities in the northeast, southwest and west with engineering programs that offered at least chemical or petroleum degrees were chosen to make the interview pool more diverse. Also, certain programs were chosen because of their history of placing engineering graduates into the oil and gas industry. Examples of these universities were Louisiana State, Oklahoma and Pennsylvania State. In total, ten engineering career services directors from separate institutions were interviewed based on the delivery strategy used (see table 1).

Table 1
Engineering Services Personnel Demographics

Name	University	Position	Regional Location
Rosemary Hill	Ohio State	Director of Career Services	Northeast
Rick McClintic	Pennsylvania State	Engineering Career Resources	Northeast
Dan Singleton	Alabama	Career Services Director	Southeast
Mary Feducia	Louisiana State	Career Services Director	Southeast
Beth Hanneman	Florida	Engineering Career Services	Southeast
Helen Fields	South Carolina	Engineering Career Services	Southeast
David McMahan	Texas A&M	Associate Director	Southwest

Bettie Scott	Oklahoma	Director Career Services	Southwest
Rachel Killam	Colorado	Career Services	West
Jean Clark	Colorado School of Mines	Employer Relations	West

Summary Remarks

There were key advantages to utilizing telephone interviews in portions of the research versus all email based study. By speaking directly to individuals questions were elaborated on and provided the transfer of ideals between both parties. All the participants were made aware of the research’s purpose so they were comfortable discussing the subject openly. In the end, the data gathered from the study reinforced some previous assumptions and helped identify other issues in recruiting. The completed telephone interview form can be found in Appendix A.

Due to some dedicated help, distribution of the surveys became a reality through the efforts of URS Washington Division and ECC- Future Leader contacts.

CHAPTER 2

LITERATURE REVIEW

General Recruiting

Recruiting the right college graduates has become a necessity among all businesses hiring in the current economic climate. Businesses have to be more selective and graduates have to find ways to distinguish their resume from those of their counterparts. College graduates that have jobs upon graduation diminished from 51 percent in 2007, to 26 percent in 2008 and are expected to be below 20 percent in 2009 according to a National Association of Colleges and Employers (NACE) survey (McCarthy 35). The survey questioned 35,000 students from 840 schools in the U.S.

Many 2009 college graduates are opting to enter graduate school and postpone entering the current workforce. Finances have an effect on the decision whether graduates stay in school or roll the dice in the job market. Since many graduates have student loans to re-pay after leaving school, they choose to further their education and delay payment.

The graduates of 2009 who do not pursue higher education are being pressed to take jobs not relevant to their degree. By taking a job outside of their discipline, graduates plan on waiting out the economic downturn until better days arrive with better opportunities. The problem with this approach is determining when will the current economic state change and how long are graduates willing to compromise for jobs outside of their technical specialty? Some students

entering the workforce have experience from internships but cannot find suitable jobs to cover their expenses upon graduation. Playing the waiting game for work conditions to improve is a key mistake made by 2009 graduates. Typically it takes around 3 months for graduates to find work in stable economic periods such as those of 2006 and 2007, while estimates today cite roughly 9 months in 2009 (Brown 1). The increased waiting period is due to 2009 being an unstable economic period. According to Christine Bolzan, who started Graduate Career Coaching, waiting is the worst mistake graduates are making (Brown 1).

In review, the job market for most college graduates is bleak, no matter how impressive the resume. Even with the current downturn there is a discipline experiencing growth that has little competition in the United States. The engineering career field is one of a select few that is still actively seeking college graduates. The reason behind the engineering career field's ability to maintain hiring numbers is due to limited competition with domestic students for such jobs. Many companies seek communication as a key hiring point in engineers. This puts American graduates at an advantage even though the U.S. outputs fewer engineers, 74,170 bachelor's degrees in 2008, than countries like China and India (Gibbons 2008). The following section describes the oil and gas industry's lack of professionals and measures taken to recruit and obtain new engineering graduates.

Overall Engineering Recruiting

The profession of engineering carries a unique distinction in the U.S. similar to that of doctors and lawyers. Certain programs aimed towards boosting engineering and science enrollment and increasing bachelor degrees awarded are vying for government funding like the Tapping America's Potential program ("Gaining Momentum, Losing Ground"). Even with the

slight increases in graduates and the tentative hiring precautions seen in other industries, engineering disciplines are still being actively recruited due to a lack of skilled graduates (Sullivan). The statistics on bachelor's degrees for a ten year period is included (see table 2).

Table 2 Bachelor's Degrees by Discipline for a Ten Year Period

BACHELOR'S DEGREES BY DISCIPLINE 1999-2008

Bachelor's Degrees	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Aerospace	1,174	1,296	1,558	1,711	2,011	2,232	2,371	2,722	2,788	2,930
Architectural	497	559	554	513	627	590	722	631	625	646
Biological/Agricultural	536	583	549	556	603	601	635	646	659	623
Biomedical	1,016	1,156	1,138	1,315	1,628	2,019	2,410	2,917	2,969	3,237
Chemical	6,199	6,023	5,740	5,529	5,233	4,801	4,521	4,452	4,551	4,850
Civil	9,416	8,653	8,027	8,066	8,192	8,142	8,247	8,935	9,402	10,132
Civil/Environmental ¹	—	—	—	—	—	—	212	291	445	464
Computer	3,117	3,972	4,519	4,720	5,746	5,838	5,455	4,901	4,046	3,808
Computer Science (inside eng.)	4,177	5,510	6,062	6,842	8,649	9,156	8,419	7,330	6,446	5,964
Electrical	10,955	11,211	11,096	11,402	11,994	12,500	12,459	11,915	11,467	10,790
Electrical/Computer	2,374	2,126	2,444	2,597	2,782	2,700	2,924	2,825	2,425	2,216
Engineering (general)	814	944	992	1,069	1,105	1,138	1,179	1,176	1,246	1,160
Engineering Management	171	186	187	227	296	302	303	238	274	331
Eng. Science & Eng. Physics	547	535	475	489	451	501	383	431	460	472
Environmental	604	588	510	465	516	576	522	437	454	486
Industrial/Manufacturing	3,524	3,555	3,474	3,575	3,769	3,790	3,647	3,664	3,503	3,367
Mechanical	12,859	12,992	12,921	13,247	13,801	14,182	14,947	16,063	16,701	17,324
Metallurgical & Materials	875	904	791	838	859	817	840	909	963	1,095
Mining	173	164	150	112	96	85	92	120	119	153
Nuclear	114	134	118	145	135	202	275	342	402	415
Other	2,192	2,478	2,627	3,106	2,422	2,488	2,724	2,902	2,942	3,211
Petroleum	219	251	268	257	250	233	315	339	428	496
TOTAL	61,553	63,820	64,200	66,781	71,165	72,893	73,602	74,186	73,315	74,170

Source: Michael Gibbons; Profiles of Engineering and Engineering Technology Colleges, Engineering by the Numbers, June 2009, Web, table 37.

Oil and Gas Recruiting

One of the most difficult barriers for the Oil and Gas industry to overcome when recruiting engineering graduates is misconceptions about the general industry. Most perspective engineering students have been inundated with negative information about the petroleum industry from the time they were in elementary school. They have been told that oil is the fuel of the past and alternative fuel sources are being developed. Resources are limited and images of oil spills are the depictions being presented in class, television and the news (“Recruiting Problems Ahead”). This is believed to have had a negative effect on students when it becomes time to prepare toward a career, which begins in high school and finishes with a college degree. In summary, students are afraid to be a part of an outdated industry.

Another key disadvantage for the Oil and Gas industry is its reputation of cyclicality (Griffin 64). A cyclical reputation had formed from boom periods of mass employment followed by bust periods with severe job layoffs. This is a difficult cycle to break due to unexpected slumps that almost force companies to cut spending, activity and people. If the industry wants to maintain skilled laborers, engineers, scientists and technical staff, they must find ways to minimize slumps presented by the economy and enlarge the talent pool. As young professionals these cycles in the industry can be seen as opportunities to experience and understand such occurrences (Ayala 3). Dating back from the earliest days of the industry to recent spikes in the 70s, 80s and 2000s; oil and gas products remain necessary commodities. Market cyclicality will always be an issue when discussing oil and gas job markets (Izundu 15).

With all the negative aspects surrounding the industry there is no reason to panic about the industry’s pending future. Even with new technologies being developed to reduce the U.S.

dependence on oil, production of offshore crude oil is expected to be 2.7 million barrels per day in 2030 compared to 1.4 million in 2007(EIA). Onshore production of crude oil increases to 4.1 million barrels per day in 2030 as compared to only 2.9 million recorded in 2007 (EIA). A large contributor to the increase is due to the projection of transportation up 68 percent from 2007, according to the Annual Energy Outlook for 2009. The demand growth coming from the transportation sector is what separates the recent recession from that of the 1980s. In the 1980s, power generation from oil and gas and was replaced by substitutes like coal and nuclear (EIA). In the present environment there are fewer options for replacing oil in the transportation sector on a large global scale. Another survey found in "The Way Ahead" was completed by 480 respondents. It compiled the thoughts of oil and gas professionals, service companies, consultants, academia and several others. Due to improving technology boosting recovery and new exploration, the survey respondents felt oil and gas would remain the main energy source until 2070 (Energy for the Future 10). "The Way Ahead," (TWA) is a magazine publication produced by the Society of Petroleum Engineers that focuses on young professionals in the oil and gas industry.

With the ever increasing demand projected to reach 86.5 million barrels per day (mbd) by 2012, supply shortages may become the hot topic that opponents of the oil and gas industry harp on (New York Times, 24 September 2009). Recent reports total new discoveries this year at 10 billion barrels. If this trend continues it would be the highest total since 2000. Areas that were once thought to be unproductive like the Gulf of Mexico have new life after British Petroleum (BP) found the deepwater Tiber field. This could prove to be the largest discovery in the gulf to date, containing up to 6 billion barrels of oil. Still the greatest asset that the oil and gas industry has in their favor isn't discovery but growing technology (TWA Interview 24). Companies are

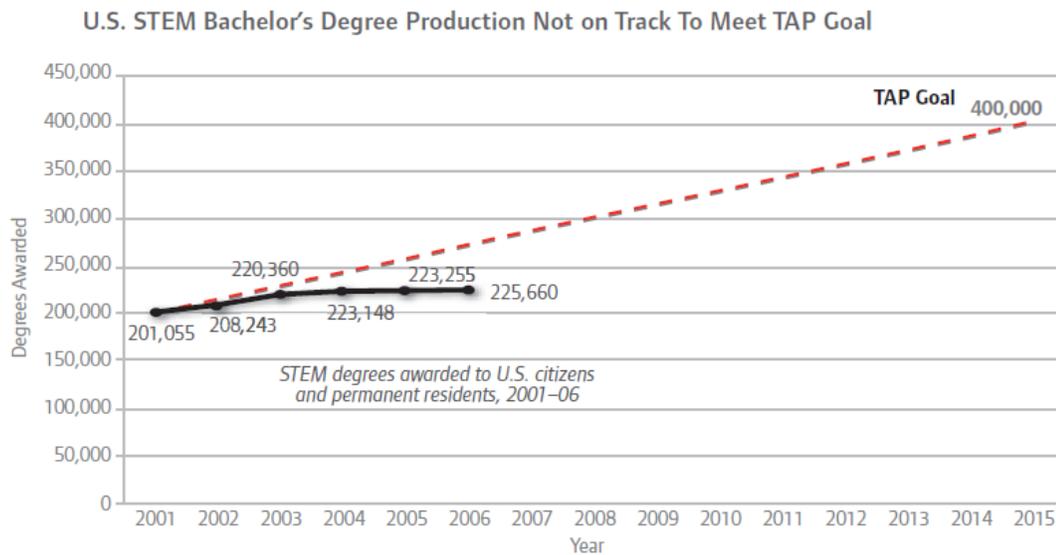
not meeting demand rates through discovery alone but through expansions in their production capabilities. Production is being expanded by developing methods to extract more oil from existing fields or using unconventional techniques of refining heavy crude oil typical of that produced in Venezuela or the tar sands Canada.

