A GUIDE TO CAREERS IN THE OIL AND NATURAL GAS INDUSTRY

2013
ACKNOWLEDGEMENTS

This Guide to Careers in the Oil and Natural Gas Industry was developed by ShaleNET, a coordinated network of the Oil and Natural Gas industry, the public workforce system and training providers. Launched in 2010, ShaleNET’s primary goal is to train local people using industry-approved curricula and place them into jobs that can lead to successful careers in the natural gas and oil industries.

The Career Guide was developed by Thomas P. Miller and Associates, LLC (TPMA) in partnership with FutureWorks, LLC. The project team would like to thank all of the individuals who participated in the development of the Guide to Careers in the Oil and Natural Gas Industry. TPMA appreciates the leadership and feedback provided by the Steering Committee as well as the industry partners that provided input throughout the process.

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CONTENTS

INTRODUCTION .................................................................................................................. 4
HOW TO USE THE CAREER GUIDE .............................................................................. 4
VETERANS ....................................................................................................................... 5
THE OIL AND NATURAL GAS INDUSTRY ........................................................................ 6
MARCELLUS SHALE ....................................................................................................... 7
UTICA SHALE ................................................................................................................ 7
THREE SEGMENTS OF THE INDUSTRY ......................................................................... 8
OIL AND NATURAL GAS COMPANIES .......................................................................... 9
BENEFITS OF WORKING IN THE INDUSTRY ............................................................... 10
TRANSFERABILITY INTO AND WITHIN THE INDUSTRY ............................................ 10
CAREER PATHS ............................................................................................................ 10
INDUSTRY EXPECTATIONS ........................................................................................... 11
SAFETY .......................................................................................................................... 11
DRUG TESTING ............................................................................................................ 11
WORKING CONDITIONS .............................................................................................. 11
STARTING OUT IN THE INDUSTRY .............................................................................. 12
FINDING JOB OPPORTUNITIES IN THE INDUSTRY ..................................................... 12
THE “EXPERIENCE” FACTOR ....................................................................................... 12
INTRODUCTION

Considering a career in the Oil and Natural Gas industry? Looking for a long-term career that will provide opportunities for growth and competitive wages?

Careers in the oil and natural gas industry are diverse and vary in skill level and educational attainment. The industry, especially the Shale oil and Shale gas industry, is also growing rapidly meaning that employers are frequently in need of skilled men and women who can fill their positions. For youth and adults interested in exploring these career fields, however, searches can be confusing, frustrating and fruitless. This Guide to Careers in the Oil and Natural Gas Industry offers information and resources to determine if this industry aligns with your career plans and interests. It also provides information regarding what level of education is needed for specific occupations, what skills are typically required, and wage ranges that can be expected.

HOW TO USE THE CAREER GUIDE

Within the Guide to Careers in the Oil and Natural Gas Industry, there are two types of information. The first section provides an overview of the Oil and Natural Gas industry with a focus on Shale Oil and Shale Natural Gas. Also included is information regarding hiring trends, work environments and day-to-day expectations relevant to any career in the industry.

The second section of the guide provides individual profiles for forty-eight (48) occupations that are employed within the industry. These profiles provide a snapshot of the occupations, the typical duties and skills needed, and a few key statistics to consider. When reviewing the occupational profiles, note the following:

Organized by Functional Families — The occupational profiles have been grouped according to the functions they address. These groups include: 1) Architectural and Engineering Occupations; 2) Management and Supervisory Occupations; 3) Construction Occupations; 4) Extraction Occupations; 5) Installation, Maintenance, and Repair Occupations, and 6) Production and Transportation Occupations. These groupings will help to narrow the search for occupations for individuals interested in a particular focus area or who are transitioning from related fields.

Individual Occupational Profiles — The profile for each occupation includes detailed information that will help to develop a deeper understanding of the job responsibilities, education levels preferred, and the skills typically required by employers. Also included in the profiles are:
Alternative Titles – In some cases, there are multiple job titles used by employers to refer to the same occupation. Alternative titles have been included for each occupation. This information can be particularly helpful when searching for current job openings.

Data Icons – The data icons included in each occupational profile provide a quick and easy way to determine the number of individuals employed in the region in that occupation, the wage ranges, if the occupation is growing and the education level typically required for the occupation.

- Current Employment – the number of individuals currently employed in the occupation in the region as well as the nation
- Projected Regional Growth – the rate at which the occupation is estimated to grow over the next five years (2013 – 2018)
- Entry Wages and Experience Wages – the wage ranges the occupation offers for workers who are just getting started in the occupation (entry) and the wage range for those who have several years of experience working in the occupation
- Education Level – the typical level of education required for the occupation

The data icons can be helpful in reviewing the occupational profiles, but be careful not to dismiss an occupation simply because these data indicators do not match your criteria. For example, an occupation may not be projected to have particularly high growth, but that occupation may have higher current employment than other jobs. This would suggest that there may be just as many job opportunities in the future.

VETERANS
Veterans are oftentimes uniquely well-suited for careers in the Oil and Natural Gas industry. The skills developed during their time in the military frequently translates into these hands-on careers. To assist in translating military qualifications to similar occupations in the Oil and Natural Gas industry, Military Occupational Classifications have been included in each occupational profile. When available, the military occupational classifications have been included for all branches of the military:

- Air Force Specialty Code (AFSC)
- Army Military Occupational Specialty (MOS)
- Coast Guard Ratings
- Marine Corps Military Occupational Specialty (MOS)
- Navy Ratings

For veterans interested in other ways their skills and military qualifications translate to civilian careers, additional information can be found at My Next Move (www.mynextmove.org/vets/).
THE OIL AND NATURAL GAS INDUSTRY

Oil and Natural Gas account for 60 percent of the energy consumed in the United States. In order to meet the growing demand for oil and natural gas, domestic production offers not only a means of keeping prices competitive, but also provides hundreds of thousands well-paying jobs for American workers. In regard to natural gas alone, the industry provides approximately 600,000 jobs for American workers. These are jobs that can be leveraged into long-term careers and provide family-sustaining wages.

The largest growing segment of the natural gas industry is Shale gas. The production of Shale gas is projected to grow by 113 percent by 2040 meaning there will be a long-term need for skilled talent in the industry. Shale plays – the geography targeted for exploration – are found across the United States with the largest plays in New York, Ohio, Pennsylvania, and West Virginia (Marcellus and Utica), Montana and North Dakota (Bakken), and Louisiana, Oklahoma and Texas.

Shale Plays in the United States

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1 US Department of Energy, National Energy Technology Laboratory (NETL), http://www.netl.doe.gov/technologies/oil-gas/
**MARCELLUS SHALE**

The Marcellus Shale play is the largest shale region found in the United States and primarily extends below Pennsylvania, West Virginia, Ohio and New York. Covering approximately 575 miles, the play also extends to parts of Kentucky, Maryland, Tennessee and Virginia. The first vertical well was drilled in the Marcellus shale play in 2003. Three years later, in 2006, the first horizontal well was completed in the region which spurred the growth and activity of the industry in the region. The Marcellus shale is typically found approximately one mile below the surface. Most commonly, gas is extracted through horizontal drilling techniques.

In Pennsylvania alone, there are an estimated 239,474 jobs that are directly employed in the natural gas industry (30,369 jobs) or its related industries (209,105 jobs). From 2009 to 2012, a total of 33,415 jobs were added within the core industries (18,181 jobs) and related industries (15,234 jobs). Furthermore, on average, oil and natural gas jobs pay significantly higher wages than other industries. The average annual wage for jobs in the core industries was $83,100 compared to $48,400 across all industries.

**UTICA SHALE**

Below the Marcellus Shale, another shale formation is found which can be tapped for both gas and oil – Utica Shale. Estimates place the Utica Shale formation at almost twice the size of the Marcellus play. Like the Marcellus formation, it extends throughout New York, Ohio, Pennsylvania and West Virginia but also reaches parts of Kentucky, Maryland, Tennessee, Virginia, Ontario and Quebec. Utica Shale is currently being explored primarily in Southeastern Ohio and Western Pennsylvania. Utica Shale is found 2,000 to 14,000 feet below the surface and can be 100 to 500+ feet thick. It is estimated to yield 15 trillion cubic feet of gas reserves and 5.5 billion barrels of oil reserves.

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4 ShaleNET, Oil and Natural Gas Industry: Shale Play Map, [http://www.shalenet.org/industryoverview](http://www.shalenet.org/industryoverview)
7 Ibid. Note: CWIA used the North American Industry Classification System (NAICS) to define the Marcellus Shale related industries. Six industries were identified as “core” and a group of 30 industries were identified as “ancillary” for Marcellus Shale related activity.
8 ShaleNET
THREE SEGMENTS OF THE INDUSTRY

Within the Shale oil and natural gas industry, there are three industry segments: Upstream, Midstream and Downstream. These three segments refer to different points in the process of locating and extracting, collecting and ultimately preparing the oil and natural gas for use. Upstream, midstream and downstream activities combine to bring oil and gas products to the end user. The following processes are all needed as part of the combined process:

**UPSTREAM**

Mapping potential well sites, leasing land, preparing land for drilling, and drilling wells

- **Step 1: Mapping** Processes used to find shale deposits - exploring and studying the geological conditions and resources, the potential for shale is identified
- **Step 2: Leasing** Negotiation of land leases, ensuring that land owners are compensated for leasing their land
- **Step 3: Preparing to Drill** Preparing the land by bringing in equipment to clear or grade the land
- **Step 4: Drilling** Drilling the well

**MIDSTREAM**

Collecting, transporting and storing the oil and gas as well as marketing of various oil and natural gas products

- **Step 5: Collecting** Capping the well and moving the oil or gas to the pipeline for collection

**DOWNSTREAM**

Refining and processing raw materials into usable products, as well as distributing and selling the products

- **Step 6: Production** Readying the oil and gas for use

Some occupations are only needed for a certain segment of the industry. Others are needed across Upstream, Midstream and Downstream operations.
OIL AND NATURAL GAS COMPANIES
The industry is comprised of not only the large energy companies that are house-hold names such as Chevron, Chesapeake, or Shell. It is also made up of many medium sized and smaller service companies that work with and support these larger corporations. Contractor companies work with the energy companies to provide a wide array of services and functions. For example, a contractor may provide well services for sites where drilling is complete.

Service companies provide just as many if not more job opportunities than the well-known energy companies within the region. It is important for individuals to widen their job searches to include companies of all sizes when they are beginning or transitioning into a career in the industry.
BENEFITS OF WORKING IN THE INDUSTRY

TRANSFERABILITY INTO AND WITHIN THE INDUSTRY
There are many opportunities to transfer into the Oil and Natural Gas from other regions of the country, from other industries and even from the military. This means that the opportunities for careers in the industry are endless. Similarly, within the industry, individuals can move along a career path relatively quickly if they display good work ethic and show initiative.

From different regions of the U.S. – The Marcellus and Utica Shale plays are two of several plays that provide long-term career opportunities in the region. There is active exploration, drilling and production in Louisiana, Montana, North Dakota, Oklahoma and Texas. While operations may vary from play to play, opportunities exist to leverage experience in one region into career opportunities in another.

From other industries into the Oil and Natural Gas Industry – At the heart of many of the occupations employed in the Oil and Natural Gas industry are skills that are commonly needed by many other industries. Whether it is applying mechanical skills from previous experience in manufacturing, supervising the construction of a highway rather than a well, or leveraging other experiences, there are opportunities to leverage experience into careers in oil and natural gas.

From the Military into the Industry – Many skills and knowledge gained through military service positions veterans to easily transition into civilian careers in the Oil and Natural Gas industry. To help in this transition, military occupational classifications have been identified in the occupational profiles that align well to the individual occupations employed in the industry.

CAREER PATHS
For those starting a career in the industry, there are many opportunities to advance along career paths. Individuals can move up quickly in responsibility and salary if they are willing to work hard and learn fast.

For example, with time and hard work, an individual can start as a Roustabout, earning $14 per hour, advance to a Rotary Drill Operator ($19 per hour) and eventually advance further to a Derrick Hand where he or she can earn up to $25 per hour.

ROUSTABOUT ➔ ROTARY DRILL OPERATOR ➔ DERRICK HAND

Many other career pathways exist and are available to those with the initiative to pursue them.
INDUSTRY EXPECTATIONS

Before starting a career in the Oil and Natural Gas industry, there are certain industry expectations to be aware of.

SAFETY

Safety is the number one priority for employers in the Oil and Natural Gas industry and there are many regulations and standard practices in place to ensure a safe environment. Employees are required to wear personal protective clothing and equipment in many circumstances while on the job site. Additionally, employees receive extensive safety training so that everyone can identify potential problems and safely correct them. In certain occupations, workers could be exposed to hazardous materials, uncomfortable noise levels, and equipment that can be dangerous if not operated properly. Anyone considering or starting a career in the Shale Oil and Shale Natural Gas industry should make safety a priority.

DRUG TESTING

Because such an emphasis is place on ensuring a safe environment, there is no tolerance for drug use in the industry. Drug testing during the hiring process and while employed is a universal practice within the industry. All individuals who are considering or pursuing a career in the Oil and Natural Gas industry should expect to undergo routine drug testing.

WORKING CONDITIONS

Working conditions in the Oil and Natural Gas industry vary, but can be demanding. Working at a well site, for example, requires individuals to work in all weather conditions. Additionally, individuals usually work long hours and often work several weeks in a row with no time off. This can be difficult for workers that cannot or do not want to spend time away from their families. In these circumstances, however, there are significant opportunities for overtime pay. Some occupations can require manual labor and a certain degree of mechanical inclination.

10 Qualities Looked for by the Industry

1. Be a fast learner
2. Work hard and be willing to work long hours.
3. Enjoy the outdoors
4. Be a reliable team player
5. Be dependable and on-time
6. Be a problem solver
7. Be a self-starter
8. Have a supportive family that will understand long hours
9. Be physically fit
10. Have strong mechanical ability

Source: ShaleNET.org
STARTING OUT IN THE INDUSTRY

FINDING JOB OPPORTUNITIES IN THE INDUSTRY

Each company in the oil and natural gas industry has its own hiring practices and methods. But, for individuals looking to start or continue their career in the industry, it is important to know of some of the common ways to find open job positions.

- **Company Websites** – most companies will post open positions on their corporate websites before posting anywhere else. Certain companies will even use their corporate website as the sole posting of an open position. Job candidates can apply directly through these sites in many cases; in others, the website will provide further details about the application process.

- **Career Websites and Job Portals** – Career websites are another popular way to post jobs online. These sites can be industry specific such as Rigzone.com or an industry association’s career site (PIOGA Career Center, OOGA Career Center, etc.). They can also be general job portals such as Monster.com or CareerBuilder.com.

- **Referrals** – Many employers look to their current employees to identify potential candidates to fill open positions. These are trusted individuals who have demonstrated their work ethic and knowledge of the industry and who can lessen the risk when hiring someone new. Individuals looking to start a career or transition into the oil and natural gas industry can ask their friends and family about others who may currently work in the industry and begin to network with these current industry employees.

THE “EXPERIENCE” FACTOR

Many employers in the oil and natural gas industry place a high priority on hiring candidates with previous experience. This can be especially difficult for younger candidates who have not had the opportunity to gain on-the-job experience yet. The amount of experience preferred by employers varies by occupation, however, and there are entry-level positions that can be leveraged as the first stepping stone along a career pathway.

Internships and other work-based learning opportunities can be a good tool to leverage while completing training or preparing for full-time employment. For others who are transitioning into the industry from other sectors such as manufacturing or other skilled trades, the experience gained through these work environments can be used to demonstrate related skills and abilities, work ethics and communication skills, and leadership.
Oil and Natural Gas
Occupational Profiles
ARCHITECTURE AND ENGINEERING OCCUPATIONS ................................................................. 18
  Real Time Snap Shot: Architecture and Engineering Occupations: ....................................... 19
    Architects .......................................................................................................................... 20
    Surveyors ......................................................................................................................... 21
    Civil Engineers ................................................................................................................ 22
    Electrical Engineers ........................................................................................................ 23
    Environmental Engineers ................................................................................................. 24
    Mechanical Engineers ..................................................................................................... 25
    Petroleum Engineers ....................................................................................................... 26
  Real Time Snap Shot: Architecture and Engineering Technician Occupations: ..................... 27
    Architectural and Civil Drafters ....................................................................................... 28
    surveying and Mapping Technicians ............................................................................. 29
    Civil Engineering Technicians ..................................................................................... 30
    Electronics Engineering Technicians ............................................................................ 31
    Environmental Engineering Technicians ....................................................................... 32
    Mechanical Engineering Technicians ........................................................................... 33
    Chemical Technicians .................................................................................................. 34
    Occupational Health and Safety Technicians ................................................................. 35

MANAGEMENT AND SUPERVISORY OCCUPATIONS ................................................................ 36
  Real Time Snap Shot: Management Occupations: ............................................................... 37
    Construction Managers ................................................................................................ 38
    Supply Chain Managers ................................................................................................ 39
    Risk Management Specialists ...................................................................................... 40
  Real Time Snap Shot: Supervisory Occupations: ................................................................. 41
    Supervisors of Construction and Extraction Workers .................................................... 42
    Supervisors of Installers, Mechanics and Repairers ....................................................... 43
    Supervisors of Production and Operation Workers ......................................................... 44

CONSTRUCTION OCCUPATIONS .............................................................................................. 45
  Real Time Snap Shot: Construction Occupations: ............................................................... 46
    Production, Planning and Expediting Clerks ................................................................ 47
    Carpenters ....................................................................................................................... 48
    Construction Laborers ................................................................................................... 49
    Operating Engineers ...................................................................................................... 51
    Pipelayers ....................................................................................................................... 52
    Plumbers, Pipefitters, and Steamfitters ......................................................................... 53
    Construction and Building Inspectors .......................................................................... 54

EXTRACTION OCCUPATIONS ................................................................................................. 55
  Real Time Snap Shot: Extraction Occupations: ................................................................. 56
    Derrick Operators ........................................................................................................... 57
Rotary Drill Operators ........................................................................................................... 58
Service Unit Operators .......................................................................................................... 59
Earth Drillers .......................................................................................................................... 60
Roustabout................................................................................................................................ 61
Helpers – Extraction Workers ............................................................................................... 62

INSTALLATION, MAINTENANCE AND REPAIR OCCUPATIONS ..................................................... 63
Real Time Snap Shot: Installation, Maintenance and Repair Occupations: ................................ 64
Mobile Heavy Equipment Mechanics ...................................................................................... 65
Industrial Machinery Mechanics ............................................................................................ 66
Electrical Power-Line Installers and Repairers ........................................................................ 67
Telecommunications Line Installers ........................................................................................ 68
General Maintenance and Repair Workers ............................................................................. 69
Helpers – Installation, Maintenance and Repair Workers ...................................................... 70

PRODUCTION AND TRANSPORTATION OCCUPATIONS .................................................................. 71
Real Time Snap Shot: Production Occupations: .................................................................... 72
Machinists .................................................................................................................................. 73
Welders, Cutters, Solderers, and Brazers ............................................................................... 74
Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic .................. 75
Gas Compressor and Gas Pumping Station Operator ................................................................. 76
Wellhead Pumpers .................................................................................................................... 77
Real Time Snap Shot: Transportation Occupations: .............................................................. 78
Heavy-Truck and Tractor-Trailer Drivers ............................................................................... 79
Industrial Truck and Tractor Operators ............................................................................... 80
A WORD ABOUT THE DATA

The development of the occupational profiles included in the Guide to Careers in the Oil and Natural Gas Industry drew on previous projects and a number of data sources. In order to identify the occupations for the career guide, previous occupational guides were examined and cross-referenced to identify common occupations. These occupations were used as a starting point for the Guide to Careers in the Oil and Natural Gas Industry. Input from the project steering committee and industry experts helped to narrow the list which was further refined to include occupations that were either entry-level positions in the industry or within a few career steps of entry-level occupations.