In total, natural gas is also projected to increase in the U.S. by nearly 4 trillion cubic feet from the years 2007-2030 (EIA). Unconventional production is expected to be the largest contributor by extracting the gas from dense rock and tight sand formations. Peter Voser, CEO of Shell, was quoted as saying that half of Shell's production by 2012 will be gas. This is a strategic move with 900 of the next 1000 electric power plants expected to use natural gas (Fletcher 2009). Voser went on to say that increased dependence on natural gas can also help address the harmful effects such as global warming. The growth rate of technology in the oil and gas markets almost insures the creation of jobs to be filled by engineering graduates. The annual energy outlook for 2009 depicts several figures that show production measures for natural gas stable or increasing in all but one sector (EIA 2009).

The pressure is now placed upon companies associated in the oil and gas sector to increase interest in engineering careers due to increasing projections. By raising interest of high school students and college underclassmen in engineering careers in oil and gas, it will improve the supply of qualified professionals to serve the industry's need. Satisfying the industry's needs should also be on the agenda of U.S. higher learning institutions as well. The oil and gas industry currently supports over 9 million U.S. jobs, nearly 5.2 percent of the total U.S. employment, which affects all 50 states (Fletcher 2009). Early in 2009 at the RMI Oilfield Breakfast Forum in Houston, the largest discussion forum in the world for the petroleum industry, recruitment was a hot topic. The breakfast forum, typically drawing over 700 participants actively involved in the

industry, posed the question of identifying the greatest immediate worry to all its speakers. The majority of speakers responded, “Keeping talented people (RMI-Houston)”. RMI is a global consultant firm to the petroleum and chemical industries.

The oil and gas industry is beginning to realize that recruitment must begin earlier than information at college career fairs and internship positions. Although these elements are of great importance, programs are now being implemented to reach students not only in high school but at the junior high level. One of the programs aimed at the youth in America is the Science, Technology, Engineering and Mathematics (STEM) Education Coalition sponsored by over 1000 groups associated with careers in such disciplines. This program rose out of the necessity to insure the U.S. economic competitiveness. The program’s goal is to have 400,000 bachelors’ graduates with STEM degrees by 2015 (“Gaining Momentum, Losing Ground”). Even with increased funding in school systems, numbers are still dwindling as represented in the following graph.



Source: National Science Foundation.

Figure 1. STEM Programs Goal and Current Bachelor Degree Numbers from the National Science Foundation; www.tap2015.com, 2008; Web; 16 November 2009.

There are also organizations like junior achievement and Cleveland Engineering Society Road show composed of members in the community who donate their time to increase interest in engineering. The “Road show,” is an example of a local program that targets sophomores and juniors and promotes the field of engineering. Students are informed of what it requires to become an engineer, career paths and opportunities in their geographic location.

The Society of Petroleum Engineers (SPE) has also created a program to increase interest and share knowledge of the upstream oil and natural gas industry in schools throughout the U.S. The “Energy 4 Me” program has a website with numerous games and information that can be used to target elementary, junior high and high school age students. The site includes a teacher tab that lists workshops, PowerPoint presentations on energy and how to get in touch with industry professionals for speaking engagements. The most beneficial aspect of the site describes opportunities in the industry, scholarships, petroleum engineering school listings and why petroleum engineering is here to stay.

These local and national programs are part of a proactive strategy that the industry is beginning to cultivate. It’s recommended that once students are attracted to engineering, the oil and gas industry must then implement the strategies explored in the study to better market their profession. Thus, recruitment begins when students are junior high through high school age, so that enrollment figures in college engineering programs are increased. By increasing the graduate totals in all engineering disciplines the effect can be nothing but beneficial for the oil and gas industry. Another method suggested for improving oil and gas hiring is incorporating and

training talent from other disciplines outside of the oil and gas industry. Many within the industry are of the belief that the skills typical to the industry are not easily transferred during technical training. Thus, the burden of shouldering the talent shortage still rests with the oil and gas industry's ability to persuade engineering graduates seeking entry level positions.

Summary Remarks

From in-depth studies focused on recruiting efforts of recent engineering graduates, it is clear that opportunities exist due to industry needs and requirements. (Table 1) depicts the total graduates with petroleum and chemical engineering degrees as some of the lowest. In fact many of the institutions offering engineering degrees in the U.S. there are only a select few that have petroleum engineering programs. These degrees are two of the most sought after within the oil and gas industry. The numbers add confirmation to what all the recruiting articles on talent shortages had stated. The Society of Petroleum Engineers (SPE) has also stressed the upcoming need for entry level engineers due to the average age of its members nearing age 50 and with anticipated retirement. University recruitment in years past has been lacking which is leading to the industry shortages of today. Thus, companies involved in the oil and gas industry are beginning to become concerned and stepping up their efforts to fix recruiting oversights. With the compensation being favorable compared to other careers and the element of travel, the time is right for oil and gas to become the ideal occupation for the young engineer looking to become a young professional.

Chapter 3

SURVEY DEVELOPMENT

Introduction

As discussed previously, the research was divided into two segments, industry and academic. The initial step was to examine the internet, academic journals and any publications dealing with the oil and gas industry. This helped to broaden knowledge of the subject and to identify any issues that must be addressed on recruitment later on. The research team compiled question ideas with URS Washington Division contacts. After compiling the right mix of questions from URS Washington Division feedback, a telephone survey was compiled under the direction of the university research team. The purpose was to restrict phone interviews to 30 minutes or less, so questions had to be limited but extract valuable information. The time limit helped professionals schedule the interview into their work day and provide accurate answers. If the respondents had to endure a long interview, they would have been short on responses or might not agree to be surveyed at all. The answers gathered from the telephone conversations, reviewed questions from URS Washington Division contacts and the research team director, allowed for the formation of the industry “New Hire” survey. The industry survey was split into five segments that incorporated different testing elements like highlighting answer choices, numeric questions and short answer responses. The survey format and length was once again a

concern during development. A variety of question formats were added to keep respondents interested while the length allowed for completion in less than one hour easily. The new hire survey contained a final total of 27 questions excluding demographic information of each participant. Instructions were also included in the file to explain the study purpose and facilitate easy submission by emailing the results to the collection source. It was important to note the people completing the surveys were volunteering their time; it was not part of their work activities.

The academic segment's survey was compiled with input from what was learned from the industry contacts, individual research and the URS Washington Division southeast recruiting coordinator. The URS: Washington Division recruiting coordinator's input was valuable for understanding the student population as a whole. The college recruiter is actively involved in visiting numerous campuses throughout the southeast. It was decided a series of telephone interviews would be conducted to mainly career service directors, and university faculty. When available, interviews were conducted in person for those resources at the University of Alabama. The survey was implemented during the summer months so extra time had to be considered for career directors out of the office. Also, length was a concern yet again, so interviews were held between 20 and 30 minutes. This allowed for 9 major topics with additional question sub-sets. After the first several interviews the survey was revised to aid in better data collection. Some questions required better definition, revising or were eliminated and replaced. After the final academic survey revision, calls were made to another group of institutions to gather their opinions. Both the original and revised copy of the survey has been included within Appendix A and B.

The teacher, student, and consultant interviews were handled free form, allowing certain ideas to be expanded on. The conversations with consultants aided in understanding young professionals of today and what grasps their attention. Their contribution to the study can be found in the data analysis section.

Evaluation Criteria

The surveys from each phase of the research project were evaluated by a different set of standards. The industry new hire survey contained agreement, rating and numeric scale questions, which made evaluation easy by tracking the total responses using Microsoft Excel graphs. The short answer questions could not be statistically measured because each person completing the survey has had different work experience, training, ideas and education. The questions with scales required the participants to highlight the most appropriate answers. Each section contained instructions, followed by the question, then the answer choices for the corresponding question. The rating scale questions can be viewed with the entire new hire survey found in Appendix C.

The academic survey was unique in the fact all answers were filled out during scheduled conversations by the same administrator. Certain trends were recognized between conversations and helped to formulate quantitative data. The other responses were unique because universities around the country all had varying opinions. Even with unique opinions from around the country, common phrases or ideals were continually repeated.

Summary Remarks

The measurement techniques implemented for both surveys helped provided measureable data that could be seen in the form of frequency diagrams and pie charts. The individual questions aided in formulating suggestions for companies attempting to attract and retain recent engineering graduates. Upon receiving the completed survey forms the measureable data was entered into a Microsoft Excel spreadsheet and a count of total participants was updated. The survey development was an iterative process between the university research team, and Washington Division contacts. The preliminary drafts were sent to URS Washington Division where the group would review for suggestions, clarifications and grammar. After revisions, the survey was approved and cleared for distribution to URS employees as well as the ECC – Future Leaders.

Chapter 4

DATA COLLECTION

Distribution Method

Distribution of the survey material was the next step in the process after having all the documents reviewed and approved by the research team director and the URS Washington Division team. The only surveys that had to be distributed were the industry new hire and adapted version for those with increased experience. The academic interviews previously discussed were done via telephone. Electronic submission of the survey was chosen because of monetary savings as well as the belief it would increase response totals. After the final approval, URS Washington Division southeast college recruiter gathered email addresses of all personnel hired in the oil and gas related fields within the past three years. The list generated contained 13 individuals that fit the specified criteria. The list was restricted to those below or near three years in the industry because the study sought to limit economic and age constraints. If those surveyed had an average experience of ten years then they would be out of sync with the current recruiting practices and the study would be less insightful. Also the recent hires have been through the struggles of not only finding an entry level position but managing to retain their job during the recent economic events of 2008 and 2009. In essence, the target demographic was individuals in the 22 to 26 age range.