Occupations are grouped by functions within the industry – Architecture and Engineering Occupations, Supervisory and Management Occupations, Construction Occupations, Extraction Occupations, Installation, Maintenance and Repair Occupations, and Production and Transportation Occupations – to make the career easier to navigate.

Occupational Profiles

To provide a well-rounded picture of the occupations, both quantitative and qualitative information is included in each of the profiles. A brief descriptions of the occupation, key tasks, work contexts and educational requirements are included as well as alternative titles to consider. Data reflecting current employment, the expected growth, and wage ranges are also found in the occupational profiles. These data are from two sources: O*NET Online (www.onetonline.org) and EMSI (www.economicmodeling.com).

Real Time Labor Market Information

In addition to the individual occupational profiles, real time labor market information (LMI) is provided for occupational groups. Real time LMI – in this case from Burning Glass – uses “spidering” technologies and matching analytics to extract job postings from the web. Real time LMI provides the most up-to-date information available. For each occupational group, a real time snap-shot is provided that highlights the number of actual job postings for those occupations over a two-year period, the companies with the most job postings, specific certifications, and the actual skills employers are seeking in job postings.

<table>
<thead>
<tr>
<th>Data Sources:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternate Titles</td>
</tr>
<tr>
<td>Military Connections</td>
</tr>
<tr>
<td>Industry Connections</td>
</tr>
<tr>
<td>Occupation Description</td>
</tr>
<tr>
<td>Education Required</td>
</tr>
<tr>
<td>Basic Work Requirements</td>
</tr>
<tr>
<td>Top Competencies</td>
</tr>
<tr>
<td>Current Employment</td>
</tr>
<tr>
<td>Projected Growth</td>
</tr>
<tr>
<td>Wage Ranges</td>
</tr>
</tbody>
</table>

*My Next Move for Veterans is an O*NET Online site.*
### STANDARD OCCUPATIONAL TITLE
(SOC Code)

#### Alternate Titles
*Source: O*NET Online*

#### Description of the occupation and the key responsibilities and tasks typically expected of individuals in the position.
*Source: O*NET Online*

#### Education Requirements
Minimum education typically required for the occupation.
*Source: EMSI*

#### Basic Work Requirements
Physical and social factors that influence the nature of work in the occupation.
*Source: O*NET Online*

#### Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
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*Source: EMSI*

#### Current Employment (2013)

<table>
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<tr>
<th>Regional Jobs</th>
<th>National Jobs</th>
</tr>
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<tbody>
<tr>
<td>Source: EMSI</td>
<td>Source: EMSI</td>
</tr>
</tbody>
</table>

#### Projected Regional Growth (2013-2018)

<table>
<thead>
<tr>
<th>Entry Wages: 10th – 25th Percentile Hourly Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Wages: Median – 75th Percentile Hourly Earnings</td>
</tr>
</tbody>
</table>

*Source: EMSI  
Note: Wages are rounded to the nearest $0.50 for clarity.*

#### Education Required
Minimum education required
*Source: EMSI*
ARCHITECTURE AND ENGINEERING OCCUPATIONS


Architecture and Engineering Occupations: Real-time Snap Shot

Occupational profiles follow for seven (7) Architecture and Engineering occupations. Between the two-year period of January 1, 2011 and December 31, 2012, there were a total of 583 online job postings for these occupations in the region. Real-time occupational data examined from these online job postings provides insight into the certifications, technical and specialized skills and hiring needs of employers in the Oil and Natural Gas Industry. Real-time information is included below for the following occupations:

- Architects
- Surveyors
- Civil Engineers
- Electrical Engineers
- Environmental Engineers
- Mechanical Engineers
- Petroleum Engineer

The chart to the right depicts the companies with the most Architecture and Engineering job postings in the region during the period of January 1, 2011 through December 31, 2013. As the postings show, there are job opportunities from energy companies and services companies and contractors.

In analyzing these actual job postings, information about the specific skills and certifications sought by employers emerges. For example, the job postings often list specific certifications sought by employers for these positions as well as the technical and foundational skills they look for in successful candidates.

<table>
<thead>
<tr>
<th>Top Skills in Demand by Employers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TECHNICAL AND SPECIALIZED SKILLS</strong></td>
</tr>
<tr>
<td>2. Engineering: General</td>
</tr>
<tr>
<td>3. Legal: General</td>
</tr>
<tr>
<td>7. Repair: General</td>
</tr>
<tr>
<td>10. IT: Web Design and Technologies</td>
</tr>
</tbody>
</table>

Top Certifications in Demand

- Engineer in Training Certification
- American Society of Mechanical Engineers (ASME) Certified
- Professional Engineer
- Commercial Driver’s License
- Six Sigma Certification
Architects plan and design structures, such as private residences, office buildings, theaters, factories, and other structural property. Tasks Architects are responsible for include, but are not limited to:

- Consult with clients to determine functional or spatial requirements of structures.
- Prepare scale drawings.
- Plan the layout of a project.
- Prepare information regarding design, structure specifications, materials, color, equipment, estimated costs, or construction time.

### Education Required
Architects typically have at least a Bachelor’s degree. Many also have a Master’s degree.

### Basic Work Requirements
Architects are required to:

- Make decisions and solve problems
- Think creatively to develop, design or create new applications or products
- Communicate with persons outside the organization
- Draft, lay out, and specify technical devices, parts, and equipment
- Evaluation information to determine compliance with standards

### Top Competencies Required

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Critical Thinking</td>
<td>Visualization</td>
</tr>
<tr>
<td>Building and Construction</td>
<td>Active Listening</td>
<td>Near Vision</td>
</tr>
<tr>
<td>Engineering and Technology</td>
<td>Complex Problem Solving</td>
<td>Deductive Reasoning</td>
</tr>
<tr>
<td>Customer and Personal Service</td>
<td>Speaking</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>Administration and Management</td>
<td>Reading Comprehension</td>
<td>Fluency of Ideas</td>
</tr>
</tbody>
</table>
SURVEYORS
SOC Code: 17-1022

Alternate Titles
County Surveyor
Land Surveyor
Survey Party Chief
Engineer
Engineering Technician
Geodesist
Licensed Land Surveyor
Mine Surveyor
Professional Land Surveyor

Career Connections

Military Connections
Surveyors are similar to the following military occupational classifications:
- Air Force: N/A
- Army: 13E, 13R, 14E, 18C
- Coast Guard: N/A
- Marine Corps: 0261
- Navy: 5599, EA

Industry Connections
Other industries that employ this occupation include:
- Engineering Services
- Architectural Services
- Surveying and Mapping Services
- Local and State Government

Surveyors make exact measurements and determine property boundaries. Provide data relevant to the shape, contour, gravitation, location, elevation, or dimension of land or land features on or near the earth’s surface for engineering, mapmaking, mining, land evaluation, construction, and other purposes. Tasks Surveyors are responsible for include, but are not limited to:
- Verify survey data is accurate including measurements and calculations conducted at survey sites.
- Search legal records, survey records, and land titles to obtain information about property boundaries in areas to be surveyed.
- Calculate heights, depths, relative positions, property lines, and other characteristics of terrain.
- Prepare and maintain sketches, maps, reports, and legal descriptions of surveys.

Education Requirements
Surveyors typically have a Bachelor’s degree.

Basic Work Requirements
Surveyors are required to:
- Be exact and/or highly accurate
- Utilize the telephone
- Utilize electronic mail
- Participate in face-to-face discussions with individuals or teams
- Work outdoors, exposed to weather

Top Competencies Required

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>Reading Comprehension</td>
<td>Mathematical Reasoning</td>
</tr>
<tr>
<td>Law and Government</td>
<td>Mathematics</td>
<td>Number Facility</td>
</tr>
<tr>
<td>Engineering and Technology</td>
<td>Critical Thinking</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>Geography</td>
<td>Writing</td>
<td>Written Comprehension</td>
</tr>
<tr>
<td>Design</td>
<td>Speaking</td>
<td>Deductive Reasoning</td>
</tr>
</tbody>
</table>

Current Employment:
- 1,051 Regional Jobs
- 42,376 National Jobs

Projected Regional Growth (2013-2018): 9.5%

Entry Wages: $13.50 - $16.00 per hour

Experienced Wages: $22.50 - $29.00 per hour

Bachelor’s Degree Required
Civil Engineers perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures, and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, and water and sewage systems. Tasks Civil Engineers are responsible for include, but are not limited to:

- Manage staff members and the construction, operations, or maintenance activities at project site.
- Provide technical advice regarding design, construction, or program modifications and structural repairs to industrial and managerial personnel.
- Inspect project sites to monitor progress, conformance to design specifications, and safety standards.
- Estimate quantities and cost of materials, equipment, or labor to determine project feasibility.

**Education Requirements**

Civil Engineers typically have a Bachelor’s degree.

**Basic Work Requirements**

Civil Engineers are required to:

- Use the telephone
- Utilize electronic mail
- Participate in face-to-face discussions with individuals or teams
- Be exact and/or highly accurate
- Exercise the freedom to make decisions, without supervision

**Top Competencies Required**

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering and Technology</td>
<td>Mathematics</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>Design</td>
<td>Critical Thinking</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Building and Construction</td>
<td>Judgment and Decision Making</td>
<td>Deductive Reasoning</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Complex Problem Solving</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>English Language</td>
<td>Reading Comprehension</td>
<td>Mathematical Reasoning</td>
</tr>
</tbody>
</table>
ELECTRICAL ENGINEERS
SOC Code: 17-2071

Alternate Titles
Electrical Design Engineer
Project Engineer
Electrical Controls Engineer
Test Engineer
Hardware Design Engineer
Circuits Engineer
Electrical and Instrument Maintenance Supervisor

Career Connections

Military Connections
Electrical Engineers are similar to the following military occupational classifications:
Air Force: 32E1E, 32E3E, 62E1E, 62E3E
Army: 24Z
Coast Guard: N/A
Marine Corps: 8824, 8834
Navy: 5904, 5913, 5917, 5925, 5927, 5960, 5961, 5970, 8004, 8015

Industry Connections
Other industries that employ this occupation include:
Engineering Services
Electrical Power Distribution
Search, Detection, Navigation, Guidance and Nautical System and Instrument Manufacturing
Fossil Fuel Electrical Power Generation

Electrical Engineers research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use. Tasks Electrical Engineers are responsible for include, but are not limited to:
- Prepare technical drawings, specifications of electrical systems, or topographical maps to ensure conformity to standards and customer requirements.
- Operate computer-assisted engineering or design software or equipment to perform engineering tasks.
- Confer with engineers, customers, or others to discuss existing or potential engineering projects or products.
- Direct or coordinate manufacturing, construction, installation, maintenance, support, documentation, or testing activities to ensure compliance with specifications, codes, or customer requirements.

Education Requirements
Electrical Engineers typically have a Bachelor’s degree.

Basic Work Requirements
Electrical Engineers are required to:
- Utilize electronic mail
- Typically work indoors in environmentally controlled conditions
- Use the telephone
- Participate in face-to-face discussions with individuals or teams
- Work with others in a group or team

Top Competencies Required

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
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<td>Engineering and Technology</td>
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<tr>
<td>Design</td>
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<tr>
<td>Mathematics</td>
<td>Active Listening</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>Computers and Electronics</td>
<td>Writing</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Physics</td>
<td>Complex Problem Solving</td>
<td>Deductive Reasoning</td>
</tr>
</tbody>
</table>

Current Employment:
3,982 Regional Jobs
158,480 National Jobs

Projected Regional Growth (2013-2018)
2.8%

Entry Wages: $26.00 - $31.50 per hour
Experienced Wages: $39.00 – $47.50 per hour

Bachelor’s Degree Required
Environmental Engineers research, design, plan, or perform engineering duties in the prevention, control, and remediation of environmental hazards using various engineering disciplines. Work may include waste treatment, site remediation, or pollution control technology. Tasks Environmental Engineers are responsible for include, but are not limited to:

- Design systems, processes, or equipment for control, management, or remediation of water, air, or soil quality.
- Advise corporations or government agencies of procedures to follow in cleaning up contaminated sites to protect people and the environment.
- Collaborate with environmental scientists, planners, hazardous waste technicians, engineers, experts in law or business to address environmental problems.
- Obtain, update, or maintain plans, permits, or standard operating procedures.

Education Requirements
Environmental Engineers typically have a Bachelor’s degree.

Basic Work Requirements
Environmental Engineers are required to:

- Utilize electronic mail
- Utilize the telephone
- Participate in face-to-face discussions with individuals or teams
- Work with others in a group or team
- Work the duration of a typical work week

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering and Technology</td>
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<td>Written Comprehension</td>
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<tr>
<td>Mathematics</td>
<td>Critical Thinking</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Complex Problem Solving</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>English Language</td>
<td>Active Listening</td>
<td>Written Expression</td>
</tr>
<tr>
<td>Law and Government</td>
<td>Active Learning</td>
<td>Oral Expression</td>
</tr>
</tbody>
</table>
Mechanical Engineers perform engineering duties in planning and designing tools, engines, machines, and other equipment. They also oversee installation, operation, maintenance, and repair of equipment such as centralized heat, gas, water, and steam systems. Tasks Mechanical Engineers are responsible for include, but are not limited to:

- Read and interpret blueprints, technical drawings, schematics, or computer-generated reports.
- Assist drafters in developing the structural design of products using drafting tools or computer-assisted design software.
- Research, design, install, and operate mechanical products, equipment, systems and processes to meet requirements.
- Confer with personnel to resolve system malfunctions, or provide technical information.

**Education Requirements**
Mechanical Engineers typically have a Bachelor’s degree.

**Basic Work Requirements**
Mechanical Engineers are required to:
- Utilize electronic mail
- Work indoors in environmentally controlled conditions
- Participate in face-to-face discussions with individuals or teams
- Utilize the telephone
- Be in contact with others through face-to-face conversations, by telephone, or otherwise

**Alternate Titles**
Design Engineer  
Product Engineer  
Mechanical Design Engineer  
Process Engineer  
Equipment Engineer  
Design Maintenance Engineer  
Systems Engineer  
Commissioning Engineer

**Career Connections**

**Military Connections**
Mechanical Engineers are similar to the following military occupational classifications:
- **Air Force:** 32E1F, 32E3F, 62E1H, 62E3H
- **Army:** N/A
- **Coast Guard:** N/A
- **Marine Corps:** N/A
- **Navy:** 8050, MMW

**Industry Connections**
Other industries that employ this occupation include:
- Engineering Services  
- Corporate, Subsidiary, and Regional Managing Offices  
- Railroad Rolling Stock Manufacturing  
- Research and Development in Physical, Engineering, and Life Sciences

**Top Competencies**

<table>
<thead>
<tr>
<th>Knowledge/Field</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering and Technology</td>
<td>Complex Problem Solving</td>
<td>Mathematical Reasoning</td>
</tr>
<tr>
<td>Design</td>
<td>Critical Thinking</td>
<td>Information Ordering</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Mathematics</td>
<td>Written Comprehension</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Reading Comprehension</td>
<td>Deductive Reasoning</td>
</tr>
<tr>
<td>Physics</td>
<td>Judgment and Decision Making</td>
<td>Problem Sensitivity</td>
</tr>
</tbody>
</table>

**Current Employment:**
- **Regional Jobs:** 7,803
- **National Jobs:** 252,939

**Projected Regional Growth (2013-2018):** 1.9%

**Entry Wages:** $23.00 - $27.50 per hour

**Experienced Wages:** $33.50 - $42.00 per hour

**Bachelor’s Degree Required**
Petroleum Engineers devise methods to improve oil and gas extraction and production and determine the need for new or modified tool designs. They oversee drilling and offer technical advice. Tasks Petroleum Engineers are responsible for include, but are not limited to:

- Assess costs and estimate the production capabilities of oil and gas wells to evaluate the economic viability of potential drilling sites.
- Develop plans for oil and gas field drilling, and for product recovery and treatment.
- Direct and monitor the completion and evaluation of wells, well testing, or well surveys.
- Analyze data to recommend placement of wells and supplementary processes to enhance production.

**Education Requirements**

Petroleum Engineers typically have a Bachelor’s degree.

**Basic Work Requirements**

Petroleum Engineers are required to:

- Utilize electronic mail
- Utilize the telephone
- Work in a structured role, rather than individually determine tasks, priorities, and goals
- Participate in face-to-face discussions with individuals or teams
- Work indoors in environmentally controlled conditions

**Top Competencies**

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering and Technology</td>
<td>Reading Comprehension</td>
<td>Written Comprehension</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Speaking</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>Physics</td>
<td>Active Listening</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Computers and Electronics</td>
<td>Critical Thinking</td>
<td>Written Expression</td>
</tr>
<tr>
<td>Administration and Management</td>
<td>Writing</td>
<td>Inductive Reasoning</td>
</tr>
</tbody>
</table>
Architecture and Engineering Technician Occupations: Real-time Snap Shot

Occupational profiles follow for seven (7) Architecture and Engineering Technician occupations. Between the two-year period of January 1, 2011 and December 31, 2012, there were a total of 81 online job postings for these occupations in the region. Real-time occupational data examined from these online job postings provides insight into the certifications, technical and specialized skills and hiring needs of employers in the Oil and Natural Gas Industry. Real-time information is included below for the following occupations:

- Surveying and Mapping Technicians
- Architectural and Civil Drafters
- Civil Engineering Technicians
- Electronics Engineering Technicians
- Environmental Engineering Technicians
- Mechanical Engineering Technicians
- Chemical Technicians

The chart to the right depicts the companies with the most Architecture and Engineering Technician job postings in the region during the period of January 1, 2011 through December 31, 2013. As the postings show, there are job opportunities from energy companies and services companies and contractors.

In analyzing these actual job postings, information about the specific skills and certifications sought by employers emerges. For example, the job postings often list specific certifications sought by employers for these positions as well as the technical and foundational skills they look for in successful candidates.

**Top Skills in Demand by Employers**

<table>
<thead>
<tr>
<th>TECHNICAL AND SPECIALIZED SKILLS</th>
<th>FOUNDATIONAL SKILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Repair</td>
<td>1. Computer Skills</td>
</tr>
<tr>
<td>2. SCADA Industrial Control Systems</td>
<td>2. Microsoft Office</td>
</tr>
<tr>
<td>3. Forklift Operation</td>
<td>3. Troubleshooting</td>
</tr>
<tr>
<td>5. Electrical Systems</td>
<td>5. Organizational Skills</td>
</tr>
<tr>
<td>7. Inspection</td>
<td>7. Project Management</td>
</tr>
<tr>
<td>10. Blueprints</td>
<td>10. Writing</td>
</tr>
</tbody>
</table>

**Top Certifications in Demand**

- Project Management Certification (e.g. PMP)
- Professional Engineer
- American Society of Mechanical Engineers (ASME) Certified
- Commercial Driver’s License
- Certified Control Systems Technician
Architectural and Civil Drafters prepare detailed drawings of architectural and structural features of buildings or drawings and topographical relief maps used in civil engineering projects, such as highways, bridges, and public works. They use knowledge of building materials, engineering practices, and mathematics to complete drawings. Tasks Architectural and Civil Drafters are responsible for include, but are not limited to:

- Operate computer-aided drafting (CAD) equipment or conventional drafting station to produce designs, working drawings, charts, forms and records.
- Analyze building codes, by-laws, space and site requirements in regard to architectural designs.
- Draw maps or diagrams using cross-sections and surveys, to represent elevations, topographical contours, subsurface formations and structures.

**Education Requirements**
Architectural and Civil Drafters typically have at least an Associate’s degree. Many Architectural Drafters have a Bachelor’s degree.

**Basic Work Requirements**
Architectural and Civil Drafters are required to:
- Utilize electronic mail
- Participate in face-to-face discussions with individuals or teams
- Utilize the telephone
- Work with a group or team
- Be exact and/or highly accurate

**Top Competencies**

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Active Listening</td>
<td>Near Vision</td>
</tr>
<tr>
<td>English Language</td>
<td>Reading Comprehension</td>
<td>Written Comprehension</td>
</tr>
<tr>
<td>Building and Construction</td>
<td>Critical Thinking</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Engineering and Technology</td>
<td>Speaking</td>
<td>Visualization</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Writing</td>
<td>Problem Sensitivity</td>
</tr>
</tbody>
</table>
SURVEYING AND MAPPING TECHNICIANS
SOC Code: 17-3031

Alternate Titles
Survey Crew Chief
Instrument Man (I-Man)
Chairman
Rodman
Instrument Operator
Stereoplotter Operator
Photogrammetric Technician
Hydrographic Surveyor
Aerotriangulation Specialist

Career Connections

Military Connections
Surveying and Mapping Technicians are similar to the following military occupational classifications:
Air Force: N/A
Army: 13E, 13F, 13P, 14E, 14S, 19D, 35G
Coast Guard: N/A
Marine Corps: 0241, 0261
Navy: 3999, IS

Industry Connections
Other industries that employ this occupation include:
Engineering Services
Local Government
Architectural Services
Surveying and Mapping Services
Building Inspection Services

Surveying and Mapping Technicians perform surveying and mapping duties to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. They calculate mapmaking information and create maps from surveying notes, aerial photography, satellite data, or other maps. Tasks Surveying and Mapping Technicians are responsible for include, but are not limited to:

- Operate surveying instruments such as prisms, theodolites, and distance-measuring equipment.
- Perform calculations to determine earth curvature, atmospheric impacts on measurements, traverse closures and adjustments, and placement of markers.
- Check all layers of maps to ensure accuracy, identifying and marking errors and making corrections.
- Determine scales, line sizes, or colors to be used for hard copies of computerized maps, using plotters.

Education Requirements
Surveying and Mapping Technicians typically have at least a high school diploma or the equivalent and moderate-term on-the-job training.

Basic Work Requirements
Surveying and Mapping Technicians are required to:

- Be exact and/or highly accurate
- Participate in face-to-face discussions with individuals or teams
- Work with others in a group or team
- Exercise the freedom to make decisions without supervision

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
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<tbody>
<tr>
<td>Mathematics</td>
<td>Critical Thinking</td>
<td>Near Vision</td>
</tr>
<tr>
<td>Geography</td>
<td>Mathematics</td>
<td>Deductive Reasoning</td>
</tr>
<tr>
<td>Computers and Electronics</td>
<td>Reading Comprehension</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>English Language</td>
<td>Complex Problem Solving</td>
<td>Written Comprehension</td>
</tr>
<tr>
<td>Design</td>
<td>Judgment and Decision Making</td>
<td>Mathematical Reasoning</td>
</tr>
</tbody>
</table>
Civil Engineering Technicians apply theory and principles of civil engineering in planning, designing, and overseeing construction and maintenance of structures and facilities under the direction of engineering staff or physical scientists. Tasks Civil Engineering Technicians are responsible for include, but are not limited to:

- Draft dimensional drawings and design layouts for projects and to ensure conformance to specifications.
- Calculate dimensions, square footage, profile and component specifications, and material quantities using calculator or computer.
- Read and review project blueprints and structural specifications to determine dimensions of structure or system and material requirements.
- Confer with supervisor to determine project details such as plan preparation, acceptance testing, and evaluation of field conditions.

Education Requirements

Civil Engineering Technicians typically have an Associate’s degree.

Basic Work Requirements

Civil Engineering Technicians are required to:

- Participate in face-to-face discussions with individuals or teams
- Work indoors in environmentally controlled conditions
- Be exact and/or highly accurate
- Utilize electronic mail
- Work with others in a group or team

Top Competencies

<table>
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<tr>
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<tbody>
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<td>Mathematics</td>
<td>Critical Thinking</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>Design</td>
<td>Writing</td>
<td>Written Expression</td>
</tr>
<tr>
<td>Public Safety and Security</td>
<td>Speaking</td>
<td>Written</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comprehension</td>
</tr>
</tbody>
</table>
Electronics Engineering Technicians build, test, troubleshoot, and modify developmental and production electronic components, equipment, and systems, such as computer equipment and machine tool numerical controls, applying principles of electronics, electrical circuitry, engineering mathematics, electronic and electrical testing, and physics. Tasks Electronics Engineering Technicians are responsible for include, but are not limited to:

- Read blueprints, diagrams, schematic drawings, or engineering instructions to assemble electronics units.
- Test electronics units and analyze results to evaluate performance and determine need for adjustment.
- Perform preventative maintenance or calibration of equipment or systems.
- Assemble, test, or maintain circuitry or electronic components.

Education Requirements
Electronics Engineering Technicians typically have an Associate’s degree.

Basic Work Requirements
Electronics Engineering Technicians are required to:

- Participate in face-to-face discussions with individuals or teams
- Utilize electronic mail
- Utilize the telephone
- Exercise the freedom to make decisions without supervision
- Work with others in a group or team

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
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<td>Computers and Electronics</td>
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<td>Oral Comprehension</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Time Management</td>
<td>Written Comprehension</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>Critical Thinking</td>
<td>Oral Expression</td>
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<tr>
<td>English Language</td>
<td>Speaking</td>
<td>Deductive Reasoning</td>
</tr>
</tbody>
</table>

Alternate Titles
Electronics Technician
Engineering Technician
Test Technician
Technician
Refurbish Technician
Electrical Technician
Electronics Test Technician
Failure Analysis Technician (FA Technician)

Career Connections

Military Connections
Electronics Engineering Technicians are similar to the following military occupational classifications:

Air Force: N/A
Army: 13C, 18E, 29E, 91K, 94H
Coast Guard: N/A
Marine Corps: N/A
Navy: AG, CTT, ETR, ETV, GM, MM-ELT, MME, MMW

Industry Connections
Other industries that employ this occupation include:

Engineering Services
US Postal Service
Printed Circuit Assembly Manufacturing
Search, Detection, Navigation, Guidance and Nautical System and Instrument Manufacturing

Entry Wages: $15.50 - $19.50 per hour
Experienced Wages: $25.50 - $31.00 per hour

Associate’s Degree Required

Current Employment:
3,547 Regional Jobs
152,578 National Jobs

-0.2%
Projected Regional Growth (2013-2018)
ENVIRONMENTAL ENGINEERING TECHNICIANS
SOC Code: 17-3025

Alternate Titles
Environmental Technician
Environmental Specialist
Engineering Technician
Industrial Waste Inspector
Engineer Technician
Environmental Engineering Assistant
Environmental Field Technician
Industrial Waste Technician

Career Connections

Military Connections
Environmental Engineering Technicians are similar to the following military occupational classifications:
- Air Force: N/A
- Army: N/A
- Coast Guard: N/A
- Marine Corps: N/A
- Navy: N/A

Industry Connections
Other industries that employ this occupation include:
- Engineering Services
- Local and State Government
- Testing Laboratories
- Management Consulting Services

Environmental Engineering Technicians apply theory and principles of environmental engineering to modify, test, and operate equipment and devices used in the prevention, control, and remediation of environmental problems, including waste treatment and site remediation, under the direction of engineering staff or scientist. They may assist in the development of environmental remediation devices. Tasks Environmental Engineering Technicians are responsible for include, but are not limited to:
- Perform laboratory work such as logging numerical and visual observations, preparing and packaging samples, and recording test results.
- Maintain project logbook records or computer program files.
- Receive, set up, test, or decontaminate equipment.
- Assist in the cleanup of hazardous material spills.

Education Requirements
Environmental Engineering Technicians typically have an Associate’s degree.

Basic Work Requirements
Environmental Engineering Technicians are required to:
- Utilize electronic mail
- Be exact and/or highly accurate
- Utilize the telephone
- Participate in face-to-face discussions with individuals or teams
- Work with others in a group or team

Top Competencies

<table>
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<td>Chemistry</td>
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<tr>
<td>Design</td>
<td>Speaking</td>
<td>Inductive Reasoning</td>
</tr>
</tbody>
</table>

Entry Wages: $14.50 - $16.50 per hour
Experienced Wages: $19.00 - $24.00 per hour

Associate’s Degree Required

Projected Regional Growth
(2013-2018)

Current Employment:
517 Regional Jobs
20,481 National Jobs
### Mechanical Engineering Technicians

**SOC Code:** 17-3027

**Alternate Titles**
- Mechanical Designer
- Research and Development Technician
- Engineering Lab Technician
- Equipment Engineer
- Process Technician
- Design Engineer
- Engineering Technical Analyst
- Lab Technician

**Career Connections**

**Military Connections**
Mechanical Engineering Technicians are similar to the following military occupational classifications:
- Air Force: N/A
- Army: N/A
- Coast Guard: N/A
- Marine Corps: N/A
- Navy: N/A

**Industry Connections**
Other industries that employ this occupation include:
- Engineering Services
- Corporate, Subsidiary and Regional Managing Offices
- Research and Development in Physical, Engineering, and Life Sciences
- Iron and Steel Mills

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Mechanical Engineering Technicians apply theory and principles of mechanical engineering to modify, develop, test, or calibrate machinery and equipment under direction of engineering staff or physical scientists. Tasks Mechanical Engineering Technicians are responsible for include, but are not limited to:

- Read dials and meters to determine amperage, voltage, electrical output and input at specific operating temperature to analyze parts performance.
- Analyze test results in relation to design or rated specifications and test objectives.
- Evaluate tool drawing designs by measuring drawing dimensions and comparing with original specifications.
- Devise and fabricate mechanical components for products such as industrial machinery or equipment.

**Education Requirements**

Mechanical Engineering Technicians typically have an Associate’s degree.

**Basic Work Requirements**

Mechanical Engineering Technicians are required to:

- Participate in face-to-face discussions with individuals or teams
- Exercise the freedom to make decisions without supervision
- Work indoors in environmentally controlled conditions
- Be in contact with others through face-to-face conversations, by telephone, or otherwise
- Be exact and/or highly accurate

**Top Competencies**

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical</td>
<td>Reading Comprehension</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Engineering and Technology</td>
<td>Active Listening</td>
<td>Deductive Reasoning</td>
</tr>
<tr>
<td>Design</td>
<td>Critical Thinking</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Operation Monitoring</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>Production and Processing</td>
<td>Speaking</td>
<td>Near Vision</td>
</tr>
</tbody>
</table>

---

Current Employment:
- **1,244 Regional Jobs**
- **46,387 National Jobs**

Projected Regional Growth (2013-2018):
- **-1.0%**

Entry Wages:
- **$16.00 - $19.00 per hour**

Experienced Wages:
- **$23.50 - $28.50 per hour**

Associate’s Degree Required
**CHEMICAL TECHNICIANS**  
SOC Code: 19-4031

**Alternate Titles**  
Laboratory Technician  
Laboratory Analyst  
Research Technician  
Analytical Lab Technician  
Laboratory Tester  
Research and Development Technician  
Environmental Lab Technician  
Formulation Technician

**Career Connections**  
**Military Connections**  
Chemical Technicians are similar to the following military occupational classifications:  
- Air Force: N/A  
- Army: N/A  
- Coast Guard: N/A  
- Marine Corps: N/A  
- Navy: N/A

**Industry Connections**  
Other industries that employ this occupation include:  
- Testing Laboratories  
- Research and Development in Physical, Engineering and Life Sciences  
- Paint and Coating Manufacturing  
- Pharmaceutical Preparation Manufacturing

Chemical Technicians conduct chemical and physical laboratory tests to assist scientists in making qualitative and quantitative analyses of solids, liquids, and gaseous materials for research and development of new products or processes, quality control and maintenance of environmental standards. Tasks Chemical Technicians are responsible for include, but are not limited to:

- Monitor product quality to ensure compliance with standards and specifications.
- Compile and interpret results of tests and analyses.
- Set up and conduct chemical experiments, tests, and analyses, using techniques such as chromatography, spectroscopy, physical or chemical separation techniques, or microscopy.
- Conduct chemical or physical laboratory tests to assist scientists in making qualitative or quantitative analyses of solids, liquids, or gaseous materials.

**Education Requirements**  
Chemical Technicians typically have an Associate's degree.

**Basic Work Requirements**  
Chemical Technicians are required to:

- Work indoors in environmentally controlled conditions
- Wear common protective/safety equipment
- Be exact and/or highly accurate
- Be exposed to hazardous conditions
- Utilize electronic mail

**Top Competencies**

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>Science</td>
<td>Written Comprehension</td>
</tr>
<tr>
<td>English Language</td>
<td>Reading Comprehension</td>
<td>Near Vision</td>
</tr>
<tr>
<td>Computers and Electronics</td>
<td>Critical Thinking</td>
<td>Inductive Reasoning</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Monitoring</td>
<td>Deductive Reasoning</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Writing</td>
<td>Written Expression</td>
</tr>
</tbody>
</table>

**Current Employment**  
2,278 Regional Jobs  
62,896 National Jobs

**Projected Regional Growth**  
(2013-2018)  
0.2%

**Entry Wages**  
$12.50 - $15.00 per hour

**Experienced Wages**  
$18.50 - $23.00 per hour

**Associate's Degree Required**
OCCUPATIONAL HEALTH AND SAFETY TECHNICIANS
SOC Code: 29-9012

Alternate Titles
Construction Safety Consultant
Director of Safety
Environmental, Health, and Safety EHS Leader
Health and Safety Tech
Plant Safety Leader
Safety Professional
Industrial Hygiene Consultant
Safety Specialist

Career Connections

Military Connections
Occupational Health and Safety Technicians are similar to the following military occupational classifications:

Air Force: 1S011, 1S031, 1S051, 1S071, 3E413, 3E433, 3E453, 3E473, 4E011, 4E031, 4E051, 4E071
Army: N/A
Coast Guard: N/A
Marine Corps: N/A
Navy: 6021, 8407, MMW, STG

Industry Connections
Other industries that employ this occupation include:
Local and State Government
Support Activities for Oil and Gas Operations
General Medical and Surgical Hospitals
Bituminous Coal Underground Mining

Occupational Health and Safety Technicians collect data on work environments for analysis by occupational health and safety specialists. They implement and conduct evaluation of programs designed to limit chemical, physical, biological, and ergonomic risks to workers. Tasks Occupational Health and Safety Technicians are responsible for include, but are not limited to:

- Test workplaces for environmental hazards, such as radiation, chemical hazards, or excessive noise.
- Verify availability or monitor use of safety equipment.
- Supply, operate, or maintain personal protective equipment.
- Evaluate situations when a worker has refused to work on the grounds that danger or potential harm exists.

Education Requirements
Occupational Health and Safety Technicians typically have at least a high school diploma or the equivalent and moderate-term on-the-job training.

Basic Work Requirements
Occupational Health and Safety Technicians are required to:

- Utilize electronic mail
- Utilize the telephone
- Participate in face-to-face discussions with individuals or teams
- Work with a group or team
- Be in contact with others through face-to-face conversations, by telephone, or otherwise

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Language</td>
<td>Speaking</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Education and Training</td>
<td>Active Listening</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>Law and Government</td>
<td>Reading Comprehension</td>
<td>Deductive Reasoning</td>
</tr>
<tr>
<td>Public Safety and Security</td>
<td>Critical Thinking</td>
<td>Inductive Reasoning</td>
</tr>
<tr>
<td>Customer and Personal Safety</td>
<td>Writing</td>
<td>Written Comprehension</td>
</tr>
</tbody>
</table>

Current Employment:
355 Regional Jobs
11,522 National Jobs

Projected Regional Growth (2013-2018): 3.4%

Entry Wages: $12.50 - $15.50 per hour
Experienced Wages: $20.00 - $24.50 per hour

Moderate-term On-the-Job Training Required
MANAGEMENT AND SUPERVISORY OCCUPATIONS
Management Occupations: Real-time Snap Shot

Occupational profiles follow for three (3) Management occupations. Between the two-year period of January 1, 2011 and December 31, 2012, there were a total of 160 online job postings for these occupations in the region. Real-time occupational data examined from these online job postings provides insight into the certifications, technical and specialized skills and hiring needs of employers in the Oil and Natural Gas Industry. Real-time information is included below for the following occupations:

- Construction Managers
- Supply Chain Managers
- Risk Management Specialist

The chart to the right depicts the companies with the most Management job postings in the region during the period of January 1, 2011 through December 31, 2013. As the postings show, there are job opportunities from energy companies and services companies and contractors.

In analyzing these actual job postings, information about the specific skills and certifications sought by employers emerges. For example, the job postings often list specific certifications sought by employers for these positions as well as the technical and foundational skills they look for in successful candidates.

Top Skills in Demand by Employers

<table>
<thead>
<tr>
<th>SPECIALIZED AND TECHNICAL SKILLS</th>
<th>FOUNDATIONAL SKILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Natural Gas: Pollution Reduction, Removal, and Remediation</td>
<td>2. Leadership</td>
</tr>
<tr>
<td>4. Repair</td>
<td>4. Budgeting</td>
</tr>
<tr>
<td>5. Scheduling</td>
<td>5. Supervisory Skills</td>
</tr>
<tr>
<td>7. Inspection</td>
<td>7. Microsoft Excel</td>
</tr>
</tbody>
</table>

Top Certifications in Demand

- Project Management Certification (e.g PMP)
- Professional Engineer
- First Aid CPR AED
- American Society Of Mechanical Engineers (ASME) Certified
- Lean Six Sigma
Consortialmanagers plan, direct, or coordinate, usually through subordinate supervisory personnel, activities concerned with the construction and maintenance of structures, facilities, and systems. They participate in the conceptual development of a construction project and oversee its organization, scheduling, budgeting, and implementation. Tasks Construction Managers are responsible for include, but are not limited to:

- Schedule and budget time to meet deadlines.
- Confer with supervisory personnel, owners, contractors, or design professionals on matters such as procedures, complaints, or construction problems.
- Prepare contracts and negotiate revisions with architects, consultants, clients, and suppliers.
- Prepare and submit budget estimates, progress reports, or cost tracking reports.

**Education Requirements**

Construction Managers typically have a Bachelor’s degree.

**Basic Work Requirements**

Construction Managers are required to:

- Utilize electronic mail
- Utilize the telephone
- Participate in face-to-face discussions with individuals or teams
- Typically work a high number of hours in one week
- Be in contact with others through face-to-face conversations, by telephone, or otherwise

**Top Competencies**

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building and Construction</td>
<td>Time Management</td>
<td>Oral</td>
</tr>
<tr>
<td>Administration and Management</td>
<td>Management of Personnel</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>Customer and Personal Service</td>
<td>Critical Thinking</td>
<td>Oral</td>
</tr>
<tr>
<td>Engineering and Technology</td>
<td>Speaking</td>
<td>Written</td>
</tr>
<tr>
<td>Design</td>
<td>Active Listening</td>
<td>Deductive Reasoning</td>
</tr>
</tbody>
</table>
Supply Chain Managers coordinate production, purchasing, warehousing, distribution, or financial forecasting services or activities to limit costs and improve accuracy, customer service, or safety. They examine streamline activities to meet product distribution needs. They also direct the movement, storage, or processing of inventory. Tasks Supply Chain Managers are responsible for include, but are not limited to:

- Confer with supply chain planners to forecast demand or create supply plans that ensure availability of materials or products.
- Monitor forecasts and quotas to identify changes or to determine their effect on supply chain activities.
- Define performance metrics for measurement, comparison, or evaluation of supply chain factors, such as product cost or quality.
- Analyze inventories to increase inventory turns, reduce waste, or optimize customer service.

Education Requirements
Supply Chain Managers typically have a Bachelor’s degree.