After compiling the list, the recruiting coordinator then sent all the new hires an email explaining the purpose of the research and that it was supported by URS: Washington Division.

The targeted candidates were encouraged to participate and return the survey as soon as possible. After the advanced email message, the survey was distributed from the University of Alabama with a short explanation and the “New Hire” survey attached. Once opening the file in Microsoft Word, the respondents should have noticed the detailed instructions provided on the first page. The instructions/demographic page is included in Appendix C.

The opening page contained instructions on how to answer the following sections, how to submit the completed survey via email and demographic information. After completing the opening page, the survey went in order allowing respondents to highlight some sections and leaving adequate space for the short answer response portion. The five survey sections can be viewed in the attached new hire survey.

Responses

After the distribution of the industry new hire survey, responses were received by email periodically from late October to late November 2009. Most surveys were returned within the first two weeks of issue but others needed extra time due to their work obligations. After a two week window, all the survey targets that had not completed the survey were contacted again as a reminder. All 13 new hire surveys issued were eventually returned. It was important that the new hires selected came predominately from engineering backgrounds and were involved in various disciplines throughout the oil and gas industry. This allowed the views of the industry as a whole be represented instead of opinions from a few select positions and disciplines. The experience level of the new hires ranged from 10 to 45 months with an average of 25.5 months. Figure 2 shows the number of respondents representing each discipline.

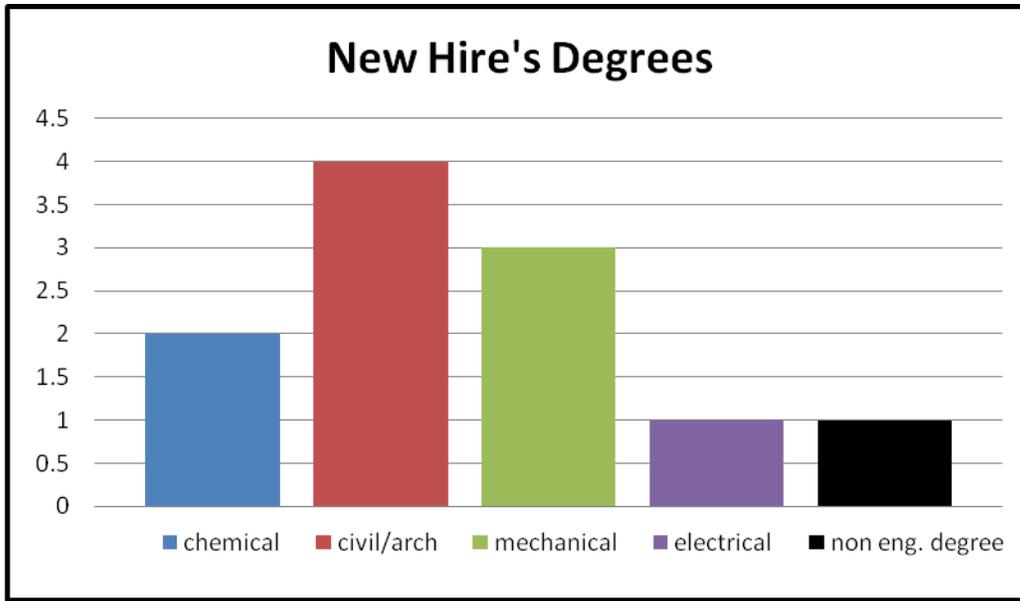


Figure 2. Number of Survey Responses by Engineering Discipline.

To incorporate additional data and utilize all the resources available, the new hire survey was altered slightly for those with more than 2-3 years of experience. Segments 1-4 remained identical to the new hire survey but the short answer questions differed. The ECC- contact's affiliation with the ECC-Future Leaders Program, discussed earlier, enabled her to distribute the survey to 44 members of the organization. The respondents were from various sectors of the industry with varying levels of experience and locations around the U.S. The returned survey respondent's positions ranged from vice president to engineering and project managers. Degrees were in the science or business disciplines for the most part. The response totals were a little lower than expected for both the new hire and the future leader's surveys. An email was sent to the ECC- future leader contact a few days before the initial two week deadline of October 30, 2009, describing the amount of participation. With the contacts help, the survey completion mark was raised slightly within the Future Leaders Program. The amount of data collected was still rather limited but the results validated some assumptions the research team already believed and

discouraged a few others. In all the data collected served the main goal by answering the objectives specified before the research.

Data Organization

With sufficient time for both sets of surveys to circulate and return, combined with the telephone survey completion, it was time to analyze the data collected. A systematic approach had to be taken to organize all the information gathered, so that results between surveys and interviews could be compared. With 10 telephone interviews lasting anywhere from 20 to 30 minutes, a method of recording the data had to be decided upon. The easiest and most cost effective method was to record data simultaneously during the interview process. By taking detailed notes during the interview, it was possible to type expanded versions of the conversation following the meeting while the conversation was still fresh to the memory. Then certain trends, phrases and answers began to occur allowing for the formation of a limited amount of numerical data. Most of the information provided during these interviews helped render opinions, suggestions and recommendations discussed in chapters 5 and 6.

The written surveys distributed by email to those on different spectrums of the experience scale also allowed for statistical data to be analyzed with the use of Excel. Since the surveys had numeric, multiple choice and agreement scale questions, frequency diagrams were incorporated. These figures and graphs are presented in the data analysis. The short answer questions combined with individual research were used in the formation of opinions, suggestions and recommendations that are discussed in the following chapters as well. An excerpt of the Microsoft Excel spreadsheet to record statistical data is presented (see fig. 3).

Numeric Open End				
	How many companies did you interview with prior to joining your first company?			
	1-3	4-6	6-8	8 or more
Totals =				
	How many of those companies were in the Oil & Gas industry?			
	1-3	4-6	6-8	8 or more
Totals =				
	Since graduation, how many times have you switched companies?			
	0	1-2	3-4	4 or more
Totals =				
	How many years have you been affiliated with the Oil & Gas industry?			
	< 12	13-24	25-36	36 or more
Totals =				*units = months
	How many times have you transferred cities as required by your job?			
	0	1-2	3-4	4 or more
Totals =				
	At your company, are recent hires used to attract (recruit) students from their alma maters?			
	Yes	No		
Totals =				

Figure 3. Sample Excel Spreadsheet Tracking Numeric Questions, Abridged.

Chapter 5

DATA ANALYSIS

Introduction

Before the research methods and objectives were decided upon by Washington Division and the University of Alabama research team, certain expectations were envisioned. For the oil and gas research project to be successful, trends and responses from consultants, faculty, career directors, industry new hires and leaders must add knowledge to URS: Washington Division and the general industry's marketing and recruiting strategies. While most of the knowledge compiled within this document might already be in place and known by most companies. There could be certain practices or ideals that can be adapted to fit organizations to attract and retain young professionals, specifically those of engineering disciplines. If a company is meeting all the recommendations and are already implementing the ideas to be discussed, then they can consider themselves in tune with current practices surveyed in the fall of 2009.

In essence, answering the question regarding the research project's success would be judged differently by all the companies who viewed the findings. Hopefully URS: Washington Division reaps the most benefit, since they supported the project and care deeply about the future of the oil and gas industry. The following analysis represented the measurable statistical data taken, while the recommendations from individual interviews via phone, direct interface and email communications were also covered extensively.

Statistical Data Analysis of New Hire Surveys

The study focused on information from four main sources: telephone surveys of engineering career service directors, new hire industry surveys, experienced industry surveys and consultants. From these sources, three could be used to create statistical data that could be visualized in the form of diagrams.

The first step in the data analysis was examining the academic surveys for all 10 institutions and comparing the results. From this analysis certain questions began creating response trends that were recorded in the previously prepared Microsoft Excel spreadsheet.

Figure 4 illustrates how the career service directors felt their universities location aided them in placing students in oil and gas careers. An important element to remember is that a majority of the schools contacted were researched and known to have affiliations with the industry. Obviously, these schools locations can be traced to areas like the gulf coast, southwest and other well known oil and natural gas producing areas. Also the survey sample size is limited due to constraints that were discussed in previous chapters. These elements are covered in greater detail in the final chapter dealing with limitations.

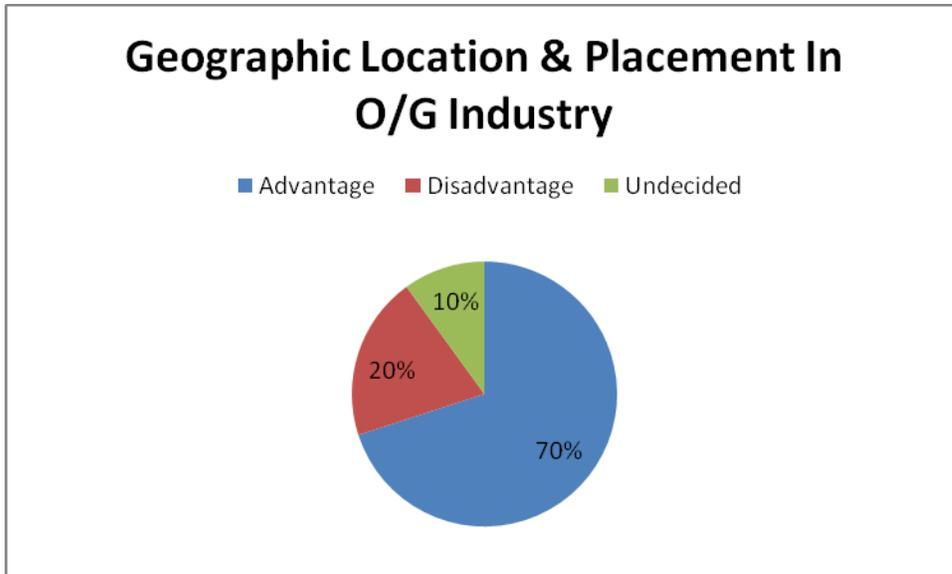


Figure 4. Schools Geographic Location to Placement in the Industry.

The telephone interviews did not allow for a statistical breakdown like the industry surveys. The only other question that could be measured in frequency would be whether students from universities were willing to relocate. Most of the directors insisted that their students are willing to relocate without hesitation. Only South Carolina’s engineering director claimed that nearly 75 percent of USC graduates stay in state according to graduation statistics. The University of South Carolina is trying to lower that percentage by reducing out of state tuition. Out of state students help universities gain more recognition around the U.S. Universities such as Oklahoma accept many students from Texas, specifically the Dallas and Houston areas to boost their recognition and reputation in the oil and gas industry. Most of the schools questioned understand the importance of operating nationwide and they pass this aspect onto its graduates. As seen in the University of Florida’s alumni by county map, many students travel outside the state to start their careers. The traditional areas associated with oil and gas such as Houston, Pennsylvania, Colorado, California and the gulf coast have large concentrations of graduates

within the past five years. Most of the valuable information from the university surveys can be found in the written findings following the statistical section.

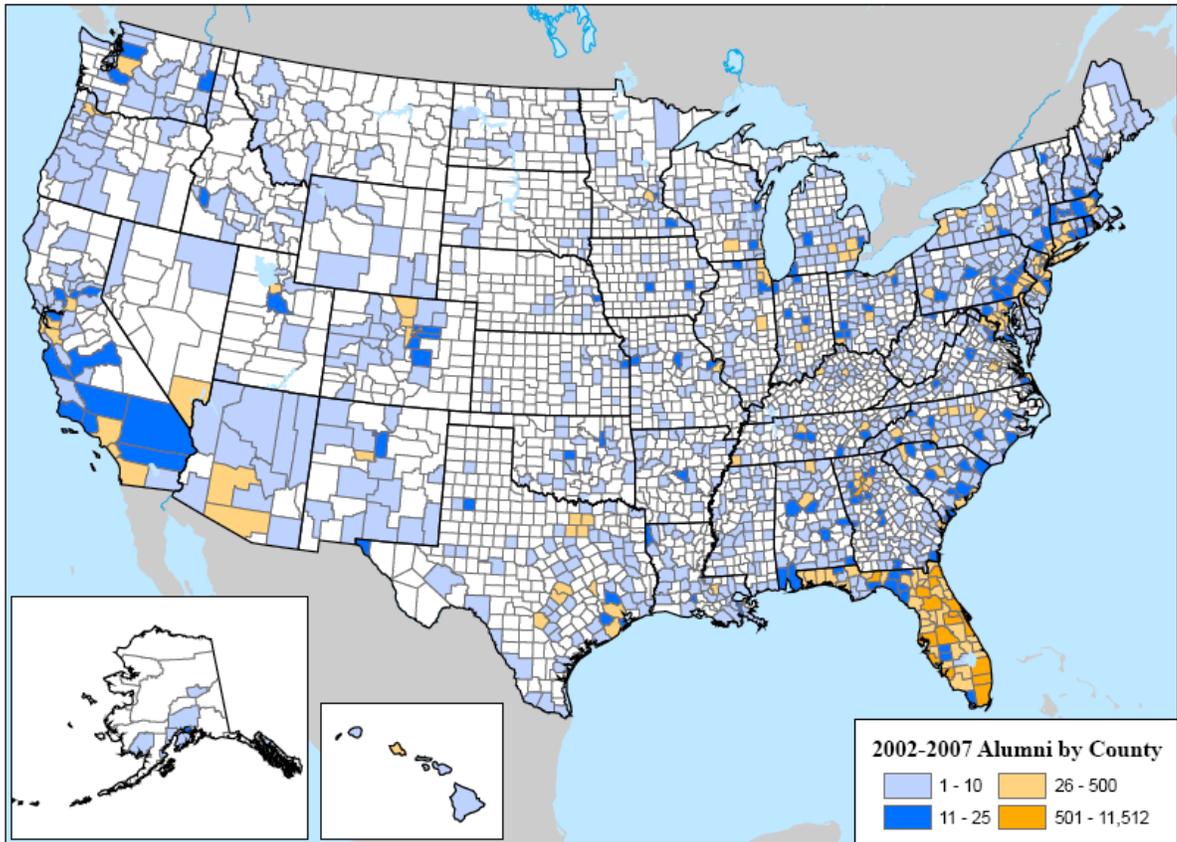


Figure 5. Florida Alumni Population by County for Years 2002-2007 from engineering career services Beth Hanneman, University of Florida; Web; 14 June 2009.

The Florida alumni map reinforces the fact that most students are willing to relocate for positions as stated by the career service directors. Of course many students stay in state but the University of Florida has a smattering of alumni over the U.S. in just a five year period.

The next step in statistical breakdowns was analyzing the new hire surveys that were circulated through Washington Division and other contacts associated with Washington Division and consultants. The first objective was to identify where newly recruited professionals were

learning of career opportunities in the industry. The statistics depict that career counselors have the greatest impact on informing students of the wide array of possibilities. This is where students learn the industry goes much deeper than just major oil companies like Shell, ExxonMobil and BP. A distant second was internet sources followed closely by other methods, word of mouth and university professors. It was noticed that most of the young professionals came from universities with backgrounds in the industry such as the University of Texas and Texas A&M. To reach a greater audience companies need to target career centers at universities outside of traditional territories along with their typical stops. The figure below illustrates the respondents' answers.

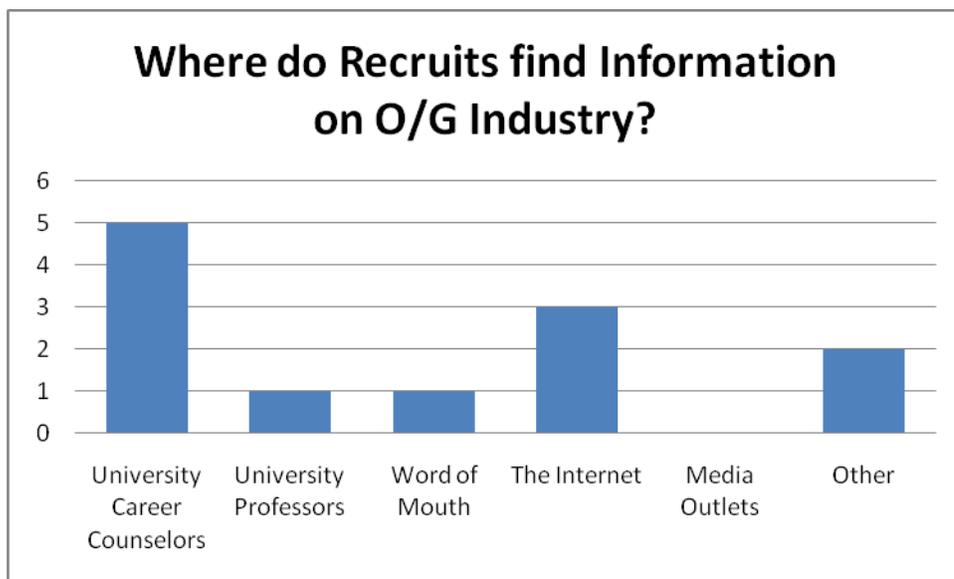


Figure 6. Information Outlets of the Oil & Gas Industry.

At what point in a student's academic life did the majority of the surveyed engineering students learn of available oil and gas careers? The research team answered this question by asking questions of its own. If students knew of the industry early in their college career they would more than likely co-op or serve an internship. The research shows that the majority of

students had no formal experience before entering the workforce. The evidence points out that the first time they considered the oil and gas industry for employment was near graduation. The second leading response was co-op or internship. This group was most likely exposed to the industry before college or soon after. Of course at institutions where petroleum and geotechnical engineering are majors, these students know exactly the field they are entering. The purpose of this research is to boost interest throughout all majors, and that is why that specific demographic was not targeted.

Why after learning of the employment possibilities would engineering majors pursue a career in the field? The highest grossing answer was the abundance of career opportunities available in technical and managerial areas. At a distant second ranks travel, foreign and domestic as top reasons for entering the workforce. Recorded near the bottom frequency was monetary compensation, which is surprising. Many career counselors pushed marketing high salaries as a means to attract students in the telephone interviews. A larger sampling would be needed to confirm whether this phenomenon holds true. The Microsoft Excel spreadsheet with illustrative graphs is included within Appendix C.

After the multiple choice section, the survey asked seven agreement scale questions ranging from strongly disagree to strongly agree. The questions focused on the respondents own personal experience and elements to improve it. Once again the question was posed about students' knowledge of oil and gas careers. Only two of the surveyed new hires believed students are fully educated on the opportunities. Interest of an online engineering forum or networking site to link students across the U.S. with professionals was determined through those surveyed. Nearly 64 percent agreed that such a program would be effective in raising an engineering student's interest in engineering careers associated with oil and gas. Many of the academic

interviews surfaced the ideal that the young professional of today is highly concerned with having a work/life balance. The graduates of 2009 and the future want to experience life outside of work which relates to the surveyed response of monetary compensation not being as important as once believed. The majority agreed that the oil and gas career they chose provides an adequate work/life balance.

The agreement scale section then focused on the young professionals' experience after joining URS Washington Division. The following excerpt of the agreement scale section is included below.

Does your company provide adequate opportunities for engineering students to learn under professionals in your industry?					
	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Undecided</i>	<i>Agree</i>	<i>Strongly Agree</i>
Totals =	0	1	2	4	4
Did your education prepare you for the challenges in your career?					
	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Undecided</i>	<i>Agree</i>	<i>Strongly Agree</i>
Totals =	0	0	1	8	2
Were you adequately educated about the Oil & Gas industry prior to entering the workforce?					
	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Undecided</i>	<i>Agree</i>	<i>Strongly Agree</i>
Totals =	0	0	5	5	1
Did your education provide you with the communication skill set needed to be successful upon graduation?					
	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Undecided</i>	<i>Agree</i>	<i>Strongly Agree</i>
Totals =	0	2	1	3	5

Figure 7. Frequency Spreadsheet for Rating Scale Questions, Abridged.

As can be seen in the spreadsheet, the survey group believes that engineering students are being adequately educated under professionals inside the URS Washington Division. This has no correlation to the number of internship or cooperative education opportunities available. The group was also questioned whether their education prepared them for the challenges of their career. Obviously, most of the respondents felt they were adequately prepared technically as well as having the necessary communication skills. Communication is an important aspect of all engineering educations due to the necessity to convey ideas and reports. Communication is the

one skill that nearly all academic directors and consultants emphasized during the telephone and personal interviews. The skills and aspects are discussed in length later in this chapter.

The next section statistically analyzed the rating scale questions, which ranged from poor to excellent. In this small section the respondents rated how they perceived the starting pay as compared to other engineering industries, future outlook in regards to the industry and their own advancement. The starting pay according to recent new hires is very competitive with other engineering industries. The survey group is likely in touch with many friends and colleagues from their college years, thus salary discussions between them have likely occurred. Many recent graduates discuss salary with those that graduated before them as well as fellow graduates. This helps them form expectations and determining whether a position is worth consideration when combined with factors such as location and travel. Over 80 percent of the new hires felt that their starting pay was adequate when compared to other industries that employ engineering disciplines. The remaining minority percentage rated the starting pay as “fair.” The next two rating scale questions were meant to gauge where young professionals believe the industry is leading in the future. The young professionals yielded mixed results with the bulk of the responses between fair and good. The next question focused on personnel advancement outlook within their current company, URS Washington Division. The results were more widespread with the response “excellent” being rated first followed closely by “fair.” The combination of these results shows that young professionals in Washington Division feel they have ability for advancement in a healthy industry.

The final statistical section was the numeric open ended questions. This question set investigated interviewing habits prior to accepting a position, industry experience, job relocation and cycling. The stacked bar chart, Figure 10, illustrates the comparison between the total

amount of interviews attended before accepting a position and the number of those interviewed companies that were involved in the oil and gas industry.