Basic Work Requirements
Supply Chain Managers are required to:
- Utilize electronic mail
- Utilize the telephone
- Participate in face-to-face discussions with individuals or teams
- Work indoors in environmentally controlled conditions
- Work the duration of a typical work week

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production and Processing</td>
<td>Active Listening</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Administration and Management</td>
<td>Reading Comprehension</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>Transportation</td>
<td>Monitoring</td>
<td>Written Comprehension</td>
</tr>
<tr>
<td>English Language</td>
<td>Coordination</td>
<td>Written Expression</td>
</tr>
<tr>
<td>Customer and Personal Service</td>
<td>Complex Problem Solving</td>
<td>Problem Sensitivity</td>
</tr>
</tbody>
</table>
RISK MANAGEMENT SPECIALISTS
SOC Code: 13-2099

Alternate Titles
Risk Management Director
Chief Risk Officer
Risk Manager
Credit Risk Management Director
Global Risk Management Director
Risk and Insurance Consultant

Career Connections

Military Connections
Risk Management Specialists are similar to the following military occupational classifications:
Air Force: N/A
Army: N/A
Coast Guard: N/A
Marine Corps: N/A
Navy: N/A

Industry Connections
Other industries that employ this occupation include:
Commercial Banking
Corporate, Subsidiary and Regional Managing Offices
State and Federal Government
Credit Unions

Risk Management Specialists analyze and manage risk management issues by identifying, measuring, and making decisions on operational or enterprise risks for an organization. Tasks Risk Management Specialists are responsible for include, but are not limited to:
- Document, and ensure communication of, key risks.
- Maintain data quality of risk management systems.
- Recommend ways to control or reduce risk.
- Identify key risks and mitigating factors of potential investments, such as asset types and values, legal and ownership structures, professional reputations, customer bases, or industry segments.

Education Requirements
Risk Management Specialists typically have a Bachelor’s degree.

Basic Work Requirements
Risk Management Specialists are required to:
- Utilize electronic mail
- Utilize the telephone
- Participate in face-to-face discussions with individuals or teams
- Typically work a high number of hours in one week
- Spend time sitting

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>Reading Comprehension</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>English Language</td>
<td>Critical Thinking</td>
<td>Deductive Reasoning</td>
</tr>
<tr>
<td>Economics and Accounting</td>
<td>Active Listening</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>Administration and Management</td>
<td>Systems Analysis</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Computers and Electronics</td>
<td>Speaking</td>
<td>Inductive Reasoning</td>
</tr>
</tbody>
</table>
Supervisory Occupations: Real-time Snap Shot

Occupational profiles follow for three (3) Supervisory occupations. Between the two-year period of January 1, 2011 and December 31, 2012, there were a total 511 online job postings for these occupations in the region. Real-time occupational data examined from these online job postings provides insight into the certifications, technical and specialized skills and hiring needs of employers in the Oil and Natural Gas Industry. Real-time information is included below for the following occupations:

- Supervisors of Installers, Mechanics and Repairers
- Supervisors of Construction and Extraction Workers
- Supervisors of Production and Operating Workers

The chart to the right depicts the companies with the most Supervisory job postings in the region during the period of January 1, 2011 through December 31, 2013. As the postings show, there are job opportunities from energy companies and services companies and contractors.

In analyzing these actual job postings, information about the specific skills and certifications sought by employers emerges. For example, the job postings often list specific certifications sought by employers for these positions as well as the technical and foundational skills they look for in successful candidates.

### Companies with the Most Job Postings (Jan 2011 – Dec 2013)

<table>
<thead>
<tr>
<th>Company</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chesapeake Energy</td>
<td>81</td>
</tr>
<tr>
<td>Baker Hughes</td>
<td>57</td>
</tr>
<tr>
<td>Weatherford International...</td>
<td>53</td>
</tr>
<tr>
<td>Exelon</td>
<td>45</td>
</tr>
<tr>
<td>Chevron</td>
<td>27</td>
</tr>
<tr>
<td>Shell Oil</td>
<td>21</td>
</tr>
<tr>
<td>Amerada Hess Corporation</td>
<td>21</td>
</tr>
<tr>
<td>Team Fishel</td>
<td>20</td>
</tr>
<tr>
<td>Range Resources Corporation</td>
<td>19</td>
</tr>
<tr>
<td>Halliburton</td>
<td>15</td>
</tr>
</tbody>
</table>

### Top Certifications in Demand

- American Society of Mechanical Engineers (ASME) Certified
- Electrical Contractor
- Electrician Certification
- Inspection Certification

### Top Skills in Demand by Employers

<table>
<thead>
<tr>
<th>SPECIALIZED AND TECHNICAL SKILLS</th>
<th>FOUNDATIONAL SKILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Scheduling and Supply Chain Logistics</td>
<td>1. Supervisory Skills</td>
</tr>
<tr>
<td>2. Repair</td>
<td>2. Communication Skills</td>
</tr>
<tr>
<td>3. Inspection</td>
<td>3. Leadership</td>
</tr>
<tr>
<td>4. Procurement</td>
<td>4. Planning</td>
</tr>
<tr>
<td>5. Mentoring</td>
<td>5. Computer Skills</td>
</tr>
<tr>
<td>7. Natural Gas</td>
<td>7. Writing</td>
</tr>
</tbody>
</table>
Supervisors of Construction and Extraction Workers directly supervise and coordinate activities of construction or extraction workers. Tasks Supervisors of Construction and Extraction Workers are responsible for include, but are not limited to:

- Supervise, coordinate, or schedule the activities of construction or extractive workers.
- Read specifications, such as blueprints, to determine construction requirements or to plan procedures.
- Inspect work progress, equipment, or construction sites to verify safety and ensure specifications are met.
- Locate, measure, and mark site locations or placement of structures or equipment.

**Education Requirements**
Supervisors of Construction and Extraction Workers typically have at least a high school diploma or the equivalent as well as work experience in a related occupation.

**Basic Work Requirements**
Supervisors of Construction and Extraction Workers are required to:

- Participate in face-to-face discussions with individuals or teams
- Take responsibility for outcomes and results
- Utilize the telephone
- Work outdoors, exposed to all weather conditions
- Wear common protective/safety equipment

### Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production and Processing</td>
<td>Active Listening</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Building and Construction</td>
<td>Coordination</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>Customer and Personal Service Administration and Management</td>
<td>Critical Thinking</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>Administration and Management</td>
<td>Speaking</td>
<td>Near Vision</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Management of Personnel Resources</td>
<td>Information Ordering</td>
</tr>
</tbody>
</table>

*Note: There are additional Military Occupational Codes which align with this occupation. Visit MyNextMove.org to view the complete listing.
**SUPERVISORS OF INSTALLERS, MECHANICS AND REPAIRERS**

SOC Code: 49-1011

### Alternate Titles
- Maintenance Foreman
- Production Crew Supervisor
- Service Manager
- Crew Leader
- Facility Maintenance Supervisor
- Electrical & Instrumentation Supervisor (E&I Supervisor)

### Career Connections

#### Military Connections
Supervisors of Installers, Mechanics and Repairers are similar to the following military occupational classifications:*

- **Air Force:** N/A
- **Army:** 15K, 15Z, 913A, 915A, 915S, 919A, 91X
- **Coast Guard:** 013, 015, 017, 62, 64
- **Marine Corps:** N/A
- **Navy:** 1104, 3373, 3376, 4204, 4260, 5977, 6704, 6940, 6978, 7241, 7609, 7930, 8189-8199, 8300, 8800, 9348

#### Industry Connections
Other industries that employ this occupation include:
- New Car Dealers
- Local Government
- General Automotive Repair
- Plumbing, Heating & Air-Conditioning Contractors

Supervisors of Installers, Mechanics and Repairers directly supervise and coordinate the activities of mechanics, installers, and repairers. Tasks Supervisors of Installers, Mechanics and Repairers are responsible for include, but are not limited to:

- Determine schedules, sequences, and assignments for work activities, based on work priority, quantity of equipment, and skill of personnel.
- Monitor employees' work levels and review work performance.
- Monitor tool and part inventories and the condition of shops to ensure adequate working conditions.
- Investigate accidents or injuries and prepare reports of findings.

### Education Requirements
Supervisors of Installers, Mechanics and Repairers typically have at least a high school diploma or the equivalent as well as work experience in a related occupation.

### Basic Work Requirements
Supervisors of Installers, Mechanics and Repairers are required to:

- Utilize the telephone
- Participate in face-to-face discussions with individuals or teams
- Utilize electronic mail
- Be in contact with others through face-to-face conversations, by telephone, or otherwise
- Frequently make decisions

### Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration and Management</td>
<td>Management of Personnel Resources</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Monitoring</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>Customer and Personal Service</td>
<td>Time Management</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>Production and Processing</td>
<td>Coordination</td>
<td>Written Comprehension</td>
</tr>
<tr>
<td>Personnel and Human Resources</td>
<td>Critical Thinking</td>
<td>Deductive Reasoning</td>
</tr>
</tbody>
</table>

*Note: There are additional Military Occupational Codes which align with this occupation. Visit MyNextMove.org to view the complete listing.*
Supervisors of Production and Operating Workers directly supervise and coordinate the activities of production and operating workers, such as inspectors, machine setters and operators, assemblers, fabricators, and plant and system operators. Tasks Supervisors of Production and Operating Workers are responsible for include, but are not limited to:

- Enforce safety and sanitation regulations.
- Direct employees engaged in the production of goods.
- Confer with other supervisors to coordinate operations and activities within or between departments.
- Plan and establish work schedules, assignments, and production sequences to meet production goals.

**Education Requirements**
Supervisors of Production and Operating Workers typically have at least a high school diploma or the equivalent as well as work experience in a related field.

**Basic Work Requirements**
Supervisors of Production and Operating Workers are required to:

- Be exposed to distracting/uncomfortable noise levels
- Be in contact with others through face-to-face conversations, by telephone, or otherwise
- Participate in face-to-face discussions with individuals or teams
- Work indoors, not in environmentally controlled conditions
- Be responsible for others’ health and safety

### Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production and Processing</td>
<td>Speaking</td>
<td>Oral Comprehension</td>
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<tr>
<td>Mechanical</td>
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</tr>
<tr>
<td>Personnel and Human Resources</td>
<td>Management of Personnel Resources</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>Engineering and Technology</td>
<td>Time Management</td>
<td>Written Comprehension</td>
</tr>
</tbody>
</table>
Construction Occupations: Real-time Snap Shot

Occupational profiles follow for eight (8) Construction occupations. Between the two-year period of January 1, 2011 and December 31, 2012, there were a total of 210 online job postings for these occupations in the region. Real-time occupational data examined from these online job postings provides insight into the certifications, technical and specialized skills and hiring needs of employers in the Oil and Natural Gas Industry. Real-time information is included below for the following occupations:

- Production, Planning and Expediting Clerks
- Carpenters
- Construction Laborers
- Paving, Surfacing and Tamping Equipment Operators
- Operating Engineers
- Pipelayers
- Plumbers, Pipefitters, and Steamfitters
- Construction and Building Inspectors

The chart to the right depicts the companies with the most Construction job postings in the region during the period of January 1, 2011 through December 31, 2013. As the postings show, there are job opportunities from energy companies and services companies and contractors.

In analyzing these actual job postings, information about the specific skills and certifications sought by employers emerges. For example, the job postings often list specific certifications sought by employers for these positions as well as the technical and foundational skills they look for in successful candidates.

<table>
<thead>
<tr>
<th>Specialized and Technical Skills</th>
<th>Foundation Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Repair</td>
<td>1. Computer Skills</td>
</tr>
<tr>
<td>2. Scheduling</td>
<td>2. Microsoft Office</td>
</tr>
<tr>
<td>4. Equipment Design</td>
<td>4. Organizational Skills</td>
</tr>
<tr>
<td>5. Inspection</td>
<td>5. Planning</td>
</tr>
<tr>
<td>7. Equipment Operation</td>
<td>7. Writing</td>
</tr>
<tr>
<td>10. Soil Conservation</td>
<td>10. Leadership</td>
</tr>
</tbody>
</table>

Top Certifications in Demand
- First Aid CPR/AED
- American Society of Mechanical Engineers (ASME) Certified
- Air Brake Certified
- Forklift Operator Certification
- Commercial Driver’s License
Production, Planning and Expediting Clerks coordinate and expedite the flow of work and materials between departments according to a production schedule. Their duties include reviewing and distributing production, work, and shipment schedules; conferring with department supervisors to determine progress of work and completion dates; and compiling reports on progress of work. Tasks Production, Planning and Expediting Clerks are responsible for include, but are not limited to:

- Examine materials, or products and monitor work processes to assess conformance to standards.
- Review production schedules or work orders to determine personnel or materials requirements.
- Confer with department supervisors to assess progress.
- Revise production schedules due to design changes, labor/material shortages or other interruptions.

**Education Requirements**
Production, Planning and Expediting Clerks typically have at least a high school diploma or the equivalent and moderate-term on-the-job training.

**Basic Work Requirements**
Production, Planning and Expediting Clerks are required to:

- Participate in face-to-face discussions with individuals or teams
- Utilize the telephone
- Work indoors in environmentally controlled conditions
- Work under time pressure and meet deadlines
- Utilize electronic mail

**Top Competencies**

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production and Processing</td>
<td>Reading Comprehension</td>
<td>Written Comprehension</td>
</tr>
<tr>
<td>Customer and Personal Service</td>
<td>Active Listening</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Computers and Electronics</td>
<td>Critical Thinking</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>Administration and Management</td>
<td>Speaking</td>
<td>Written Expression</td>
</tr>
<tr>
<td>English Language</td>
<td>Time Management</td>
<td>Near Vision</td>
</tr>
</tbody>
</table>
CARPENTERS
SOC Code: 47-2031

Alternate Titles
Carpenter
Apprentice Carpenter
Form Carpenter
Journeyman Carpenter
Rough Carpenter
Union Carpenter
Bridge Carpenter
Bridge Repair Crew Person

Career Connections

Military Connections
Carpenters are similar to the following military occupational classifications:
- **Air Force:** 3E311, 3E331, 3E351
- **Army:** 12W
- **Coast Guard:** N/A
- **Marine Corps:** 1300, 1371
- **Navy:** 5999, BU

Industry Connections
Other industries that employ this occupation include:
- Residential Remodelers
- Commercial and Institutional Building Construction
- New Single-Family Housing Construction
- Industrial Building Construction

Rough Carpenters build rough wooden structures, such as concrete forms, scaffolds, tunnel, bridge, or sewer supports, billboard signs, and temporary frame shelters, according to sketches, blueprints, or oral instructions. Tasks Carpenters are responsible for include, but are not limited to:
- Measure materials or distances, using square, measuring tape, or rule to lay out work.
- Study blueprints and diagrams to determine dimensions of structure or form to be constructed.
- Cut boards, timbers, or plywood to required size, using handsaw, power saw, or woodworking machine.
- Mark cutting lines on materials, using pencil and scriber.

Education Requirements
Carpenters typically have at least a high school diploma or the equivalent plus long-term on-the-job training.

Basic Work Requirements
Carpenters are required to:
- Wear common protective/safety equipment
- Be in contact with others through face-to-face conversations, by telephone, or otherwise
- Participate in face-to-face discussions with individuals or teams
- Exercise the freedom to make decisions without supervision
- Spend time standing

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
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<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building and Construction</td>
<td>Critical Thinking</td>
<td>Manual Dexterity</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Active Listening</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Coordination</td>
<td>Trunk Strength</td>
</tr>
<tr>
<td>Design</td>
<td>Judgment and Decision Making</td>
<td>Multi-limb Coordination</td>
</tr>
<tr>
<td>Production and Processing</td>
<td>Monitoring</td>
<td>Near Vision</td>
</tr>
</tbody>
</table>

Current Employment:
- **19,002 Regional Jobs**
- **584,727 National Jobs**

Projected Regional Growth (2013-2018):
- **3.3%**

Entry Wages:
- **$11.50 - $14.00 per hour**

Experienced Wages:
- **$18.50 - $23.00 per hour**

Long-term On-the-Job Training Required
CONSTRUCTION LABORERS
SOC Code: 47-2061

Alternate Titles
Construction Worker
Curb and Gutter Laborer
Drain Layer
Drop Crew Laborer
Helper
Laborer
Post Framer
Skill Labor
Union Laborer

Career Connections

Education Requirements
Construction Laborers typically have at least a high school diploma or the equivalent plus short-term on-the-job training.

Basic Work Requirements
Construction Laborers are required to:
- Be in contact with others through face-to-face conversations, by telephone, or otherwise
- Wear common protective/safety equipment
- Participate in face-to-face discussions with individuals or teams
- Spend time standing
- Work outdoors, exposed to all weather conditions

Top Competencies

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<tr>
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</thead>
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<td>Manual Dexterity</td>
</tr>
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<td></td>
<td>Coordination</td>
<td>Arm-Hand Strength</td>
</tr>
<tr>
<td>Administration and</td>
<td>Operation Monitoring</td>
<td>Static Strength</td>
</tr>
<tr>
<td>Management</td>
<td>Speaking</td>
<td>Multi-limb Coordination</td>
</tr>
<tr>
<td>Public Safety and Security</td>
<td>Reading Comprehension</td>
<td>Oral Comprehension</td>
</tr>
</tbody>
</table>

Current Employment:
21,828 Regional Jobs
801,609 National Jobs

Projected Regional Growth (2013-2018)
10.2%

Entry Wages: $9.50 - $11.50 per hour
Experienced Wages: $15.50 - $20.50 per hour

Short-term On-the-Job Training Required
PAVING, SURFACING, AND TAMPING EQUIPMENT OPERATORS
SOC Code: 47-2071

**Alternate Titles**
Equipment Operator (EO)
Paver Operator
Roller Operator
Truck Driver
Screed Operator
Heavy Equipment Operator
Maintenance Equipment Operator (MEO)
Asphalt Raker
Asphalt Paver Operator

**Career Connections**

**Military Connections**
Paving, Surfacing and Tamping Equipment Operators are similar to the following military occupational classifications:
- **Air Force:** 3E211, 3E231, 3E251
- **Army:** 12V
- **Coast Guard:** N/A
- **Marine Corps:** N/A
- **Navy:** 5710

**Industry Connections**
Other industries that employ this occupation include:
- Highway, Street and Bridge Construction
- Local and State Government
- Site Preparation Contractors
- Specialty Trade Contractors

Paving, Surfacing and Tamping Equipment Operators use equipment used for applying concrete, asphalt, or other materials to road beds, parking lots, or airport runways and taxiways, or equipment used for tamping gravel, dirt, or other materials. Tasks Paving, Surfacing and Tamping Equipment Operators are responsible for include, but are not limited to:
- Operate machines to spread, smooth, level, or steel-reinforce stone, concrete, or asphalt on road beds.
- Observe distribution of paving material to adjust machine settings or material flow, and indicate low spots for workers to add material.
- Control traffic.
- Light burners or start heating units of machines, and regulate screed temperatures and asphalt flow rates.

**Education Requirements**
Paving, Surfacing and Tamping Equipment Operators typically have at least a high school diploma or the equivalent plus moderate-term on-the-job training.

**Basic Work Requirements**
Paving, Surfacing and Tamping Equipment Operators are required to:
- Work outdoors, exposed to all weather conditions
- Wear common protective/safety equipment
- Be responsible for others’ health and safety
- Spend time using one’s hands to control/handle tools
- Be exposed to contaminants

**Top Competencies**

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<tr>
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<td>Public Safety and Security</td>
<td>Operation Monitoring</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>Transportation</td>
<td>Operation and Control</td>
<td>Control Precision</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Monitoring</td>
<td>Multi-limb Coordination</td>
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<td>Rate Control</td>
</tr>
<tr>
<td>English Language</td>
<td>Critical Thinking</td>
<td>Reaction Time</td>
</tr>
</tbody>
</table>

**Current Employment**
- **1,599 Regional Jobs**
- **52,936 National Jobs**

**Projected Regional Growth**
- **11.6%** (2013-2018)

**Entry Wages:**
- $12.00 - $14.50 per hour

**Experienced Wages:**
- $18.50 - $24.00 per hour

**Moderate-term On-the-Job Training Required**
Operating Engineers operate one or several types of power construction equipment, such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. They may repair and maintain equipment in addition to other duties. Tasks Operating Engineers are responsible for include, but are not limited to:

- Learn and follow safety regulations.
- Take actions to avoid potential hazards or obstructions, such as utility lines, other equipment, other workers, or falling objects.
- Locate underground services, such as pipes or wires, prior to beginning work.
- Monitor operations to ensure that health and safety standards are met.