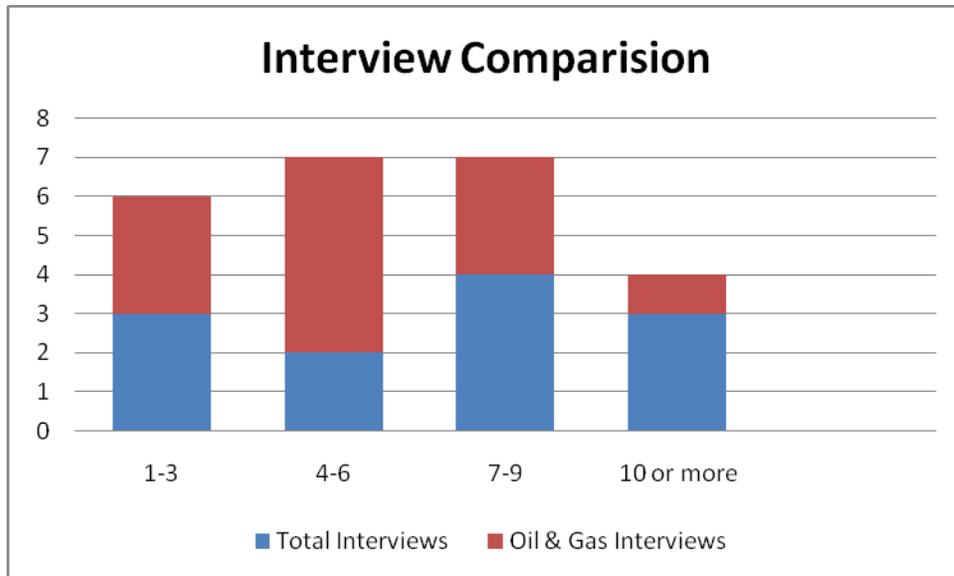


Figure 8. Comparison of Interview Totals.

All of the young professionals interviewed have been with URS: Washington Division since their graduation. There have not been any job transfers among all the respondents, defying the industry reputation as having a lack of company loyalty. Figure 11 depicts the industry experience spread of the survey group. Overall city transfers within the organization remain low as well, allowing recent graduates to become comfortable in their current location assignments.

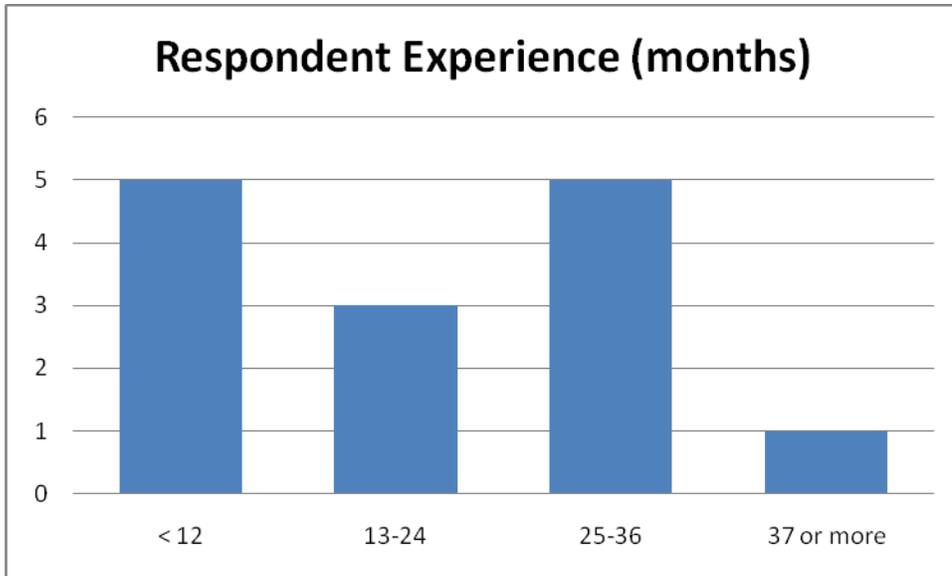


Figure 9. Respondent Experience Measured in Months.

The final figure in the new hire statistical breakdown identified if survey respondents were used for recruiting purposes, specifically at their alma maters. This allows companies to cover a larger recruiting base and pick up solid employees. It can be inferred that the recruit had nearly the same technical training as their counterpart. Therefore if an employee is very successful, then they should have been used to recruit fellow students from their former learning institutions.

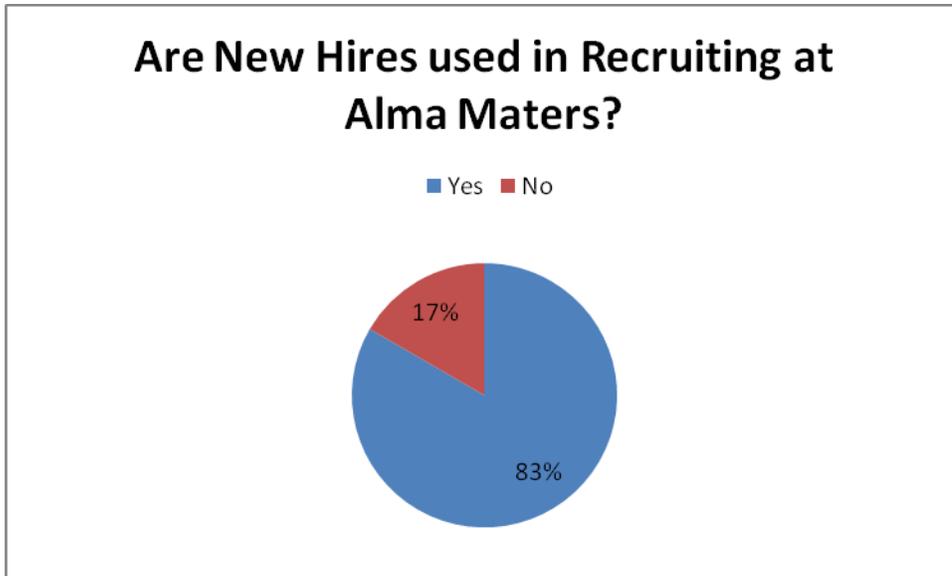


Figure 10. New Hires used in Recruiting.

Statistical Data Analysis of ECC-Future Leader Surveys

Unfortunately the ECC-Future Leader surveys only yielded a limited number of respondents. Even though the survey was distributed to nearly 50 members and a deadline set in the initial email only 4 members completed the survey. Also, in an attempt to gain more responses a contact within the group sent the email asking for help, rather than someone they did not know. Thus, the statistical data would not accurately represent the whole population. The majority of the survey was almost identical to the new hire survey. The purpose was to see the difference in how the new generation versus the old generation answered similar questions. Even with the response being limited some important insights can be observed among those that completed the survey.

The first noticeable trend was that all the future leaders had multiple degrees. The interesting part was that all the members had one degree in the arts and one in science. The experience between these individual ranged from 10 to 22 years in oil and gas related fields. The

companies represented are the Shaw Group, specializing in piping, Kiewit Energy, Bentley Systems, specializing in oil and gas solutions in the form of construction, maintenance, etc... and REF-CHEM specializing in industrial construction.

Table 3

ECC – Future Leader Company Profiles

Company	Sector	Employees	Value
Shaw Group	Industrial Goods: Energy, Piping, Infrastructure, Consulting, etc...	28,000	\$7.28 Billion
Kiewit Energy	Power and Mechanical Process Facilities	Private	\$8 Billion
Bentley Systems	Oil and Gas construction and maintenance, software applications	2,774	\$450.4 Million
REF-CHEM	Heavy Industrial Construction, Engineering and Maintenance	1,000	\$105.6 Million

The biggest difference in the multiple choice answers for the future leaders versus the new hires was the amount of experience in the industry before beginning full time and the reasons for pursuing such a career. All the future leaders had either part-time, an internship or a family member in an oil and gas career. This is different from the new hires where many had no experience prior to accepting a full time position. The future leaders queried also pursued their respective careers due to compensation reasons. Per recent surveys and consultant interviews, college graduates do not value compensation as highly as previous generations. Today's graduate is more concerned with the quality of life their career can offer them.

Most of the agreement section questions were dispersed where no real conclusion could be inferred. The sections that dealt with the adequacy of their education all scored highly. All four members disagreed that they were properly versed in the industry prior to entering the workforce. Thus, a shortcoming in the educational awareness of oil and gas is noted in the older generation. The new hires were nearly split over the same issue. From the data comparison, it seems that schools, companies, internet sources are getting better at informing new graduates of what opportunities exist in oil and gas. Even with the statistical improvement over half of the new hires were undecided, so improvement is still required.

As expected from the multiple choice section, the compensation rating for beginning pay was high. The employment outlook from both the future leaders and new hires were identical. Be sure to remember the small survey groups when reading into these interpretations. Both groups viewed the outlook between fair and good. This could just be coincidence or the older generation has an affect over the thoughts of the new hires, since they are in a position of power. The last interesting discrepancy is the future leaders all thought that company advancement opportunities are high. While the new hires were mixed between fair to excellent.

As expected with the numeric section, the experience level is vastly increased along with transferring between companies and locations. Every one of the four future leaders had switched companies between 2 and 4 times. This could be due to the cyclical nature or better opportunities came available. While most of the new hires had not yet been required to change locations all the future leaders had changed at least once. Basically, it may be one of the necessary requirements of accepting a career in oil and gas. This is not a bad element to promote because many engineering graduates are looking to expand and challenge themselves in a location unfamiliar to them.

The future leader respondents offered some key insight that contradicted statements in the new hire surveys. This highlighted segments where the industry has improved or still needs improving. Also it showed changes in the disposition of engineering graduates today as compared to the past. Marketing to the newest generation of graduates requires a different approach. The correct approach was identified using the statistical data described above, the short answer survey responses, and the telephone interviews.

Short Answer Response Findings to the New Hire Survey

The short answer section of the survey sought personal opinions regarding how to attract higher numbers of engineering graduates, and enhancing their educational experience. The trends recognized in the following sections helped to answer the objectives outlined earlier in chapter one.

The first few questions centered on educational experience and what was and was not beneficial, such as certain classes or the lack of important elements that are featured in the industry. When polled on the elements that benefited engineers the most early in their careers a diverse set of answers were received. With multiple disciplines being represented, variations in the results were sure to occur. For example a process engineer at one company stressed the importance of their geology and fluid flow classes. While an electrical engineer thought the work with DCS and PLC systems during their education aided them the most. DCS and PLCs are control systems used to control specific tasks in plant operations. The beneficial aspects that were mentioned across all disciplines were theory application and principles, problem solving, and technical design. As a whole, the group seemed to feel confident that their respective institutions set them up with a proper base of technical knowledge. The elements that the group

felt needed higher priority were technical writing, business skills such as communication in the workplace and management, and specialized classes focused on oil and gas. Many times communication is overlooked at the university level in favor of technical knowledge, although an engineer's ability to communicate through his writing, speech and demeanor are leading factors to success. At the University of Alabama, administrators are noticing the importance of blending skills of business and engineering. A program is currently being developed to incorporate business school aspects to the engineering curriculum and vice versa. The CEO of Chevron described how his technical knowledge gained from engineering, aids him in management and business decisions (TWA Interview 4). If curriculums can cultivate such programs, it could accelerate the new hire learning curve.

After the educational questions, the survey asked the young professionals their feelings toward the industry's progression and health, what engineering disciplines were lacking and attractive characteristics of oil and gas careers in general. As expected from the statistical breakdown, the progression and health of the industry was seen as positive by nearly the entire majority. Many of the young professionals believed the industry would keep increasing its presence steadily with the demand for oil and gas commodities rising worldwide. The only aspect mentioned that could shift demand requirements was the green movement. With the confidence of the young engineers high regarding the health of the industry, the survey sought to identify certain disciplines lagging in participation. Many identified all the major disciplines lacking participate in the industry like civil, electrical, mechanical, process or chemical and petroleum engineering. The disciplines that were mentioned alone in multiple survey responses were electrical and chemical engineers. Engineers in abundance were identified as mechanical and some cited civil engineering.

The most important question of the subset requested opinions on how to attract students to engineering degrees and oil and gas careers. The new hires noted the importance of early education of all the possible career avenues. A suggestion was a daily blog that described the activities of personnel in exploration and production (E&P), downstream refining, construction and service sectors. This could be a unique way to convey the diverse challenges, travel ability and high level responsibility associated with the before mentioned career sectors. New hires also thought advertising the competitive pay, benefits, opportunity for growth, and diverse company portfolios to increase interest. One respondent claimed the reason they were attracted to URS Washington Division was due to their involvement in diverse sectors like power and infrastructure. This leaves the new hire with a sense of job security, which was another reason for attraction. Along with blogs, social networking sites, magazines, internet sites, experience with actual equipment and software programs are all technology tools new hires listed as important to describe the functions of their careers.

The last short response question focused on specific elements in each new hires career that are exciting and worth choosing oil and gas employment. Of course better than average compensation was mentioned several times but other factors were just as important. Responsibility at a young age, exposure to a variety of projects, working across multiple disciplines and relocation travel demands were all factors seen as desirable. Also it was noted in the surveys that with the wealth of the industry, engineers are working with the best and latest technologies. Even with all the fast paced industry, one respondent mentioned they have a rewarding career but not at the expense of having a life. The quality they thought attractive was the ability to have free time to enjoy social and personal activities. The work-life balance is an issue that surfaces in nearly every aspect of the research.

Short Answer Response Findings to the ECC-Future Leaders Survey

The short answer questions used in the future leader surveys were the same as those asked of the new hires. It was important to keep the question sets the same so the responses between the industry veterans and the young professionals could be observed. As in the new hire survey the short answer questions sought educational experience and opinions from the future leader members.

The more experienced industry professionals noted a variety of elements that were beneficial in their career with problem solving ability being mentioned by all. Other beneficial skills obtained at the collegiate level were planning, strategic and business, leadership, personnel management and communication. The subject areas that were not stressed enough are project management, ethics, travel and responsibilities that accompany work and a family. Business segments such as contracts, accounting, and interpersonal skills were also noted to be inadequate. Even with leadership and communication being the most beneficial elements of their college education, the respondents still wanted these items stressed more in the engineering curricula. Thus, the elements seen as the most beneficial are the items not being taught as readily. The respondents then offered some key insights on promotions to future engineers. Technology and salary capabilities were measures that peaked student interest during recruiting visits. One professional distributes demos of ConstructSim software to promote the technology used in an industry setting. As seen in numerous interviews and accounts the future leaders urged consistency in recruiting, not just when positions are needed.

The professionals from various high ranking positions were asked to give their opinions on the health of the industry, disciplines lacking in the field, and technology mediums to describe

job functions. The future leaders as a whole thought the industry would remain steady over the next few decades with decline in the distant future. The push towards green energy sources that are cleaner and more sustainable. A project manager for Kiewit Energy believes the push for alternative energy will diminish the weaker players but in turn open more opportunities for graduates. The professionals had numerous opinions regarding not only disciplines lacking in the industry but skills. Engineers with design experience are wanted especially during boom times when E&C companies cannot meet the demand. The Kiewit project manager also noted in the past, electrical engineers have been in short supply. In the new hire surveys an electrical engineer described the push by their institution for graduates to seek careers in the technology field. This could explain the lack of electrical engineering entering oil and gas careers. The skills lacking were leadership at the field and operating levels, scheduling, negotiation, and project management. The professionals attributed this downfall to industry due to the lack of student internships available. To explain the functions of an industry professional through technology mediums it's important to understand what mediums students are using. Online magazines like "The Way Ahead" and "Oil and Gas Journal" can be useful. One future leader suggested DVDs and podcasts as a unique way to interact with younger generations. Many universities have implemented podcasts that give virtual tours of the campus. Oil and gas companies could do something similar and make them available to institutions across the country. 3D Cad, scheduling programs, and design review applications are also important technology mediums.

The final questions surveyed involvement in the hiring process and what aspects make their job enjoyable. All the professionals hired had a direct relationship with hiring of new professionals. Since they have a role in hiring operations it helps to validate their responses. The

enjoyable aspects of an oil and gas career are immediate project work, quick promotions opportunities, ongoing training, and flexible work environments.

Academic Interview Findings

As discussed in the methodology section of the research, interviews with career service directors were conducted around the U.S. Many of the schools targeted had reputations for placing students into oil and gas careers. The other schools interviewed that are not typically synonymous with the industry added variety and an opportunity to get an outsider opinion. For example the Colorado School of Mines places many students in the industry, while the University of South Carolina is not. The interviews explored a wide variety of subjects with the main topic as recruitment practices and improvement.

The first question in the interview was intended to spark the conversation about oil and gas recruiting and to determine what kind of presence these companies had on campus. It leads into whether or not their respective schools location aided them in placing students in the industry. As expected, the location of the school played a major role in internship and job opportunities an engineering student could expect to be offered. The geographic areas feeding the industry as interpreted by the research are the southeastern, southwestern, Colorado and Pennsylvania regions. This separates the industry from numerous graduating engineers that could be viable additions to the company. Travel and relocation play major roles in the oil and gas industry. The majority of the directors claim most students are open to relocating and do so following graduation. At Ohio State University nearly 50 percent of students relocate away from home with that number reaching 60 percent for chemical engineers. Numerous engineering

graduates from the institutions interviewed are in close proximity to the industry. Thus, location is not as big a factor as one would believe.

The next question's objective was to retrieve suggestions for improving student interest in oil and gas careers. The question was followed by numerous subsets that break down the question topic into parts. Schools directors were asked where they recognized the greatest need for improving interest. What years do these improvements need to be implemented and are internships available? The directors thought universities could do a better job educating students on environmental issues that affect the industry. Some universities claimed they needed to be more proactive and develop contacts in oil and gas so students would be afforded more opportunities. Also the directors felt schools need to get better at informing high school students of the mathematics and science requirements. Given the proper background, students can have more opportunities in science and technology. With the rising unemployment rate, 9.5 % in October 2009, directors thought internship numbers and job offers must be increased to keep interest up. Texas A&M University's engineering services director who has 31 years of experience in the chemical industry described the decreased opportunity situation. According to him, universities received a lot of pressure from the industry for not producing enough graduates. Now with university enrollments in engineering programs up, internships and jobs are disappearing. At the University of Alabama internships have seen similar happening, yet their cooperative education has been doing well. This is due to employers having students for 3-5 work terms and having a better return on their investment. Once students graduate they have the knowledge and training to be productive at the beginning of employment.

At some universities such as the Colorado School of Mines, freshmen are not allowed to declare majors until taking a class that demonstrates what each engineering program has to offer.

The research revealed that universities need to reach out to early high school age students to improve technical backgrounds. Once on campus oil and gas companies must be involved with careers services, faculty, and student organizations to present the opportunities to increase participation. A recommended way to be involved is through these freshmen general engineering classes present at all the schools surveyed. Pennsylvania State University and the Colorado School of Mines have stronger internship programs because of the length of co-ops delay graduation. At PSU nearly 80-85% of interns offered a full time position accepted the offer. This demonstrates loyalty between the company and interns. As far as incentives for entry level engineers, everything seems standard across the board. Move in and signing bonuses are the most common incentives but not as prevalent with companies looking to cut expenses. Another suggestion for improving interest was creating video diaries of new graduates across various fields. Shell Oil Company implements the video strategy by having young professionals from around the world discuss and present a workday in their life. Shell also has the eco-marathon that bridges many disciplines of engineering (US Shell). It's an effective strategy because it prepares engineers to work together and helps bring students to the company rather than shell to student locations. In summary, branding a company name at the university level is as important as any new age techniques. If students never hear a company name, then they never have the initiative to find out more about their operation. In essence all the new techniques like video diaries would not be seen without knowing where to look.

Question five was similar to four but it sought to identify what companies were actually doing to recruit students instead of suggestions. The sub questions were what methods of recruitment are most effective on each of the respective campuses and which were not. The overwhelming response was attendance to the career fair, specifically during the fall semester.

On campus interviews, sponsoring student organization events, scholarships, senior design classes, student field trips and serving on campus boards. All these measures are effective means to recruiting noted by the directors. At the University of Alabama all these events are used to target the engineering students. Student field trips were also mentioned several times as recruitment tools. It opened students' eyes to the complexity, scale, and charm of an oil and gas career.

With demand increasing for engineering disciplines in the near future, the research wanted to identify if the industry is still pursuing new recruits given unemployment at 9.5 percent. The national unemployment rate is deceiving because it does not break the statistics into age groups. The recent recession has affected those under 25 the most, while ages over 50 remained relatively unscathed (Morin and Taylor). Also, how to recruit during tough economic periods and are certain skills or traits sought more readily? The schools surveyed definitely felt the unemployment crunch by seeing internships and job offers sometimes sliced by half, according to Ohio State University's career services director for engineering. Companies are still pursuing engineering graduates but they are being more selective about how money and resources are distributed. The universities yielding high employment rates to oil and gas are receiving the majority of attention. The research revealed that companies are putting high importance in communication, writing and social skills. They have also been raising grade point average requirements to a 3.5 out of a 4.0 scale in some instances. This measuring tool had been relaxed in the past but its now being stressed to sieve through applicants. Specific information about companies on campus or statistics identifying which hired the most from individual universities would not be released.