**Education Requirements**
Operating Engineers typically at least a high school diploma or the equivalent plus moderate-term on-the-job training.

**Basic Work Requirements**
Operating Engineers are required to:
- Work outdoors, exposed to all weather conditions
- Wear common protective/safety equipment
- Participate in face-to-face discussions with individuals or teams
- Spend time using one’s hands to control/handle tools
- Sometimes work in very hot or cold temperatures

### Top Competencies

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<td>Depth Perception</td>
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<td>Monitoring</td>
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<tr>
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<td>Coordination</td>
<td>Near Vision</td>
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<tr>
<td>Public Safety and Security</td>
<td>Equipment Maintenance</td>
<td>Far Vision</td>
</tr>
<tr>
<td>Mathematics</td>
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</tr>
</tbody>
</table>

**Alternate Titles**
- Back Hoe Operator
- Engineering Equipment Operator
- Equipment Operator
- Heavy Equipment Operator
- Loader Operator
- Machine Operator
- Motor Grader Operator
- Operator
- Track Hoe Operator

**Career Connections**

**Military Connections**
Operating Engineers are similar to the following military occupational classifications:
- Air Force: N/A
- Coast Guard: 681, 682, 683
- Marine Corps: 1345, 1372
- Navy: 5711, 5712, 5799, EO

**Industry Connections**
Other industries that employ this occupation include:
- Site Preparation Contractors
- Local Government
- Highway, Street, and Bridge Construction
- Bituminous Coal Underground Mining

**Current Employment:**
- 16,462 Regional Jobs
- 340,380 National Jobs

**Projected Regional Growth (2013-2018):**
9.2%

**Entry Wages:**
$13.00 - $15.50 per hour

**Experienced Wages:**
$19.50 - $25.00 per hour

**Moderate-term On-the-Job Training Required**
PIPELAYERS
SOC Code: 47-2151

Alternate Titles
Pipe Layer
Laborer
Equipment Operator
Construction Laborer
Machine Operator
Skilled Laborer

Career Connections
Military Connections
Pipelayers are similar to the following military occupational classifications:
- Air Force: N/A
- Army: N/A
- Coast Guard: N/A
- Marine Corps: N/A
- Navy: N/A

Industry Connections
Other industries that employ this occupation include:
- Local Government
- Water and Sewer Line and Related Structures
- Construction
- Plumbing, Heating, and Air-Conditioning Contractors
- Site Preparation Contractors

Pipelayers lay pipe for storm or sanitation sewers, drains, and water mains. They perform any combination of the following tasks: grade trenches or culverts, position pipe, or seal joints. Tasks Pipelayers are responsible for include, but are not limited to:
- Check slopes for conformance to requirements, using levels or lasers.
- Cover pipes with earth or other materials.
- Connect pipe pieces and seal joints, using welding equipment, cement, or glue.
- Cut pipes to required lengths.

Education Requirements
Pipelayers typically have at least a high school diploma or the equivalent plus short-term on-the-job training.

Basic Work Requirements
Pipelayers are required to:
- Wear common protective/safety equipment
- Work outdoors, exposed to all weather conditions
- Participate in face-to-face discussions with individuals or a team
- Be exposed to distracting/uncomfortable noise levels
- Be in contact with others through face-to-face conversations, by telephone, or otherwise

Top Competencies

<table>
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<td>Public Safety and Security</td>
<td>Quality Control Analysis</td>
<td>Arm-Hand Steadiness</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Critical Thinking</td>
<td>Manual Dexterity</td>
</tr>
</tbody>
</table>

Current Employment:
- 996 Regional Jobs
- 46,315 National Jobs

Projected Regional Growth (2013-2018): 14.3%

Entry Wages: $13.50 - $16.00 per hour

Experienced Wages: $20.00 - $24.50 per hour

Short-term On-the-Job Training Required
PLUMBERS, PIPEFITTERS, AND STEAMFITTERS

SOC Code: 47-2152

Alternate Titles
Drain Technician
Plumber Gasfitter
Plumbing and Heating Mechanic
Welder
Sprinkler Fitter
Machine Repairman
Journeyman Pipe Fitter
Millwright
Pipe Welder

Career Connections

Plumbers, Pipefitters and Steamfitters assemble, install, and repair pipelines or pipe systems that carry water, steam, air, or other liquids or gases. They may install heating and cooling equipment and mechanical control systems. Tasks Plumbers, Pipefitters and Steamfitters are responsible for include, but are not limited to:

- Plan pipe system layout, installation, or repair, according to specifications.
- Inspect, examine, or test installed systems or pipe lines, using pressure gauge, hydrostatic testing, observation, or other methods.
- Measure, cut, thread, or bend pipe using hand or power tools or machines.
- Study plans and inspect structures to assess needs and plan installation around obstructions.

Education Requirements
Plumbers, Pipefitters and Steamfitters typically have at least a high school diploma or the equivalent plus long-term on-the-job training.

Basic Work Requirements
Plumbers, Pipefitters and Steamfitters are required to:

- Participate in face-to-face discussions with individuals or a team
- Spend time using one’s hands to control/handle tools
- Utilize the telephone
- Be in contact with others through face-to-face conversations, by telephone, or otherwise
- Frequently make decisions

Top Competencies

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<td>English Language</td>
<td>Coordination</td>
<td>Finger Dexterity</td>
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<tr>
<td>Mathematics</td>
<td>Time Management</td>
<td>Multi-limb Coordination</td>
</tr>
<tr>
<td>Design</td>
<td>Operation</td>
<td>Near Vision</td>
</tr>
</tbody>
</table>

Current Employment:
9,296 Regional Jobs
359,542 National Jobs

Projected Regional Growth (2013-2018)
8.5%

Entry Wages:
$15.00 - $18.00 per hour

Experienced Wages:
$23.50 - $29.50 per hour

Long-term On-the-Job Training Required

Military Connections
Plumbers, Pipefitters and Steamfitters are similar to the following military occupational classifications:

- Air Force: N/A
- Army: 12K
- Coast Guard: N/A
- Marine Corps: 1171
- Navy: 4952, 4999, 6199, HT, UT

Industry Connections
Other industries that employ this occupation include:

- Plumbing, Heating, and Air-Conditioning Contractors
- Commercial and Institutional Building Construction
- Local Government
Construction and Building Inspectors

Alternate Titles
Engineering Technician
Engineer
Associate Architect
Plumbing Inspector
Building Code Administrator
Building Mechanical Engineer
Building Official

Career Connections

Military Connections
Construction and Building Inspectors are similar to the following military occupational classifications:
- Air Force: N/A
- Army: N/A
- Coast Guard: N/A
- Marine Corps: N/A
- Navy: 5501, 6001

Industry Connections
Other industries that employ this occupation include:
- Local and State Government
- Engineering Services
- Architectural Services
- Testing Laboratories

Construction and Building Inspectors examine structures using engineering skills to determine structural soundness and compliance with specifications, building codes, and other regulations. Inspections may be general in nature or may be limited to a specific area, such as electrical systems or plumbing. Tasks Construction and Building Inspectors are responsible for include, but are not limited to:
- Issue violations and stop-work orders, conferring with violators to recommend rectifications.
- Inspect highways, buildings, wiring, plumbing, electrical circuits, sewers, or foundations for structural quality, general safety, or conformance to codes.
- Approve plans that meet required specifications.
- Review plans, site layouts or construction methods to ensure compliance to legal and safety requirements.

Education Requirements
Construction and Building Inspectors typically have at least a high school diploma or the equivalent as well as work experience in a related occupation.

Basic Work Requirements
Construction and Building Inspectors are required to:
- Utilize the telephone
- Utilize electronic mail
- Participate in face-to-face discussions with individuals or a team
- Exercise the freedom to make decisions
- Work outdoors, exposed to all weather conditions

Top Competencies

<table>
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<td>Engineering and Technology</td>
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<td>Public Safety and Security</td>
<td>Judgment and Decision Making</td>
<td>Near Vision</td>
</tr>
</tbody>
</table>

Current Employment:
3,158 Regional Jobs
90,636 National Jobs

Projected Regional Growth (2013-2018):
3.7%

Entry Wages:
$15.00 - $18.00 per hour

Experienced Wages:
$22.50 - $26.50 per hour

Work Experience in a Related Occupation Required
EXTRACTION OCCUPATIONS
Extraction Occupations: Real-time Snap Shot

Occupational profiles follow for six (6) Extraction occupations. Between the two-year period of January 1, 2011 and December 31, 2012, there were a total of 212 online job postings for these occupations in the region. Real-time occupational data examined from these online job postings provides insight into the certifications, technical and specialized skills and hiring needs of employers in the Oil and Natural Gas Industry. Real-time information is included below for the following occupations:

- Derrick Operators, Oil and Gas
- Rotary Drill Operators
- Service Unit Operators, Oil, Gas, and Mining
- Earth Drillers
- Roustabouts, Oil and Gas
- Helpers - Extraction Workers

The chart to the right depicts the companies with the most Extraction job postings in the region during the period of January 1, 2011 through December 31, 2013. As the postings show, there are job opportunities from energy companies and services companies and contractors.

In analyzing these actual job postings, information about the specific skills and certifications sought by employers emerges. For example, the job postings often list specific certifications sought by employers for these positions as well as the technical and foundational skills they look for in successful candidates.

Top Skills in Demand by Employers

<table>
<thead>
<tr>
<th>SPECIALIZED AND TECHNICAL SKILLS</th>
<th>FOUNDATIONAL SKILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Repair</td>
<td>2. Management</td>
</tr>
<tr>
<td>3. Technical Training</td>
<td>3. Quality Assurance and Control</td>
</tr>
<tr>
<td>4. Legal Compliance</td>
<td>4. Writing</td>
</tr>
<tr>
<td>5. Energy Services</td>
<td>5. Communication Skills</td>
</tr>
<tr>
<td>6. First Aid</td>
<td>6. Teaching</td>
</tr>
<tr>
<td>7. Expense Reports</td>
<td>7. Research</td>
</tr>
<tr>
<td>8. Training Programs</td>
<td>8. Problem Solving</td>
</tr>
<tr>
<td>10. Pressure Gauges</td>
<td>10. Supervisory Skills</td>
</tr>
</tbody>
</table>

Top Certifications in Demand

- Commercial Driver's License
- Air Brake Certified
- CDL Class B
- Contractor’s License
- Hazardous Materials Certification
DERRICK OPERATORS
SOC Code: 47-5011

Alternate Titles
Derrick Hand
Derrick Man
Floor Hand
Derrick Worker

Career Connections

Education Requirements
Derrick Operators typically have at least a high school diploma or the equivalent plus short-term on-the-job training.

Basic Work Requirements
Derrick Operators are required to:
- Be exposed to contaminants
- Work outdoors, exposed to all weather conditions
- Wear common protective/safety equipment
- Typically work a high number of hours in one week
- Be exposed to distracting/uncomfortable noise levels

Top Competencies

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<td>Critical Thinking</td>
<td>Reaction Time</td>
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<td>Education and Training</td>
<td>Repairing</td>
<td>Manual Dexterity</td>
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<tr>
<td>Public Safety and Security</td>
<td>Monitoring</td>
<td>Arm-Hand Steadiness</td>
</tr>
</tbody>
</table>

Current Employment:
- 865 Regional Jobs
- 24,813 National Jobs
40.7% Projected Regional Growth (2013-2018)

Entry Wages: $17.50 - $20.00 per hour
Experienced Wages: $22.00 - $25.50 per hour

Short-term On-the-Job Training Required

Derrick Operators rig derrick equipment and operate pumps to circulate mud through drill hole. Tasks Derrick Operators are responsible for include, but are not limited to:
- Inspect derricks, or order their inspection, prior to being raised or lowered.
- Inspect derricks for flaws, and clean and oil derricks in order to maintain proper working conditions.
- Control the viscosity and weight of the drilling fluid.
- Repair pumps, mud tanks, and related equipment.

Derrick Operators are responsible for include, but are not limited to:
- Inspect derricks, or order their inspection, prior to being raised or lowered.
- Inspect derricks for flaws, and clean and oil derricks in order to maintain proper working conditions.
- Control the viscosity and weight of the drilling fluid.
- Repair pumps, mud tanks, and related equipment.
ROTARY DRILL OPERATORS
SOC Code: 47-5012

Alternate Titles
Driller
Tool Pusher
Daylight Driller
Drill Foreman
Drill Operator
Drilling Rig Operator
Motor Man
Oil Rig Driller
Oil Well Driller
Relief Driller

Career Connections

Education Requirements
Rotary Operators set up or operate a variety of drills to remove underground oil and gas, or remove core samples for testing during oil and gas exploration. Tasks Rotary Operators are responsible for include, but are not limited to:

- Train crews, and introduce procedures to make drill work more safe and effective.
- Observe pressure gauge and move throttles and levers in order to control the speed of rotary tables, and to regulate pressure of tools at bottoms of boreholes.
- Count sections of drill rod in order to determine depths of boreholes.
- Push levers and brake pedals in order to control gasoline, diesel, electric, or steam draw works that lower and raise drill pipes and casings in and out of wells.

Basic Work Requirements
Rotary Operators are required to:

- Wear common protective/safety equipment
- Typically work a high number of hours in one week
- Participate in face-to-face discussions with individuals or a team
- Work outdoors, exposed to all weather conditions
- Be exposed to distracting/uncomfortable noise levels

Top Competencies

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<td>Education and Training</td>
<td>Monitoring</td>
<td>Multi-limb Coordination</td>
</tr>
<tr>
<td>Personnel and Human Resources</td>
<td>Instructing</td>
<td>Manual Dexterity</td>
</tr>
</tbody>
</table>

Current Employment:
1,271 Regional Jobs
26,061 National Jobs

Projected Regional Growth (2013-2018)
29.5%

Entry Wages: 
$13.00 - $15.00 per hour

Experienced Wages:
$19.00 - $25.00 per hour

Alternate Titles
Driller
Tool Pusher
Daylight Driller
Drill Foreman
Drill Operator
Drilling Rig Operator
Motor Man
Oil Rig Driller
Oil Well Driller
Relief Driller

Career Connections

Military Connections
Rotary Operators are similar to the following military occupational classifications:
- Air Force: N/A
- Army: N/A
- Coast Guard: N/A
- Marine Corps: N/A
- Navy: N/A

Industry Connections
Other industries that employ this occupation include:
- Support Activities for Oil and Gas Operations
- Support Activities for Coal Mining
- Support Activities for Nonmetallic Minerals (except Fuels) Mining
SERVICE UNIT OPERATORS
SOC Code: 47-5013

Alternate Titles
Rig Operator
Pulling Unit Operator
Service Rig Operator
Fishing Tool Supervisor
Service Operator
Reverse Unit Operator-Fisherman
Tool Pusher
Well Servicing Rig Operator
Wireline Operator
Work Over Rig Operator

Career Connections

Military Connections
Service Unit Operators are similar to the following military occupational classifications:
- Air Force: N/A
- Army: N/A
- Coast Guard: N/A
- Marine Corps: N/A
- Navy: N/A

Industry Connections
Other industries that employ this occupation include:
- Support Activities for Oil and Gas Operations
- Support Activities for Coal Mining

Service Unit Operators utilize equipment to increase oil flow from producing wells or to remove stuck pipe, casing, tools, or other obstructions from drilling wells. They may also perform similar services in mining exploration operations.

Tasks Service Unit Operators are responsible for include, but are not limited to:
- Observe load variations on strain gauges, mud pumps, and motor pressure indicators; and listen to engines, rotary chains, and other equipment in order to detect faulty operations or unusual well conditions.
- Confer with others to gather information regarding pipe or tool sizes or borehole conditions in wells.
- Drive truck-mounted units to well sites.
- Install pressure-control devices onto wellheads.

Education Requirements
Service Unit Operators typically have at least a high school diploma or the equivalent plus moderate-term on-the-job training.

Basic Work Requirements
Service Unit Operators are required to:
- Work outdoors, exposed to all weather conditions
- Wear common protective/safety equipment
- Participate in face-to-face discussions with individuals or a team
- Typically work a high number of hours in one week
- Work with a group or team

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical</td>
<td>Operation</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td></td>
<td>Monitoring</td>
<td></td>
</tr>
<tr>
<td>Customer and</td>
<td>Critical Thinking</td>
<td>Control Precision</td>
</tr>
<tr>
<td>Personal Service</td>
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</tr>
<tr>
<td>English Language</td>
<td>Monitoring</td>
<td>Multi-limb</td>
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<td></td>
<td></td>
<td>Coordination</td>
</tr>
<tr>
<td>Public Safety and</td>
<td>Operation and</td>
<td>Arm-Hand</td>
</tr>
<tr>
<td>Security</td>
<td>Control</td>
<td>Steadiness</td>
</tr>
<tr>
<td>Transportation</td>
<td>Active Listening</td>
<td>Depth Perception</td>
</tr>
</tbody>
</table>
Earth Drillers operate a variety of drills such as rotary, churn, and pneumatic to tap sub-surface water and salt deposits, to remove core samples during mineral exploration or soil testing, and to facilitate the use of explosives in mining or construction. They may use explosives and includes horizontal and earth boring machine operators. Tasks Earth Drillers are responsible for include, but are not limited to:

- Regulate air pressure, rotary speed, and downward pressure, according to the type of rock or concrete being drilled.
- Verify depths and alignments of boring positions.
- Monitor drilling operations, checking gauges and listening to equipment to determine the need to adjust drilling or alter equipment.
- Start, stop, and control drilling speed of machines and insertion of casings into holes.

**Education Requirements**
Earth Drillers typically have at least a high school diploma or the equivalent plus moderate-term on-the-job training.

**Basic Work Requirements**
Earth Drillers are required to:

- Typically work a high number of hours in one week
- Exercise the freedom to make decisions
- Work outdoors, exposed to all weather conditions
- Spend time using one’s hands to control/handle tools
- Work in a structured role, rather than individually determine tasks, priorities, and goals

**Top Competencies**

<table>
<thead>
<tr>
<th>Knowledge</th>
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<tr>
<td>Public Safety and</td>
<td>Operation and Control</td>
<td>Multi-limb Coordination</td>
</tr>
<tr>
<td>Security</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration and</td>
<td>Monitoring</td>
<td>Manual Dexterity</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>Equipment Maintenance</td>
<td>Reaction Time</td>
</tr>
<tr>
<td>Building and</td>
<td>Quality Control</td>
<td>Arm-Hand Steadiness</td>
</tr>
<tr>
<td>Construction</td>
<td>Analysis</td>
<td></td>
</tr>
</tbody>
</table>

**Alternate Titles**
Driller  
Blaster  
Blast Hole Driller  
Drill Operator  
Well Driller  
Blasting Production Technician  
Hard Rock Drill Operator  
Highwall Drill Operator  
Overburden Drill Operator  
Rock Drill Operator

**Career Connections**

**Military Connections**
Earth Drillers are similar to the following military occupational classifications:
- **Air Force:** N/A
- **Army:** N/A
- **Coast Guard:** N/A
- **Marine Corps:** N/A
- **Navy:** 5707

**Industry Connections**
Other industries that employ this occupation include:
- Support Activities for Oil and Gas Operations
- Bituminous Coal Underground Mining
- Water and Sewer Line and Related Structures
- Construction

**Entry Wages:**
$12.50 - $14.00 per hour

**Experienced Wages:**
$17.00 - $20.50 per hour

**Projected Regional Growth (2013-2018):**
12.2%

**Current Employment:**
887 Regional Jobs  
18,809 National Jobs

**Moderate-term On-the-Job Training Required**
ROUSTABOUTS
SOC Code: 47-5071

Alternate Titles
Roustabout Pusher
Roustabout Hand
Floor Hand
Oil Field Roustabout
Rig Hand
Roustabout Crew Leader
Roustabout Crew Pusher
Production Roustabout
Galley Hand

Career Connections

Education Requirements
Roustabouts typically have at least a high school diploma or the equivalent plus moderate-term on-the-job training.