Originally the research team thought that lack of engineers in oil and gas could be the result of education gaps at certain universities. From analyzing all the short answer responses, that is not the case. The directors feel confident in their programs because they encourage companies to be involved with faculty and administrators, where they have a chance to voice opinions on areas that would prepare students better. If companies do not like the output at a certain university they will stop attending programs and distribute their money elsewhere. Also oil and gas related businesses must find ways to weather down times so interest in the field doesn't slip. At Oklahoma in the 1980s, there were over 400 students in the petroleum and geological engineering program. After the bust period of the late 80s only 3 students remained.

Individual Consultant Interviews

Several consultants with information about the oil and gas industry and marketing techniques were questioned by phone, email or face to face communication. Faculty members interviewed at the University of Alabama from the business, engineering and career services departments. Other attempted contacts were the director of Next Generation Consulting, professors of petroleum engineering at Louisiana Lafayette University and West Virginia University and the 20/30 club of Cleveland, Ohio. Interviews could not be scheduled with some of these groups and individuals due to conflicting schedules and the time constraints facing the research.

The interviews at the University of Alabama were conducted for a variety of reasons. General knowledge of the industry and how engineering majors factor into different processes was first. It was beneficial to have a knowledge base from an experienced petroleum engineer like the professor at the University of Alabama. The meeting helped to describe positions in the

upstream and downstream markets where engineering disciplines skills are best utilized. For example civil engineers can fit into many different aspects, while petroleum engineers are associated with upstream activities and chemical majors are involved in refining operations. With an adequate general knowledge of engineering in the industry it allowed for more strategic researching.

The next on campus interview involved a professor of marketing and management, also the faculty advisor to Students in Free Enterprise (SIFE). The marketing professor had an understanding of the industry due to family involvement and living in Lafayette, Louisiana. The University of Louisiana Lafayette is located here and offers a degree in petroleum engineering as well as chemical, mechanical and other typical engineering degrees. He was also knowledgeable about marketing aspects as a professor and owner of his own business for several years. The discussion covered many of the same aspects of the survey with more of an emphasis placed on marketing. Companies market themselves by providing adventure through relocations in the U.S. as well as overseas. The target demographic is under 30, a passion for foreign cultures, and a quality lifestyle or living. Effective strategies implemented on campus by various companies in differing industries are social networking and campus visits. The campus visits differ from the one to two day career fair experience. Companies have begun building relationships with students during their sophomore year and following their progression. They send care packages during finals, invite these students to nearby company events in Birmingham, Alabama and had ongoing discussions with the recruit. The technique allows companies to determine what companies they are competing against and provides a longer interaction period with the student. The marketing professor stated as an entrepreneur, he was more interested how recruits acted six months following the initial meeting. The skill sets he thought were most important were

communication, social aspects and analytical ability like many of those surveyed. The last skill recommendation was how new hires respond to stressful environments or a sense of controlled chaos. If new recruits could remain proactive and flexible, then they were likely to be successful in any work situation. The last topic in the interview was, what do young graduates want to see in any company? The ability to grow, on the job training, continuing education like graduate school funding and a feeling of value which inspires them to be a better asset.

The interview with the engineering career services director was for the purpose of completing an academic survey that was conducted to most schools via telephone. With Singleton being on campus it allowed for discussion of the survey and elaboration on certain topics regarding oil and gas. The survey information gathered is included in the telephone interview portion. The elaboration of industry public relations related back to a survey submitted by one of the future leader members. He described how on television today certain careers are fantasized, like forensic science and law professions. Engineering could be the same way with all the technology and interesting positions. He believed companies should better present their actions in the media through positive relations with the environment, and break the evil industry stereotype.

The director of Next Generation Consulting also provided some input as to what young professionals seek in a company. The top six elements young people want to see in a company according Next Generation were: life-work balance, trust, great managers, development, rewards and connection, in descending order. Suggestions for life-work balance are, compressed work weeks, work from home, job sharing and flexible ideas from website such as lifemeetswork.com.

Chapter 6

CONCLUSION

Limitations

As stated previously, certain limitations were encountered during the oil and gas research in regards to technical knowledge, time period, sample sizes and overall study timing. With the research team's technical specialty in civil and construction engineering, aspects of chemical, petroleum and detailed geotechnical information were absent. That is why the study was focused on aspects such as marketing oil and gas careers, attracting new disciplines, curricula needs and helping universities and companies streamline their recruitment efforts. The time period for the study affected the sample sizes of the academic representatives, new hires and experienced professionals. During the summer months when the academic segment was initiated, mass emails describing the research effort were distributed. Unfortunately, many respondents were unavailable for long periods of time during these months and contact had to be re-made once schools were back in session. The new hire surveys had a high return rate but overall distribution numbers were not adequate. This is due to low new hire rates at Washington Division in the past several years. Outside contacts at other companies helped to boost the survey respondent total. The ECC- Future Leader survey received a very low response for such a large distribution, nearly 50 members. The future leader contact claimed work and travel demands as the reason for low response. Even with the low respondent numbers, inferences, suggestions, and recommendations were still offered to meet the required objectives.

Findings and Recommendations

All the objective statements for the research project were successfully addressed. The first objective was to determine how the oil and gas industry can effectively market career opportunities, thus attracting engineering graduates. As stated in Chapter 5, the data analysis of industry and academic professionals, many methods are incorporated into the recruitment effort. Salary, travel, technology, unique work environments, and a variety of projects and careers, were aspects that the survey groups felt separated oil and gas engineering employment from other careers. The methods of how to market and present the listed aspects varied. The academic personnel pushed on campus career fairs where employers have access to mass numbers of students. The on campus visits should include the formation of long term relationships to cultivate possible employees. These relationships can be formed through increased internship programs, inviting students to employee events and sponsored trips to witness operations. Technology mediums such as on line message forums, podcasts and engineering events were also suggested applications to attract possible engineering employees. Oil and gas engineering careers can be marketed as prized careers like law and forensic science are on television.

The second objective sought to identify any shortcomings in the curriculum, student programs or campus events. The industry professionals with multiple years of experience cited business aspects such as contracts, accounting principles, and social skills as those they wanted increased in educational settings. Leadership, technical writing, project management and ethics were also elements that had not received enough attention. Overall, the technical aspects needed for problem solving were not seen as a shortcoming. Academic institutions welcome industry to become involved with faculty, directors and service on panels or boards. These opportunities give the oil and gas industry chances to impact student education. The best way to impact a

university if its students had not met industry expectations was to stop attending campus events. Engineering directors explained this measure sends a clear message that a company is not pleased with the technical education output.

The third objective sought ways to interest students in oil and gas careers earlier in college and high school. Oil and gas companies can become involved in Science, Technology, Engineering and Mathematics (STEM) programs aimed at raising awareness in elementary and high school age students. Speakers and mentorship programs have had impacts on introductory engineering classes at all the schools interviewed. Shell uses videos that describe a day in the life of certain engineering disciplines like reservoir engineer. These tools are used to promote research of oil and gas careers and the academic steps students must accomplish to reach such a goal.

The final objective was to define ways to help not only the oil and gas industry but universities add engineering employees and students to their rosters, respectively. The cumulative data analysis and previous objective descriptions should provide each group with the tools to maximize the effort placed into recruiting engineers.

Closing Remarks

As described throughout the research, the issue of keeping qualified graduates interested in oil and gas careers is a vital one that the industry is taking notice of. There are numerous organizations, publications, events, and programs where companies can make their presence known to future graduating engineers. From all the information gathered, the main obstacle facing oil and gas companies from boosting their engineering talent pool is a lack of knowledge pertaining to career opportunities. Many engineering graduates never think about the possibilities

that lie outside of upstream and downstream activities. Many companies specialize in servicing the industry's construction, maintenance and material needs. The research fulfilled its stated objectives listed in chapter one, by serving as an aid to both the oil and gas sector as well as academic programs.

Some unique strategies are being utilized by oil companies promoting technology in the industry. Although the majority of responses for attracting engineers of all types dealt with traditional methods like sponsorships, mentoring, information sessions, etc... The top priority is insuring companies brand themselves on campus. From analyzing the new hire, future leader and academic interviews no significant technical educational gaps existed between academic output and industry needs. The major areas that all survey respondents felt need increased attention were communication, writing, and business skills. It appears that universities that place the most students in the industry have good communication with oil and gas professionals. These professionals help to suggest areas of importance that the faculty can incorporate into the class curriculum. Career fairs seem to be the highly important campus events that companies should take the opportunity to present itself. While on campus, these companies can utilize speaking opportunities and interview processes. All these suggestions are a small snapshot of the objective topics analyzed in the data analysis. In summary, the research benefits both industry and academic personnel by presenting different educational vantage points to satisfy both institutions goals.

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APPENDIX A

ORIGINAL TELEPHONE INTERVIEW FORM

"The Student Pipeline to the Oil & Gas Industry"

Interview Questionnaire

1. What are your initial thoughts on the Oil & Gas recruiting of new professionals?
2. Does your institution's geographic location give it an advantage in placing students in the Oil & Gas Industry? (Ex. Gulf Coast Region)
3. Are students willing to relocate for positions in the Oil & Gas Industry from your institution?
4. What suggestions do you have for improving student interest in Oil & Gas?
 - a. Where do you recognize the greatest need for improvement?
 - b. At what years do these improvements need to take place? (Ex. Fr., Soph., Jr., Sr.)
 - c. Internships available?
 - d. Do you feel your university educates more towards commercial engineering rather than industrial engineering?
5. What particular methods or strategies are being used to target engineering recruits?
 - a. Which methods are the most effective at your campus?
 - b. What incentives are students being offered for co-op/internships and full time hires (signing bonus, move in, etc)?
6. Do you feel that the Oil & Gas Industry is still pursuing new recruits in a "down" economy?
 - a. How do you suggest recruiting in a down market?
 - b. What type students are being selected or targeted during the recession?
 - c. What companies have been actively recruiting/hiring on your campus in recent months?
7. Do you perceive a gap between educational institution output and industry needs?
 - a. If yes, how can this problem be alleviated?
 - b. Which Oil & Gas companies are active within your institution (Career Fairs, Sponsor Events, etc...)? Who hires the most?
 - c. Does your institution have any faculty with Oil & Gas experience and do they translate this experience to the students?
 - d. What skill sets are taught to make students desirable to hire in the Oil & Gas arena?

<p>a. Have you noticed trends in hiring (ex. Passage of the FE exam, Certain Degrees, etc...)?</p>
2. What degree programs do companies prefer?
<p>a. What type of student is attracted to the Oil & Gas Industry from your institution?</p> <p>b. In your opinion, what degree does your institution offer that will most benefit a student seeking employment in Oil & Gas? (Civil, Chemical, Industrial, Mechanical, Electrical, etc...)</p>
3. Suggestions for Industries attempting to persuade new graduates into the Oil & Gas Industry?
<p>a. What is the student/faculty health perspective regarding the Oil & Gas Industry in the current market?</p> <p>b. What factors or information influenced your opinion?</p>
4. What is your background? (Respondent Information)
<p>a. Name -</p> <p>b. University -</p> <p>c. Region (i.e. southeast, southwest, etc.) -</p> <p>d. Position (i.e. engineering manager, etc.) -</p>

APPENDIX B
REVISED TELEPHONE INTERVIEW FORM

"The Student Pipeline to the Oil & Gas Industry"

Interview Questionnaire

1. What are your initial thoughts on the Oil & Gas recruiting of new professionals approaching 2010? Are companies making a greater effort to increase interest and fortify their industry talent pool?
2. Does your institution's geographic location give it an advantage in placing students in the Oil & Gas Industry? (Ex. Gulf Coast Region)
3. Are students willing to relocate for positions in the Oil & Gas Industry from your institution?
4. What suggestions do you have for improving student interest in Oil & Gas?
 - a. Where do you recognize the greatest need for improvement?
 - b. At what years do these improvements need to take place? (Ex. Fr., Soph., Jr., Sr. / possibly high school?)
 - c. Internships available?
 - d. What percentage (estimate) of interns are offered full time positions upon graduation?
 - e. Does your institution utilize some of the mentorship programs available? (career advice, curriculum decisions, general knowledge)
5. What particular methods or strategies are being used by oil and gas companies to target engineering recruits?
 - a. Which methods are the most effective at your campus?
 - b. Which methods are the least effective or not beneficial?
 - c. What incentives are students being offered for full time hires (signing bonus, move in, etc)?
6. Do you feel that the Oil & Gas Industry is still pursuing new recruits in a "down" economy?
 - a. How do you suggest recruiting in a down market?
 - b. What skill sets are being selected or targeted during the recession?
7. Do you perceive a gap between educational institution output and industry needs?
 - a. If yes, how can this problem be alleviated?
 - b. Are oil and gas companies active in helping shape the curriculum, present at student events? How or what is their contribution?

- a. Does your institution have any involvement with the Society of Petroleum Engineers (SPE) or organizations like it? What is their involvement, and do you have student chapters of these organizations?
 - b. What skill sets best benefit students, making them desirable to hire in the Oil & Gas arena?
2. What degree programs do companies prefer?
 - a. Besides Petroleum Engineering, what degree does your institution offer that will most benefit a student seeking employment in Oil & Gas? (Chemical, Mechanical, Civil, etc...)
3. Suggestions for Industries attempting to persuade new graduates into the Oil & Gas Industry?
 - a. What is the student/faculty health perspective regarding the Oil & Gas Industry for years to come?
 - b. What elements should oil and gas companies market the most to attract more engineers? [Ex. Lifestyle, career opportunities (technical and managerial)]
4. What is your background? (Respondent Information)
 - a. Name -
 - b. University -
 - c. Region (i.e. southeast, southwest, etc.) -
 - d. Position (i.e. Director, etc.) -

APPENDIX C
NEW HIRE INDUSTRY SURVEY

Instructions to Answer Survey

URS Washington Division and The University of Alabama have teamed together to research and analyze effective means of recruiting for the Oil & Gas Industry. The research initiative is being undertaken as a result of the limited availability of qualified industry professionals entering the workforce. As seen in last few years, the demand of qualified professionals is much more than the supply. Therefore, URS Washington Division and The University of Alabama are conducting research that will lend itself to valuable conclusions and recommendations to alleviate the problem in the future.

The following survey was built to understand the role that industry plays in the recruiting process. The survey is geared towards individuals with careers in the Oil and Gas industry as well as those who service the industry. There are two topics of questions within the survey. The first section is based on personal experience. These questions are developed to understand why individuals chose to work in the Oil & Gas industry. Please answer these based on your personal experience. The second section of questions is based on general industry practices. Please answer these questions based on your experience and how industry should handle those topics. It is important to note that the answers are not necessarily based on what is occurring within industry now, but what industry's role should be in your opinion.

Instructions on Submitting Survey

First, thank you for your participation and support of the research being conducted. Please fill in the following sections (1-5) using Microsoft Word. For the multiple choice, agreement and rating scale questions please highlight the most appropriate choice. If the multiple choice answers require additional information there is a blank that allows for additional comments. When the survey is completed, please email me the finished copy at ben.a.peck@gmail.com with the subject O/G Survey.

Demographic Data

Name:

Email:

Contact #:

Company:

Position:

Location (Geographic Area):

University & Degree(s):

Graduation Date:

Age:

Industry Experience (years/months):

Section 1 – Multiple Choice

Please highlight the most appropriate answer to the following questions. If your preferred answer choice is not listed, please select other and insert your comment.

Where do most new recruits find their information on the Oil & Gas Industry?

- a. University Career Counselors
- b. University Professors/Administrators
- c. Word of Mouth
- d. The Internet
- e. Media Outlets
- f. Other _____

If other, please explain.

What experience did you have in the industry before entering the work force?

- a. Co-op/Internship
- b. Part-time
- c. Other _____

If you were involved in an internship/co-op opportunity, what were the benefits, and were you involved and utilized so that it prepared you for your career?

What elements of the Oil & Gas Industry attracted you to pursue a career in the field?

- a. Wide range of career possibilities
- b. Travel (domestic and international)
- c. Family and friends in industry
- d. Compensation (monetary)
- e. Other _____

If other, please explain.

Section 2 – Agreement Scale

Please highlight the most appropriate value underneath the following questions. In each question, you will select answers from an agreement scale that range from Strongly Disagree, Disagree, Undecided, Agree and Strongly Agree.

Do you believe that some sort of university based online engineering forum or networking site for Industry Professionals to link with Students would be successful?

Strongly Disagree *Disagree* *Undecided* *Agree* *Strongly Agree*

Do you agree that engineering students are made aware of all the employment possibilities that exist in the Oil & Gas Industry?

Strongly Disagree *Disagree* *Undecided* *Agree* *Strongly Agree*

Does the Oil & Gas industry provide a good work/life balance?

Strongly Disagree *Disagree* *Undecided* *Agree* *Strongly Agree*

Does your company provide adequate opportunities for engineering students to learn under professionals in your industry?

Strongly Disagree *Disagree* *Undecided* *Agree* *Strongly Agree*

Did your education prepare you for the challenges in your career?

Strongly Disagree *Disagree* *Undecided* *Agree* *Strongly Agree*

Were you adequately educated about the Oil & Gas industry prior to entering the workforce?

Strongly Disagree *Disagree* *Undecided* *Agree* *Strongly Agree*

Did your education provide you with the communication skill set needed to be successful upon graduation?

Strongly Disagree *Disagree* *Undecided* *Agree* *Strongly Agree*

Section 3 – Rating Scale

Please highlight the most appropriate value for the following questions on the rating scale. In each question, you will select answers that range from Poor, Fair, Good, and Excellent.

What is your perception of starting pay competitiveness in the Oil & Gas industry as compared to other industries that employ engineers?

Poor *Fair* *Good* *Excellent*

Taking economic factors into account, how do you perceive the outlook for employment in the Oil and Gas industry?

Poor *Fair* *Good* *Excellent*

In your company, what is the outlook for advancement?

Poor *Fair* *Good* *Excellent*

Section 4 – Numeric Open End

Please insert the most appropriate value for the following questions.

How many companies did you interview with prior to joining your first company? ____

How many of those companies were in the Oil & Gas industry? ____

Since graduation, how many times have you switched companies? ____

How many years have you been affiliated with the Oil & Gas industry? ____

How many times have you transferred cities as required by your job? ____

At your company, are recent hires used to attract (recruit) students from their alma maters?

(Yes/No) _____

Section 5 – Fill in the Blank

Please provide a short response to the following questions.

What elements of your education benefited you the most when entering a career in Oil & Gas?

Were there any gaps in your education that didn't adequately prepare you? What elements do you wish were stressed more in the curriculum?

What are your suggestions for attracting engineering disciplines to the Oil & Gas Industry?

Considering today's economy, how do you envision the progression and health of the Oil & Gas Industry for the future?

What are basic needs in terms of disciplines for Oil & Gas projects? Which disciplines are lacking and which are the most abundant?

What information mediums (technology tools) can be utilized to describe the real life functions of an industry professional to engineering students?

What elements of your job make it an attractive opportunity for engineering graduates?

Do you have any involvement in the hiring of new professionals and if so, to what extent?

APPENDIX D
STATISTICAL SPREADSHEET FOR SURVEYS

Agreement Scale				
Do you believe that some sort of university based online engineering forum or networking site for Industry Professionals to link with Students would be successful?				
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Undecided</i>	<i>Agree</i>	<i>Strongly Agree</i>
0	1	3	7	1
Do you agree that engineering students are made aware of all the employment possibilities that exist in the Oil & Gas Industry?				
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Undecided</i>	<i>Agree</i>	<i>Strongly Agree</i>
0	7	2	3	0
Does the Oil & Gas industry provide a good work/life balance?				
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Undecided</i>	<i>Agree</i>	<i>Strongly Agree</i>
0	0	3	9	0
Does your company provide adequate opportunities for engineering students to learn under professionals in your industry?				
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Undecided</i>	<i>Agree</i>	<i>Strongly Agree</i>
0	1	2	4	5
Did your education prepare you for the challenges in your career?				
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Undecided</i>	<i>Agree</i>	<i>Strongly Agree</i>
0	0	1	8	3
Were you adequately educated about the Oil & Gas industry prior to entering the workforce?				
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Undecided</i>	<i>Agree</i>	<i>Strongly Agree</i>
0	0	5	5	1
Did your education provide you with the communication skill set needed to be successful upon graduation?				
<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Undecided</i>	<i>Agree</i>	<i>Strongly Agree</i>
0	2	1	4	5

Rating Scale			
What is your perception of starting pay competitiveness in the Oil & Gas industry as compared to other industries that employ engineers?			
<i>Poor</i>	<i>Fair</i>	<i>Good</i>	<i>Excellent</i>
0	2	4	6
Taking economic factors into account, how do you perceive the outlook for employment in the Oil and Gas industry?			
<i>Poor</i>	<i>Fair</i>	<i>Good</i>	<i>Excellent</i>
0	5	6	1
In your company, what is the outlook for advancement?			
<i>Poor</i>	<i>Fair</i>	<i>Good</i>	<i>Excellent</i>
0	4	3	5
Numeric Open End			
How many companies did you interview with prior to joining your first company?			
1-3	4-6	7-9	10 or more
3	2	4	3
How many of those companies were in the Oil & Gas industry?			
1-3	4-6	7-9	10 or more
3	5	3	1
Since graduation, how many times have you switched companies?			
0	1-2	3-4	4 or more
12	0	0	0
How many months have you been affiliated with the Oil & Gas industry?			
< 12	13-24	25-36	37 or more
5	3	5	1
*units = months			
How many times have you transferred cities as required by your job?			
0	1-2	3-4	4 or more
8	3	1	0
At your company, are recent hires used to attract (recruit) students from their alma maters?			
Yes	No		
10	2		