Basic Work Requirements
Roustabouts are required to:
• Work outdoors, exposed to all weather conditions
• Wear common protective/safety equipment
• Participate in face-to-face discussions with individuals or a team
• Spend time using one’s hands to control/handle tools
• Typically work a high number of hours in one week

Top Competencies

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<thead>
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<td>Mathematics</td>
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<td>Problem Sensitivity</td>
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<tr>
<td>English Language</td>
<td>Quality Control Analysis</td>
<td>Near Vision</td>
</tr>
<tr>
<td>Building and Construction</td>
<td>Operation Monitoring</td>
<td>Control Precision</td>
</tr>
</tbody>
</table>

Current Employment:
2,191 Regional Jobs
64,200 National Jobs

33.3%
Projected Regional Growth
(2013-2018)

Entry Wages:
$10.00 - $11.50 per hour

Experienced Wages:
$14.00 - $19.00 per hour

Alternate Titles
Roustabout Pusher
Roustabout Hand
Floor Hand
Oil Field Roustabout
Rig Hand
Roustabout Crew Leader
Roustabout Crew Pusher
Production Roustabout
Galley Hand

Career Connections

Military Connections
Roustabouts are similar to the following military occupational classifications:
• Air Force: N/A
• Army: N/A
• Coast Guard: N/A
• Marine Corps: N/A
• Navy: N/A

Industry Connections
Other industries that employ this occupation include:
• Support Activities for Oil and Gas Operations
• Support Activities for Coal Mining

Roustabouts assemble or repair oil field equipment using hand and power tools. They also perform other tasks as needed. Tasks Roustabouts are responsible for include, but are not limited to:
• Keep pipe deck and main deck areas clean and tidy.
• Unscrew or tighten pipes, casing, tubing, and pump rods, using hand and power wrenches and tongs.
• Walk flow lines to locate leaks, using electronic detectors and by making visual inspections, and repair the leaks.
• Move pipes to and from trucks, using truck winches and motorized lifts, or by hand.

Roustabouts are responsible for include, but are not limited to:
• Keep pipe deck and main deck areas clean and tidy.
• Unscrew or tighten pipes, casing, tubing, and pump rods, using hand and power wrenches and tongs.
• Walk flow lines to locate leaks, using electronic detectors and by making visual inspections, and repair the leaks.
• Move pipes to and from trucks, using truck winches and motorized lifts, or by hand.

Education Requirements
Roustabouts typically have at least a high school diploma or the equivalent plus moderate-term on-the-job training.

Basic Work Requirements
Roustabouts are required to:
• Work outdoors, exposed to all weather conditions
• Wear common protective/safety equipment
• Participate in face-to-face discussions with individuals or a team
• Spend time using one’s hands to control/handle tools
• Typically work a high number of hours in one week

Top Competencies

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</tr>
</tbody>
</table>
HELPERS – EXTRACTION WORKERS
SOC Code: 47-5081

Alternate Titles
Driller Helper
Coal Miner
Maintainer
Blasting Helper
Continuous Miner Operator Helper
Longwall Machine Operator Helper
Mining Technician
Salt Miner
Underground Miner

Career Connections

Military Connections
Extraction Worker Helpers are similar to the following military occupational classifications:
- Air Force: N/A
- Army: N/A
- Coast Guard: N/A
- Marine Corps: N/A
- Navy: N/A

Industry Connections
Other industries that employ this occupation include:
- Support Activities for Oil and Gas Operations
- Bituminous Coal Underground Mining
- Bituminous Coal and Lignite Surface Mining

Extraction Worker Helpers help extraction craft workers, such as earth drillers, blasters and explosives workers, derrick operators, and mining machine operators, by performing duties requiring less skill. They perform duties that include supplying equipment or cleaning work area. Tasks Extraction Worker Helpers are responsible for include, but are not limited to:
- Repair and maintain automotive and drilling equipment, using hand tools.
- Observe and monitor equipment operation during the extraction process in order to detect any problems.
- Drive moving equipment in order to transport materials and parts to excavation sites.
- Clean up work areas and remove debris after extraction activities are complete.

Education Requirements
Extraction Worker Helpers typically have at least a high school diploma or the equivalent plus short-term on-the-job training.

Basic Work Requirements
Extraction Worker Helpers are required to:
- Wear common protective/safety equipment
- Spend time using one’s hands to control/handle tools
- Be exposed to hazardous equipment
- Participate in face-to-face discussions with individuals or a team
- Be exposed to distracting/uncomfortable noise levels

Top Competencies

<table>
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<tr>
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<th>Skills</th>
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<tr>
<td>Law and Government</td>
<td>Operation Monitoring</td>
<td>Multi-limb Coordination</td>
</tr>
<tr>
<td>Public Safety and Security</td>
<td>Monitoring</td>
<td>Far Vision</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Repairing</td>
<td>Near Vision</td>
</tr>
<tr>
<td>Education and Training</td>
<td>Equipment Maintenance</td>
<td>Manual Dexterity</td>
</tr>
<tr>
<td>Production and Processing</td>
<td>Operation and Control</td>
<td>Problem Sensitivity</td>
</tr>
</tbody>
</table>

Current Employment:
1,972 Regional Jobs
28,391 National Jobs

14.8%
Projected Regional Growth (2013-2018)

Entry Wages:
$11.00 - $12.00 per hour

Experienced Wages:
$14.00 - $18.50 per hour

Short-term On-the-Job Training Required
INSTALLATION, MAINTENANCE AND REPAIR OCCUPATIONS
Installation, Maintenance and Repair Occupations: Real-time Snap Shot

Occupational profiles follow for six (6) Installation, Maintenance and Repair occupations. Between the two-year period of January 1, 2011 and December 31, 2012, there were 442 online job postings for these occupations in the region. Real-time occupational data examined from the online job postings provides insight into the certifications, technical and specialized skills and hiring needs of employers in the Oil and Natural Gas Industry. Real-time information is included below for the following occupations:

- Mobile Heavy Equipment Mechanics
- Industrial Machinery Mechanics
- Electrical Power-Line Installers and Repairers
- Telecommunications Line Installers
- Maintenance and Repair Workers, General
- Helpers of Installation, Maintenance and Repair Workers

The chart to the right depicts the companies with the most Installation, Maintenance and Repair job postings in the region during the period of January 1, 2011 through December 31, 2013. As the postings show, there are job opportunities from energy companies and services companies and contractors.

In analyzing these actual job postings, information about the specific skills and certifications sought by employers emerges. For example, the job postings often list specific certifications sought by employers for these positions as well as the technical and foundational skills they look for in successful candidates.

### Top Skills in Demand by Employers

<table>
<thead>
<tr>
<th>SPECIALIZED AND TECHNICAL SKILLS</th>
<th>FOUNDATIONAL SKILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Electrical Repair</td>
<td>1. Communication Skills</td>
</tr>
<tr>
<td>2. Inspection</td>
<td>2. Troubleshooting</td>
</tr>
<tr>
<td>3. Pollution Reduction, Removal, and Remediation</td>
<td>3. Preventative Maintenance</td>
</tr>
<tr>
<td>5. Welding</td>
<td>5. Planning</td>
</tr>
<tr>
<td>7. Power Tools</td>
<td>7. Microsoft Office</td>
</tr>
<tr>
<td>10. SAP</td>
<td>10. Quality Assurance and Control</td>
</tr>
</tbody>
</table>

### Top Certifications in Demand

- American Society of Mechanical Engineers (ASME) Certified
- CDL Class A
- CDL Class C
- Project Management Certification (e.g. PMP)
- Electrician Certification
MOBILE HEAVY EQUIPMENT MECHANICS

SOC Code: 49-3042

Mobile Heavy Equipment Mechanics diagnose, adjust, repair, or overhaul mobile mechanical, hydraulic, and pneumatic equipment, such as cranes, bulldozers, graders, and conveyors, used in construction, logging, and surface mining. Tasks Mobile Heavy Equipment Mechanics are responsible for include, but are not limited to:

- Repair and replace damaged or worn parts.
- Dismantle and reassemble heavy equipment using hoists and hand tools.
- Operate and inspect machines or heavy equipment to diagnose defects.
- Test mechanical products and equipment after repair or assembly to ensure proper performance and compliance with manufacturers' specifications.

**Education Requirements**
Mobile Heavy Equipment Mechanics typically have at least a high school diploma or the equivalent plus long-term on-the-job training.

**Basic Work Requirements**
Mobile Heavy Equipment Mechanics are required to:
- Spend time using one’s hands to control/handle tools
- Potentially be exposed to contaminants
- Wear common protective/safety equipment
- Work in a cramped space or awkward positions
- Potentially be exposed to hazardous equipment

**Top Competencies**

<table>
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<tr>
<td>Customer and Personal Service</td>
<td>Repairing</td>
<td>Manual Dexterity</td>
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<tr>
<td>Computers and Electronics</td>
<td>Equipment Maintenance</td>
<td>Multi-limb Coordination</td>
</tr>
<tr>
<td>Engineering and Technology</td>
<td>Operation Monitoring</td>
<td>Finger Dexterity</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Quality Control Analysis</td>
<td>Near Vision</td>
</tr>
</tbody>
</table>

**Alternate Titles**

- Field Service Technician
- Field Mechanic
- Equipment Technician
- Construction Equipment Mechanic
- Heavy Equipment Technician
- Diesel Mechanic

**Career Connections**

**Military Connections**
Mobile Heavy Equipment Mechanics are similar to the following military occupational classifications:

- **Air Force:** 2T312A, 2T312C, 2T332A, 2T351, 2T352A, 2T352C
- **Coast Guard:** 711, 713
- **Marine Corps:** 6072
- **Navy:** A130, A133, 4541, 5899, 7603, 7607, 7618, ABE, CM, MM-ELT, MME, MMW, SB

**Industry Connections**

Other industries that employ this occupation include:
- Bituminous Coal
- Underground Mining
- Industrial Machinery and Equipment Wholesalers
- Local Government

**Current Employment:**
- 3,853 Regional Jobs
- 119,396 National Jobs

**Projected Regional Growth:**
10.1% (2013-2018)

**Entry Wages:**
$14.00 - $16.50 per hour

**Experienced Wages:**
$20.50 - $24.50 per hour

**Long-term On-the-Job Training Required**
INDUSTRIAL MACHINERY MECHANICS
SOC Code: 49-9041

Alternate Titles
Maintenance Mechanic
Maintenance Technician
Master Mechanic
Machine Adjuster
Overhauler
Industrial Electrician
Industrial Mechanic

Career Connections
Military Connections
Industrial Machinery Mechanics are similar to the following military occupational classifications:
- Air Force: 3E412, 3E432, 3E452
- Army: 91J
- Coast Guard: N/A
- Marine Corps: N/A
- Navy: 4140, 4143, 4231, 4233, 4234, 4253, 4283, 4291, 4308, 4314, 4324, 4355, 4366, 4509, 7022, 7601, 7606, 7612, 7614, 7616, 7617, 9594, ABE, MM-ELT, MME, MMW

Industry Connections
Other industries that employ this occupation include:
- Iron and Steel Mills
- Industrial Machinery and Equipment Wholesalers
- Plastics Product Manufacturing

Industrial Machinery Mechanics repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems. Tasks Industrial Machinery Mechanics are responsible for include, but are not limited to:
- Disassemble machinery or equipment to remove parts and make repairs.
- Repair or replace broken or malfunctioning components of machinery or equipment.
- Repair or maintain the operating condition of industrial production or processing machinery or equipment.
- Examine parts for defects, such as breakage or excessive wear.

Education Requirements
Industrial Machinery Mechanics typically have at least a high school diploma or the equivalent plus long-term on-the-job training.

Basic Work Requirements
Industrial Machinery Mechanics are required to:
- Wear common protective/safety equipment
- Participate in face-to-face discussions with individuals or a team
- Potentially be exposed to hazardous equipment
- Typically work a high number of hours in one week
- Potentially be exposed to contaminants

Top Competencies

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<tr>
<td>Engineering and Technology</td>
<td>Operation Monitoring</td>
<td>Manual Dexterity</td>
</tr>
<tr>
<td>Design</td>
<td>Troubleshooting</td>
<td>Finger Dexterity</td>
</tr>
<tr>
<td>English Language</td>
<td>Quality Control Analysis</td>
<td>Near Vision</td>
</tr>
</tbody>
</table>

Current Employment:
11,797 Regional Jobs
319,541 National Jobs

Projected Regional Growth (2013-2018)
7.8%

Entry Wages:
$14.50 - $17.50 per hour

Experienced Wages:
$21.00 - $25.50 per hour

Long-term On-the-Job Training Required
ELECTRICAL POWER-LINE INSTALLERS AND REPAIRERS
SOC Code: 49-9051

Alternate Titles
A Class Lineman
Apprentice Lineman Third Step
Class A Lineman
Electric Lineman
Electrical Lineworker
Journeyman Lineman
Lineman
Lineworker
Power Lineman

Career Connections

Military Connections
Electrical Power-line Installers and Repairers are similar to the following military occupational classifications:

Air Force: 3D117, 3D137, 3D157, 3D177
Army: 12Q
Coast Guard: N/A
Marine Corps: N/A
Navy: 14RO, 5644, 5699, CE

Industry Connections
Other industries that employ this occupation include:
Electric Power Distribution
Fossil Fuel Electric Power Distribution
Power and Communication Line Construction
Local Government

Electrical Power-line Installers and Repairers install or repair cables or wires used in electrical power or distribution systems. They may erect poles and light or heavy duty transmission towers. Tasks Electrical Power-line Installers and Repairers are responsible for include, but are not limited to:

- Adhere to safety practices and procedures, such as checking equipment regularly and erecting barriers.
- Test conductors to identify corresponding conductors and to prevent incorrect connections.
- Open switches or attach grounding devices to remove electrical hazards from disturbed or fallen lines or to facilitate repairs.
- Climb poles or use truck-mounted buckets to access equipment.

Education Requirements
Electrical Power-line Installers and Repairers typically have at least a high school diploma or the equivalent plus long-term on-the-job training.

Basic Work Requirements
Electrical Power-line Installers and Repairers are required to:

- Participate in face-to-face discussions with individuals or a team
- Wear common protective/safety equipment
- Work outdoors, exposed to all weather conditions
- Frequently make decisions
- Be responsible for others' health and safety

Top Competencies

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</tr>
</thead>
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<td>Near Vision</td>
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<tr>
<td>Customer and Personal Service</td>
<td>Monitoring</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>Physics</td>
<td>Operation Monitoring</td>
<td>Multi-limb Coordination</td>
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<tr>
<td>Mathematics</td>
<td>Critical Thinking</td>
<td>Arm-Hand steadiness</td>
</tr>
<tr>
<td>English Language</td>
<td>Troubleshooting</td>
<td>Oral Comprehension</td>
</tr>
</tbody>
</table>

Current Employment:
3,225 Regional Jobs
108,743 National Jobs

Projected Regional Growth (2013-2018): 1.4%

Entry Wages:
$18.50 - $23.00 per hour

Experienced Wages:
$28.50 - $33.00 per hour

Long-term On-the-Job Training Required
**TELECOMMUNICATIONS LINE INSTALLERS**

SOC Code: 49-9052

### Alternate Titles
- Combination Technician
- Service Technician
- Installation and Repair Technician (I & R Technician)
- Cable Splicer
- Cable Technician
- Installer
- Outside Plant Technician
- Lineman

### Career Connections

#### Military Connections
Telecommunications Line Installers are similar to the following military occupational classifications:
- **Air Force:** N/A
- **Army:** 25L, 25U, 31L, 31U, 36C
- **Coast Guard:** 281
- **Marine Corps:** 0600, 0612, 0613
- **Navy:** N/A

#### Industry Connections
Other industries that employ this occupation include:
- Wired Telecommunications Carriers
- Electrical Contractors and Other Wiring Installation Contractors
- Power and Communication Line Construction

Telecommunications Line Installers install and repair telecommunications cable, including fiber optics. Tasks Telecommunications Line Installers are responsible for include, but are not limited to:
- Travel to customers' premises to install, maintain, or repair audio and visual electronic reception equipment or accessories.
- Inspect or test lines or cables, recording and analyzing test results, to assess transmission characteristics and locate faults or malfunctions.
- Splice cables, using hand tools, epoxy, or mechanical equipment.
- Measure signal strength at utility poles, using electronic test equipment.

### Education Requirements
Telecommunications Line Installers typically have at least a high school diploma or the equivalent plus moderate-term on-the-job training.

### Basic Work Requirements
Telecommunications Line Installers are required to:
- Participate in face-to-face discussions with individuals or a team
- Work outdoors, exposed to all weather conditions
- Work in an enclosed vehicle or equipment
- Wear common protective/safety equipment
- Spend time using one’s hands to control/handle tools

### Top Competencies

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<tr>
<td>Telecommunications</td>
<td>Troubleshooting</td>
<td>Oral Comprehension</td>
</tr>
<tr>
<td>Customer and Personal Service</td>
<td>Operation Monitoring</td>
<td>Oral Expression</td>
</tr>
<tr>
<td>Computers and Electronics</td>
<td>Active Listening</td>
<td>Extent Flexibility</td>
</tr>
<tr>
<td>English Language</td>
<td>Operation and Control</td>
<td>Near Vision</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Critical Thinking</td>
<td>Multi-limb Coordination</td>
</tr>
</tbody>
</table>

Current Employment:
- **3,523 Regional Jobs**
- **149,224 National Jobs**

Projected Regional Growth (2013-2018)
- **-6.2%**

Entry Wages:
- **$13.00 - $18.50 per hour**

Experienced Wages:
- **$26.00 - $31.00 per hour**

Long-term On-the-Job Training Required
GENERAL MAINTENANCE AND REPAIR WORKERS
SOC Code: 49-9071

Alternate Titles
Maintenance Technician
Maintenance Mechanic
Maintenance Electrician
Process Technician
Equipment Engineering Technician
Building Mechanic
Facilities Technician

General Maintenance and Repair Workers perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Tasks General Maintenance and Repair Workers are responsible for include, but are not limited to:
- Use tools ranging from common hand and power tools, to precision measuring instruments and electrical and electronic testing devices.
- Perform routine maintenance so machines continue to run smoothly or building systems operate efficiently.
- Inspect, operate, or test machinery or equipment to diagnose machine malfunctions.
- Diagnose mechanical problems and determine how to correct them.

Education Requirements
General Maintenance and Repair Workers typically have at least a high school diploma or the equivalent plus moderate-term on-the-job training.

Basic Work Requirements
General Maintenance and Repair Workers are required to:
- Spend time using one’s hands to control/handle tools
- Wear common protective/safety equipment
- Be in contact with others through face-to-face conversations, by telephone, or otherwise
- Spend time standing
- Exercise the freedom to make decisions

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical</td>
<td>Repairing</td>
<td>Information</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ordering</td>
</tr>
<tr>
<td>Customer and</td>
<td>Equipment</td>
<td>Manual Dexterity</td>
</tr>
<tr>
<td>Personal Service</td>
<td>Maintenance</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Building and</td>
<td>Troubleshooting</td>
<td>Arm-Hand</td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td>Steadiness</td>
</tr>
<tr>
<td>Public Safety and</td>
<td>Critical</td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td>Thinking</td>
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<td></td>
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<td>Near Vision</td>
</tr>
<tr>
<td>English Language</td>
<td>Reading</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td></td>
<td>Comprehension</td>
<td></td>
</tr>
</tbody>
</table>

Alternate Titles
Maintenance Technician
Maintenance Mechanic
Maintenance Electrician
Process Technician
Equipment Engineering Technician
Building Mechanic
Facilities Technician

Career Connections
Military Connections
General Maintenance and Repair Workers are similar to the following military occupational classifications:
- Air Force: 2W011, 2W031, 2W051, 2W071, 2W111, 2W131, 2W151, 2W171, 2W211, 2W231, 2W251, 2W271
- Army: 91K
- Coast Guard: N/A
- Marine Corps: 0411, 6531, 6541
- Navy: 41E9, 41M9, 4299, 7399, ABE, GSE, GSM, MM, PR

Industry Connections
Other industries that employ this occupation include:
- Local Government
- Lessors of Residential Buildings and Dwellings
- Iron and Steel Mills

Current Employment:
38,794 Regional Jobs
1,254,758 National Jobs

0.5% Projected Regional Growth (2013-2018)

Entry Wages:
$9.50 - $12.00 per hour

Experienced Wages:
$16.00 - $20.50 per hour
HELPERS – INSTALLATION, MAINTENANCE AND REPAIR WORKERS
SOC Code: 49-9098

Alternate Titles
Building Equipment Operator Helper
Maintenance Helper
Trades Helper
General Maintenance Mechanic
Well Tender
Facilities Maintenance Technician
Mechanic Helper

Career Connections

Military Connections
Installation, Maintenance and Repair Worker Helpers are similar to the following military occupational classifications:
Air Force: N/A
Army: 91F
Coast Guard: N/A
Marine Corps: N/A
Navy: FC, GM, MM-ELT, MME, MMW

Industry Connections
Other industries that employ this occupation include:
New Car Dealers
Plumbing, Heating, and Air-Conditioning Contractors
General Automotive Repair
Local Government

Installation, Maintenance and Repair Worker Helpers assist with maintenance, parts replacement, and repair of vehicles, machinery, and equipment. They furnish tools, materials, and supplies to other workers; clean work areas, machines, and tools; and hold materials or tools for other workers. Tasks Installation, Maintenance and Repair Worker Helpers are responsible for include, but are not limited to:
- Transfer equipment and supplies to work stations.
- Disassemble broken or defective equipment to facilitate repair and reassemble equipment.
- Install or replace machinery, equipment, parts and instruments, using hand or power tools.
- Examine and test machinery, equipment, components, and parts for defects to ensure proper functioning.

Education Requirements
Installation, Maintenance and Repair Worker Helpers typically have at least a high school diploma or the equivalent plus moderate-term on-the-job training.

Basic Work Requirements
Installation, Maintenance and Repair Worker Helpers are required to:
- Participate in face-to-face discussions with individuals or team members
- Spend time using one’s hands to control/handle tools
- Utilize the telephone
- Be in contact with others through face-to-face conversations, by telephone, or otherwise
- Spend time standing

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical</td>
<td>Operation Monitoring</td>
<td>Control Precision</td>
</tr>
<tr>
<td>English Language</td>
<td>Active Listening</td>
<td>Manual Dexterity</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Equipment Maintenance</td>
<td>Near Vision</td>
</tr>
<tr>
<td>Customer and Personal Service</td>
<td>Critical Thinking</td>
<td>Arm-Hand steadiness</td>
</tr>
<tr>
<td>Building and Construction</td>
<td>Repairing</td>
<td>Multi-limb Coordination</td>
</tr>
</tbody>
</table>

Current Employment:
3,199 Regional Jobs
127,629 National Jobs

5.3% Projected Regional Growth (2013-2018)

Entry Wages:
$8.00 - $9.00 per hour

Experienced Wages:
$11.00 - $15.00 per hour

Moderate-term On-the-Job Training Required
PRODUCTION AND TRANSPORTATION OCCUPATIONS
Production Occupations: 
Real-time Snap Shot

Occupational profiles follow for five (5) Production occupations. Between the two-year period of January 1, 2011 and December 31, 2012, there were a total of 99 online job postings for these occupations in the region. Real-time occupational data examined from these online job postings provides insight into the certifications, technical and specialized skills and hiring needs of employers in the Oil and Natural Gas Industry. Real-time information is included below for the following occupations:

- Machinists
- Welders, Cutters, Solderers, and Brazers
- Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic
- Gas Compressor and Gas Pumping Station Operator
- Wellhead Pumpers

The chart to the right depicts the companies with the most Production job postings in the region during the period of January 1, 2011 through December 31, 2013. As the postings show, there are job opportunities from energy companies and services companies and contractors.

In analyzing these actual job postings, information about the specific skills and certifications sought by employers emerges. For example, the job postings often list specific certifications sought by employers for these positions as well as the technical and foundational skills they look for in successful candidates.

### Top Skills in Demand by Employers

<table>
<thead>
<tr>
<th>SPECIALIZED AND TECHNICAL SKILLS</th>
<th>FOUNDATIONAL SKILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Natural Gas: Pollution Reduction, Removal, and Remediation</td>
<td>1. Microsoft Office</td>
</tr>
<tr>
<td>2. Inspection</td>
<td>2. Computer Skills</td>
</tr>
<tr>
<td>3. Information Technologies and Software</td>
<td>3. Troubleshooting</td>
</tr>
<tr>
<td>4. Maintenance Coordination</td>
<td>4. Team Work</td>
</tr>
<tr>
<td>5. Repair</td>
<td>5. Leadership</td>
</tr>
<tr>
<td>7. Surveys</td>
<td>7. Research</td>
</tr>
<tr>
<td>10. Operational Qualification (OQ)</td>
<td>10. Microsoft Windows</td>
</tr>
</tbody>
</table>

### Top Certifications in Demand

- Commercial Driver’s License
- Hazardous Materials Certification
- Certified Overhead Crane Operator
- Basic Safety Training (BST)
- Air Brake Certified
MACHINISTS
SOC Code: 51-4041

Alternate Titles
Gear Machinist
Journeyman Machinist
Machine Operator
Machine Repair Person
Maintenance Machinist
Maintenance Specialist
Production Machinist
Set-Up Machinist
Tool Room Machinist

Career Connections

Educational Requirements
Machinists typically have at least a high school diploma or the equivalent plus long-term on-the-job training.

Basic Work Requirements
Machinists are required to:
- Wear common protective/safety equipment
- Participate in face-to-face discussions with individuals or team members
- Be exact and/or highly accurate
- Potentially be exposed to hazardous equipment
- Spend time using one’s hands to control/handle tools

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>Operation Monitoring</td>
<td>Manual Dexterity</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Operation and Control</td>
<td>Arm-Hand Steadiness</td>
</tr>
<tr>
<td>Production and Processing</td>
<td>Critical Thinking</td>
<td>Control Precision</td>
</tr>
<tr>
<td>English Language</td>
<td>Monitoring</td>
<td>Finger Dexterity</td>
</tr>
<tr>
<td>Design</td>
<td>Reading Comprehension</td>
<td>Near Vision</td>
</tr>
</tbody>
</table>

Current Employment:
16,564 Regional Jobs
392,763 National Jobs

Projected Regional Growth (2013-2018):
0.0%

Entry Wages: $11.50 - $14.50 per hour
Experienced Wages: $17.50 - $21.00 per hour

Long-term On-the-Job Training Required

Machinists set up and operate a variety of machine tools to produce precision parts and instruments. They may fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, mathematics, metal properties, layout, and machining procedures. Tasks Machinists are responsible for include, but are not limited to:
- Calculate dimensions or tolerances, using instruments such as micrometers or vernier calipers.
- Machine parts to specifications, using machine tools, such as lathes, milling machines, shapers, or grinders.
- Set up, adjust, or operate basic or specialized machine tools used to perform precision machining operations.
- Align and secure holding fixtures, cutting tools, attachments, accessories, or materials onto machines.

Military Connections
Machinists are similar to the following military occupational classifications:
- Air Force: 2A711, 2A731, 2A750, 2A771
- Army: 91E
- Coast Guard: N/A
- Marine Corps: 2161
- Navy: 4402, 4499, 4542, MR

Industry Connections
Other industries that employ this occupation include:
- Machine Shops
- Special Die and Tool, Die Set, Jig and Fixture Manufacturing
- Precision Turned Product Manufacturing
- Railroad Rolling Stock Manufacturing

Alternate Titles
Gear Machinist
Journeyman Machinist
Machine Operator
Machine Repair Person
Maintenance Machinist
Maintenance Specialist
Production Machinist
Set-Up Machinist
Tool Room Machinist
WELDERS, CUTTERS, SOLDERERS, AND BRAZERS
SOC Code: 51-4121

Alternate Titles
Mig Welder
Sub Arc Operator
Welder-Fitter
Wirer
Assembly Line Brazer
Connector
Electronic Technician
Production Technician
Electrical Assembler

Career Connections

Military Connections
Welders, Cutters, Solderers and Brazers are similar to the following military occupational classifications:

Air Force: N/A
Army: 44A, 44B, 44C, 91W
Coast Guard: N/A
Marine Corps: 1316, 6043
Navy: 3351, 4955, 6015, 7222

Industry Connections
Other industries that employ this occupation include:
Railroad Rolling Stock Manufacturing
Machine Shops
Sheet Metal Working Manufacturing
Fabricated Structural Metal Manufacturing

Welders, Cutters, Solderers and Brazers use hand-welding, flame-cutting, hand soldering, or brazing equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products. Tasks Welders, Cutters, Solderers and Brazers are responsible for include, but are not limited to:

- Weld components in flat, vertical, or overhead positions.
- Lay out, position, align, and secure parts and assemblies prior to assembly, using straightedges, combination squares, calipers, and rulers.
- Melt and apply solder along adjoining edges of workpieces to solder joints, using soldering irons, gas torches, or electric-ultrasonic equipment.
- Heat soldering irons to specified temperatures for soldering, using gas flames or electric current.

Education Requirements
Welders, Cutters, Solderers and Brazers typically have a post-secondary non-degree award such as an industry certification.

Basic Work Requirements
Welders, Cutters, Solderers and Brazers are required to:

- Be exact and/or highly accurate
- Participate in face-to-face discussions with individuals or a team
- Spend time using one’s hands to control/handle tools
- Wear common protective/safety equipment
- Work with a group or team

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production and Processing</td>
<td>Critical Thinking</td>
<td>Arm-Hand Steadiness</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Monitoring</td>
<td>Near Vision</td>
</tr>
<tr>
<td>English Language</td>
<td>Active Listening</td>
<td>Manual Dexterity</td>
</tr>
<tr>
<td>Administration and Management</td>
<td>Operation Monitoring</td>
<td>Problem Sensitivity</td>
</tr>
<tr>
<td>Design</td>
<td>Quality Control Analysis</td>
<td>Control Precision</td>
</tr>
</tbody>
</table>

Entry Wages: $11.50 - $14.00 per hour
Experienced Wages: $16.50 - $19.50

Post-secondary Non-Degree Award Required

Current Employment:
12,764 Regional Jobs
339,179 National Jobs

3.1% Projected Regional Growth (2013-2018)
PLATING AND COATING MACHINE SETTERS, OPERATORS, AND TENDERS, METAL AND PLASTIC

SOC Code: 51-4193

Alternate Titles
Plater
Line Operator
Coater Operator
Machine Operator
Anodizer
Anodizing Line Operator
Chrome Plater
Coater Associate
Electro Associate
Hard Plater

Career Connections

Plating and Coating Machine Setters, Operators and Tenders are similar to the following military occupational classifications:

- Air Force: N/A
- Army: N/A
- Coast Guard: N/A
- Marine Corps: N/A
- Navy: N/A

Industry Connections

Other industries that employ this occupation include:

- Electroplating, Plating, Polishing, Anodizing, and Coloring
- Metal Coating, Engraving, and Allied Services to Manufacturers
- Metal Heat Treating
- Printed Circuit Assembly Manufacturing

Plating and Coating Machine Setters, Operators and Tenders set up, operate, or tend plating or coating machines to coat metal or plastic products with chromium, zinc, copper, cadmium, nickel, or other metal to protect or decorate surfaces. Includes electrolytic processes. Tasks Plating and Coating Machine Setters, Operators and Tenders are responsible for include, but are not limited to:

- Inspect coated or plated areas for defects such as air bubbles or uneven coverage.
- Immerse objects to be coated or plated into cleaning solutions, or spray objects with conductive solutions to prepare them for plating.
- Immerse work pieces in coating solutions or liquid metal or plastic for specified times.
- Set up, operate, or tend plating or coating machines to coat metal or plastic products with chromium, zinc, copper, cadmium, nickel, or other metal to protect or decorate surfaces.

Education Requirements

Plating and Coating Machine Setters, Operators and Tenders typically have at least a high school diploma or the equivalent plus moderate-term on-the-job training.

Basic Work Requirements

Plating and Coating Machine Setters, Operators and Tenders are required to:

- Wear common protective/safety equipment
- Potentially be exposed to contaminants
- Spend time standing
- Be exposed to distracting/ uncomfortable noise levels
- Spend time using one’s hands to control/handle tools

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
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<tbody>
<tr>
<td>Production and Processing</td>
<td>Operation</td>
<td>Oral</td>
</tr>
<tr>
<td></td>
<td>Monitoring</td>
<td>Comprehension</td>
</tr>
<tr>
<td>Public Safety and Security</td>
<td>Monitoring</td>
<td>Near Vision</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Speaking</td>
<td>Manual Dexterity</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Critical Thinking</td>
<td>Multi-limb Coordination</td>
</tr>
<tr>
<td>Administration and Management</td>
<td>Judgment and Decision Making</td>
<td>Control Precision</td>
</tr>
</tbody>
</table>
Gas Compressor and Gas Pumping Station Operators oversee steam, gas, electric motor, or internal combustion engine driven compressors. They transmit, compress, or recover gases, such as butane, nitrogen, hydrogen, and natural gas. Tasks Gas Compressor and Gas Pumping Station Operator are responsible for include, but are not limited to:

- Monitor meters and pressure gauges to determine consumption rates, temperatures, and pressures.
- Adjust valves and equipment to obtain specified performance.
- Read gas meters, and maintain records of the amounts of gas received and dispensed from holders.
- Operate power-driven pumps that transfer liquids, semi-liquids, gases, or powdered materials.

**Education Requirements**
Gas Compressor and Gas Pumping Station Operator typically have at least a high school diploma or the equivalent plus moderate-term on-the-job training.

**Basic Work Requirements**
Gas Compressor and Gas Pumping Station Operator are required to:

- Wear common protective/safety equipment
- Work outdoors, exposed to all weather conditions
- Be exposed to distracting/uncomfortable noise levels
- Work indoors, not in environmentally controlled conditions
- Potentially be exposed to hazardous conditions

**Top Competencies**

<table>
<thead>
<tr>
<th>Knowledge</th>
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<th>Abilities</th>
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</thead>
<tbody>
<tr>
<td>Mechanical</td>
<td>Operation Monitoring</td>
<td>Problem Sensitivity</td>
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<tr>
<td>Mathematics</td>
<td>Operation and Control</td>
<td>Arm-Hand Steadiness</td>
</tr>
<tr>
<td>Public Safety and Security</td>
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</tr>
<tr>
<td>Production and Processing</td>
<td>Active Listening</td>
<td>Finger Dexterity</td>
</tr>
<tr>
<td>Physics</td>
<td>Equipment Maintenance</td>
<td>Multi-limb Coordination</td>
</tr>
</tbody>
</table>

**Alternate Titles**
- Plant Operator
- Compressor Operator
- Compressor Station Operator
- Field Operator
- Filler
- Liquefied Natural Gas Plant Operator (LNG Plant Operator)
- Pipeline Technician
- Production Technician
- Pipeline Systems Operator
- Terminal Operator

**Career Connections**

**Military Connections**
Gas Compressor and Gas Pumping Station Operator are similar to the following military occupational classifications:
- Air Force: N/A
- Army: N/A
- Coast Guard: N/A
- Marine Corps: N/A
- Navy: MME, MMW

**Industry Connections**
Other industries that employ this occupation include:
- Other Chemical and Allied Product Wholesalers
Wellhead Pumpers operate power pumps and auxiliary equipment to produce flow of oil or gas from wells in oil field. Tasks Wellhead Pumpers are responsible for include, but are not limited to:

- Monitor control panels during pumping operations in order to ensure that materials are being pumped at the correct pressure, density, rate, and concentration.
- Operate engines and pumps in order to shut off wells according to production schedules, and to switch flow of oil into storage tanks.
- Perform routine maintenance on vehicles and equipment.
- Repair gas and oil meters and gauges.

**Education Requirements**
Wellhead Pumpers typically have at least a high school diploma or the equivalent plus moderate-term on-the-job training.

**Basic Work Requirements**
Wellhead Pumpers are required to:

- Work in an enclosed vehicle or equipment
- Work outdoors, exposed to all weather conditions
- Potentially be exposed to contaminants
- Participate in face-to-face discussions with individuals or a team
- Utilize the telephone

**Top Competencies**

<table>
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<td>Repairing</td>
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<td>Processing</td>
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<tr>
<td>Public Safety and</td>
<td>Monitoring</td>
<td>Near Vision</td>
</tr>
<tr>
<td>Security</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English Language</td>
<td>Critical Thinking</td>
<td>Reaction Time</td>
</tr>
</tbody>
</table>
Transportation Occupations: Real-time Snap Shot

Occupational profiles follow for two (2) Transportation occupations. Between the two-year period of January 1, 2011 and December 31, 2012, there were a total of 219 online job postings for these occupations in the region. Real-time occupational data examined from these online job postings provides insight into the certifications, technical and specialized skills and hiring needs of employers in the Oil and Natural Gas Industry. Real-time information is included below for the following occupations:

- Heavy-Truck and Tractor-Trailer Drivers
- Industrial Truck and Tractor Operators

The chart to the right depicts the companies with the most Transportation job postings in the region during the period of January 1, 2011 through December 31, 2013. As the postings show, there are job opportunities from energy companies and services companies and contractors.

In analyzing these actual job postings, information about the specific skills and certifications sought by employers emerges. For example, the job postings often list specific certifications sought by employers for these positions as well as the technical and foundational skills they look for in successful candidates.

### Top Skills in Demand by Employers

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<tr>
<th>SPECIALIZED AND TECHNICAL SKILLS</th>
<th>FOUNDATIONAL SKILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Repair: Automotive</td>
<td>1. Troubleshooting</td>
</tr>
<tr>
<td>2. Hand Tools</td>
<td>2. Self-Starter</td>
</tr>
<tr>
<td>4. Inspection</td>
<td>4. English</td>
</tr>
<tr>
<td>5. Forklift Operation</td>
<td>5. Problem Solving</td>
</tr>
<tr>
<td>7. Equipment Repair</td>
<td>7. Writing</td>
</tr>
<tr>
<td>8. Equipment Inspection</td>
<td>8. Positive Disposition</td>
</tr>
</tbody>
</table>

### Companies with the Most Job Postings (Jan 2011 – Dec 2013)

- Chesapeake Energy: 115
- Range Resources Corporation: 20
- Frac Technical Services: 18
- Key Energy Services: 16
- Baker Hughes: 10
- Superior Energy Services: 10
- Amerada Hess Corporation: 7
- Conocophillips: 5
- Halliburton: 3
- Penn Line Service Incorporated: 2

### Top Certifications in Demand

- CDL Class A
- Commercial Driver’s License
- Hazardous Materials Certification
HEAVY-TRUCK AND TRACTOR-TRAILER DRIVERS
SOC Code: 53-3032

Alternate Titles
Truck Driver
Over the Road Driver (OTR Driver)
Line Haul Driver
Delivery Driver
Owner Operator
Road Driver
Semi Truck Driver
City Driver
Feeder Driver

Career Connections

Military Connections
Heavy-Truck and Tractor-Trailer Drivers are similar to the following military occupational classifications:

Air Force: 2T111, 2T131, 2T151
Coast Guard: N/A
Marine Corps: 3531, 3534
Navy: N/A

Industry Connections
Other industries that employ this occupation include:
General Freight Trucking
Specialized Freight Trucking

Heavy-Truck and Tractor-Trailer Drivers operate a tractor-trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW). They may be required to unload truck and the occupations requires a commercial drivers’ license. Tasks Heavy-Truck and Tractor-Trailer Drivers are responsible for include, but are not limited to:
- Check vehicles to ensure that mechanical, safety, and emergency equipment is in good working order.
- Maneuver trucks into loading or unloading positions, following signals from loading crew and checking that vehicle and loading equipment are properly positioned.
- Collect delivery instructions from appropriate sources, verifying instructions and routes.
- Maintain logs of working hours, vehicle service, or repair status, following state and federal regulations.

Education Requirements
Heavy-Truck and Tractor-Trailer Drivers typically have at least a high school diploma or the equivalent plus short-term on-the-job training.

Basic Work Requirements
Heavy-Truck and Tractor-Trailer Drivers are required to:
- Work in an enclosed vehicle or equipment
- Work outdoors, exposed to all weather conditions
- Utilize the telephone
- Spend time using one’s hands to control/handle tools
- Typically work a high number of hours in one week

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation</td>
<td>Operation and Control</td>
<td>Control Precision</td>
</tr>
<tr>
<td>Public Safety and Security</td>
<td>Operation Monitoring</td>
<td>Far Vision</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Time Management</td>
<td>Multi-limb Coordination</td>
</tr>
<tr>
<td>Customer and Personal</td>
<td>Troubleshooting</td>
<td>Response Orientation</td>
</tr>
<tr>
<td>Administration and</td>
<td>Monitoring</td>
<td>Depth Perception</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Current Employment:
49,933 Regional Jobs
1,597,377 National Jobs

Projected Regional Growth (2013-2018): 7.2%

Entry Wages: $12.00 - $15.00 per hour
Experienced Wages: $18.00 - $22.00 per hour

Short-term On-the-Job Training Required
INDUSTRIAL TRUCK AND TRACTOR OPERATORS
SOC Code: 53-7051

Alternate Titles
Forklift Operator
Material Handler
Fork Lift Operator
Truck Driver
Fork Truck Driver
Lift Truck Operator,
Forklift Driver
Fork Lift Technician
Spotter Driver
Fork Lift Driver

Career Connections

Military Connections
Industrial Truck and Tractor Operators are similar to the following military occupational classifications:
- Air Force: N/A
- Army: N/A
- Coast Guard: N/A
- Marine Corps: 3536
- Navy: N/A

Industry Connections
Other industries that employ this occupation include:
- General Warehousing and Storage
- Home Centers
- Plastics Product Manufacturing
- General Freight Trucking

Industrial Truck and Tractor Operators utilize industrial trucks or tractors equipped to move materials around a warehouse, storage yard, factory, construction site, or similar location. Tasks Industrial Truck and Tractor Operators are responsible for include, but are not limited to:
- Inspect product load for accuracy and safely move it around the facility to ensure delivery.
- Move controls to drive gasoline- or electric-powered trucks, cars, or tractors and transport materials between loading, processing, and storage areas.
- Move controls that operate lifting devices, such as forklifts, lift beams, hoists, or elevating platforms, to load, unload, transport, or stack material.
- Position lifting devices under, over, or around loaded pallets, skids, or boxes and secure material or products for transport to designated areas.

Education Requirements
Industrial Truck and Tractor Operators typically have at least a high school diploma or the equivalent plus short-term on-the-job training.

Basic Work Requirements
Industrial Truck and Tractor Operators are required to:
- Spend time using one’s hands to control/handle tools
- Wear common protective/safety equipment
- Participate in face-to-face discussions with individuals or a team
- Be exact and/or highly accurate
- Work in an open vehicle or equipment

Top Competencies

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Skills</th>
<th>Abilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production and Processing</td>
<td>Operation and Control</td>
<td>Control Precision</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Operation Monitoring</td>
<td>Multi-limb Coordination</td>
</tr>
<tr>
<td>Customer and Personal Service</td>
<td>Coordination</td>
<td>Response Orientation</td>
</tr>
<tr>
<td>Public Safety and Security</td>
<td>Equipment Maintenance</td>
<td>Reaction Time</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Active Listening</td>
<td>Manual Dexterity</td>
</tr>
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</table>
APPENDIX A:
Occupational Crosswalks to Educational Programs of Study

The table below provides the post-secondary programs of study aligned with each occupation included in the Guide to Careers in the Oil and Natural Gas Industry. For each occupation, one or more relevant programs of study are listed based on the Classification of Instructional Programs (CIP) coding system. Individuals interested in pursuing a career in the Oil and Natural Gas industry can use the table below to begin planning additional education and training that can help to advance into these careers. Only one occupation does not have any aligned programs of study – Helpers, Extraction Workers.

### ARCHITECTURE AND ENGINEERING OCCUPATIONS

<table>
<thead>
<tr>
<th>Occupations</th>
<th>Program of Study/CIP Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-1011 Architects</td>
<td>Architecture (04.0201)</td>
</tr>
<tr>
<td></td>
<td>Environmental Design/Architecture (04.0401)</td>
</tr>
<tr>
<td></td>
<td>Architecture and Related Services, Other (04.9999)</td>
</tr>
<tr>
<td>17-1022 Surveyors</td>
<td>Surveying Technology/Surveying (15.1102)</td>
</tr>
<tr>
<td>17-2051 Civil Engineers</td>
<td>Civil Engineering, General (14.0801)</td>
</tr>
<tr>
<td></td>
<td>Civil Engineering, Other (14.0899)</td>
</tr>
<tr>
<td></td>
<td>Transportation and Highway Engineering (14.0804)</td>
</tr>
<tr>
<td></td>
<td>Water Resources Engineering (14.0805)</td>
</tr>
<tr>
<td>17-2071 Electrical Engineers</td>
<td>Electrical and Electronics Engineering (14.1001)</td>
</tr>
<tr>
<td></td>
<td>Electrical, Electronics and Communications Engineering, Other (14.1099)</td>
</tr>
<tr>
<td>17-2081 Environmental Engineers</td>
<td>Environmental/Environmental Health Engineering (14.1401)</td>
</tr>
<tr>
<td>17-2141 Mechanical Engineers</td>
<td>Mechanical Engineering (14.1901)</td>
</tr>
<tr>
<td></td>
<td>Electromechanical Engineering (14.4101)</td>
</tr>
<tr>
<td>17-2171 Petroleum Engineer</td>
<td>Petroleum Engineering (14.2501)</td>
</tr>
<tr>
<td>17-3011 Architectural and Civil Drafters</td>
<td>Drafting and Design Technology/Technician, General (15.1301)</td>
</tr>
<tr>
<td></td>
<td>CAD/CADD Drafting and/or Design Technology/Technician (15.1302)</td>
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<td>Architectural Drafting and Architectural CAD/CADD (15.1303)</td>
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<tr>
<td></td>
<td>Architectural Technology/Technician (04.0901)</td>
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<tr>
<td></td>
<td>Civil Drafting and Civil Engineering CAD/CADD (15.1304)</td>
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<tr>
<td></td>
<td>Architectural and Building Sciences/Technology (04.0902)</td>
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<tr>
<td></td>
<td>Architectural Sciences and Technology, Other (04.0999)</td>
</tr>
<tr>
<td>17-3022 Civil Engineering Technicians</td>
<td>Construction Engineering Technology/Technician (15.1001)</td>
</tr>
<tr>
<td></td>
<td>Engineering Technology, General (15.0000)</td>
</tr>
<tr>
<td></td>
<td>Civil Engineering Technology/Technician (15.0201)</td>
</tr>
<tr>
<td></td>
<td>Building Construction Technology (46.0415)</td>
</tr>
<tr>
<td>17-3023 Electronics Engineering Technicians</td>
<td>Electrical, Electronic and Communications Engineering Technology/Technician (15.0303)</td>
</tr>
<tr>
<td></td>
<td>Engineering Technology, General (15.0000)</td>
</tr>
<tr>
<td></td>
<td>Computer Technology/Computer Systems Technology (15.1202)</td>
</tr>
<tr>
<td></td>
<td>Computer Engineering Technology/Technician (15.1201)</td>
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<tr>
<td>Program of Study/CIP Code</td>
<td>Occupations</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>17-3025</td>
<td>Environmental Engineering Technicians</td>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>17-3027</td>
<td>Mechanical Engineering Technicians</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>17-3031</td>
<td>Surveying and Mapping Technicians</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>19-4031</td>
<td>Chemical Technicians</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>29-9012</td>
<td>Occupational Health and Safety Technicians</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

**SUPERVISORY AND MANAGEMENT OCCUPATIONS**

<table>
<thead>
<tr>
<th>Occupations</th>
<th>Program of Study/CIP Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>49-1011 Supervisors of Installers, Mechanics and Repairers</td>
<td>Operations Management and Supervision (52.0205)</td>
</tr>
<tr>
<td></td>
<td>High Performance and Custom Engine Technician/Mechanic (47.0617)</td>
</tr>
<tr>
<td></td>
<td>Vehicle Maintenance and Repair Technologies, General (47.0600)</td>
</tr>
<tr>
<td></td>
<td>Recreation Vehicle (RV) Service Technician (47.0618)</td>
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<tr>
<td>47-1011 Supervisors of Construction and Extraction Workers</td>
<td>Electrician (46.0302)</td>
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<tr>
<td></td>
<td>Carpentry/Carpenter (46.0201)</td>
</tr>
<tr>
<td></td>
<td>Plumbing Technology/Plumber (46.0503)</td>
</tr>
<tr>
<td></td>
<td>Construction Trades, General (46.0000)</td>
</tr>
<tr>
<td></td>
<td>Building/Construction Finishing, Management, and Inspection, Other (46.0499)</td>
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<tr>
<td></td>
<td>Building/Home/Construction Inspection/Inspector (46.0403)</td>
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<tr>
<td></td>
<td>Building Construction Technology (46.0415)</td>
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<tr>
<td></td>
<td>Building/Construction Site Management/Manager (46.0412)</td>
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<tr>
<td></td>
<td>Well Drilling/Driller (46.0504)</td>
</tr>
<tr>
<td>51-1011 Supervisors of Production and Operating Workers</td>
<td>Operations Management and Supervision (52.0205)</td>
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11-9021 Construction Managers | Business Administration and Management, General (52.0201) |
<table>
<thead>
<tr>
<th>Code</th>
<th>Program of Study/CIP Code</th>
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<tbody>
<tr>
<td>84</td>
<td>Business/Commerce, General (52.0101)</td>
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<tr>
<td></td>
<td>Operations Management and Supervision (52.0205)</td>
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<tr>
<td></td>
<td>Construction Engineering Technology/Technician (15.1001)</td>
</tr>
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<td>Construction Management (52.2001)</td>
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<tr>
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<td>Construction Trades, General (46.0000)</td>
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<tr>
<td>11-9199</td>
<td><strong>Supply Chain Managers</strong>*</td>
</tr>
<tr>
<td></td>
<td>Business Administration and Management, General (52.0201)</td>
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<td></td>
<td>Business/Commerce, General (52.0101)</td>
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<td></td>
<td>Business Administration, Management and Operations, Other (52.0299)</td>
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<tr>
<td></td>
<td>Business, Management, Marketing, and Related Support Services, Other (52.9999)</td>
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<tr>
<td></td>
<td>Project Management (52.0211)</td>
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<tr>
<td>13-2099</td>
<td><strong>Risk Management Specialist</strong>*</td>
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<td>Finance, General (52.0801)</td>
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<td></td>
<td>Financial Mathematics (27.0305)</td>
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**CONSTRUCTION OCCUPATIONS**

<table>
<thead>
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<th>Code</th>
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<tbody>
<tr>
<td>43-5061</td>
<td>Production, Planning and Expediting Clerks</td>
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<tr>
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<td>Parts, Warehousing, and Inventory Management Operations (52.0409)</td>
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<tr>
<td>47-2031</td>
<td>Carpenters</td>
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<tr>
<td></td>
<td>Carpentry/Carpenter (46.0201)</td>
</tr>
<tr>
<td></td>
<td>Construction Trades, General (46.0000)</td>
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<tr>
<td>47-2061</td>
<td>Construction Laborers</td>
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<td></td>
<td>Construction Trades, Other (46.9999)</td>
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<tr>
<td>47-2071</td>
<td><strong>Paving, Surfacing and Tamping Equipment Operators</strong></td>
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<tr>
<td></td>
<td>Construction/Heavy Equipment/Earthmoving Equipment Operation (49.0202)</td>
</tr>
<tr>
<td></td>
<td>Construction Trades, General (46.0000)</td>
</tr>
<tr>
<td>47-2073</td>
<td>Operating Engineers</td>
</tr>
<tr>
<td></td>
<td>Construction/Heavy Equipment/Earthmoving Equipment Operation (49.0202)</td>
</tr>
<tr>
<td></td>
<td>Construction Trades, General (46.0000)</td>
</tr>
<tr>
<td>47-2151</td>
<td>Pipayers</td>
</tr>
<tr>
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<td>Plumbing Technology/Plumber (46.0503)</td>
</tr>
<tr>
<td></td>
<td>Construction Trades, General (46.0000)</td>
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<tr>
<td>47-2152</td>
<td><strong>Plumbers, Pipefitters, and Steamfitters</strong></td>
</tr>
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<td>Plumbing Technology/Plumber (46.0503)</td>
</tr>
<tr>
<td></td>
<td>Construction Trades, General (46.0000)</td>
</tr>
<tr>
<td></td>
<td>Pipefitting/Pipefitter and Sprinkler Fitter (46.0502)</td>
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<tr>
<td></td>
<td>Plumbing and Related Water Supply Services, Other (46.0599)</td>
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<tr>
<td>47-4011</td>
<td><strong>Construction and Building Inspectors</strong></td>
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<td>Building/Home/Construction Inspection/Inspector (46.0403)</td>
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**EXTRACTION OCCUPATIONS**

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<tbody>
<tr>
<td>47-5011</td>
<td><strong>Derrick Operators, Oil and Gas</strong></td>
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<tr>
<td></td>
<td>Well Drilling/Driller (46.0504)</td>
</tr>
<tr>
<td>47-5012</td>
<td><strong>Rotary Drill Operators</strong></td>
</tr>
<tr>
<td></td>
<td>Well Drilling/Driller (46.0504)</td>
</tr>
<tr>
<td>47-5013</td>
<td><strong>Service Unit Operators, Oil, Gas, and Mining</strong></td>
</tr>
<tr>
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<td>Mining Technology/Technician (15.0901)</td>
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<tr>
<td>47-5021</td>
<td><strong>Earth Drillers</strong></td>
</tr>
<tr>
<td></td>
<td>Construction/Heavy Equipment/Earthmoving Equipment Operation (49.0202)</td>
</tr>
<tr>
<td></td>
<td>Well Drilling/Driller (46.0504)</td>
</tr>
<tr>
<td>Occupation</td>
<td>Program of Study/CIP Code</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------------------------------------------------------------</td>
</tr>
<tr>
<td>Roustabouts, Oil and Gas</td>
<td>Heavy/Industrial Equipment Maintenance Technologies, Other</td>
</tr>
<tr>
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<td>(47.0399)</td>
</tr>
<tr>
<td>Helpers - Extraction Workers</td>
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</table>

**INSTALLATION, MAINTENANCE AND REPAIR OCCUPATIONS**

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<thead>
<tr>
<th>Occupations</th>
<th>Program of Study/CIP Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile Heavy Equipment Mechanics</td>
<td>Heavy Equipment Maintenance Technology/Technician</td>
</tr>
<tr>
<td></td>
<td>(47.0302)</td>
</tr>
<tr>
<td></td>
<td>Agricultural Mechanics and Equipment/Machine Technology</td>
</tr>
<tr>
<td></td>
<td>(01.0205)</td>
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<tr>
<td>Industrial Machinery Mechanics</td>
<td>Industrial Mechanics and Maintenance Technology (47.0303)</td>
</tr>
<tr>
<td></td>
<td>Heavy/Industrial Equipment Maintenance Technologies, Other</td>
</tr>
<tr>
<td></td>
<td>(47.0399)</td>
</tr>
<tr>
<td>Electrical Power-Line Installers and</td>
<td>Lineworker (46.0303)</td>
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<tr>
<td>Repairers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical and Power Transmission Installation/Installer,</td>
</tr>
<tr>
<td></td>
<td>General (46.0301)</td>
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<tr>
<td></td>
<td>Electrical and Power Transmission Installers, Other (46.0399)</td>
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<tr>
<td>Telecommunications Line Installers</td>
<td>Communications Systems Installation and Repair Technology</td>
</tr>
<tr>
<td></td>
<td>(47.0103)</td>
</tr>
<tr>
<td>Maintenance and Repair Workers, General</td>
<td>Building/Property Maintenance (46.0401)</td>
</tr>
<tr>
<td>Helpers - Installation, Maintenance and</td>
<td>Industrial Mechanics and Maintenance Technology (47.0303)</td>
</tr>
<tr>
<td>Repair Workers</td>
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</table>

**PRODUCTION AND TRANSPORTATION OCCUPATIONS**

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<thead>
<tr>
<th>Occupation</th>
<th>Program of Study/CIP Code</th>
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</thead>
<tbody>
<tr>
<td>Machinists</td>
<td>Machine Tool Technology/Machinist (48.0501)</td>
</tr>
<tr>
<td></td>
<td>Machine Shop Technology/Assistant (48.0503)</td>
</tr>
<tr>
<td>Welders, Cutters, Solderers, and Brazers</td>
<td>Welding Technology/Welder (48.0508)</td>
</tr>
<tr>
<td></td>
<td>Welding Engineering Technology/Technician (15.0614)</td>
</tr>
<tr>
<td>Plating and Coating Machine Setters,</td>
<td>Machine Tool Technology/Machinist (48.0501)</td>
</tr>
<tr>
<td>Operators, and Tenders, Metal and Plastic</td>
<td>Machine Shop Technology/Assistant (48.0503)</td>
</tr>
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<td>Precision Metal Working, Other (48.0599)</td>
</tr>
<tr>
<td>Gas Compressor and Gas Pumping Station</td>
<td>Well Drilling/Driller (46.0504)</td>
</tr>
<tr>
<td>Operator</td>
<td></td>
</tr>
<tr>
<td>Wellhead Pumpers</td>
<td>Well Drilling/Driller (46.0504)</td>
</tr>
<tr>
<td>Heavy-Truck and Tractor-Trailer Drivers</td>
<td>Truck and Bus Driver/Commercial Vehicle Operator and</td>
</tr>
<tr>
<td></td>
<td>Instructor (49.0205)</td>
</tr>
<tr>
<td>Industrial Truck and Tractor Operators</td>
<td>Ground Transportation, Other (49.0299)</td>
</tr>
</tbody>
</table>

Source: Economic Modeling Specialists, Inc. EMSI 2013.2 Class of Worker.
*Note: CIP codes for Supply Chain Managers are for the broader occupation 11-9199 Managers, All Other; CIP codes for Risk Management Specialist are for 13-2099 Financial Specialists, All Other.*
APPENDIX B:
Survey of Oil and Natural Gas Employers

In June 2013, a survey was conducted among employers in the Oil and Gas Industry to inform the development of this career guide. Its goal was to add accuracy and real-time employer input about careers in the industry today, validating information gathered from other secondary sources.

The survey asked the following questions in relation to 47 occupations across five categories in the industry (Architecture & Engineering; Construction; Extraction; Installation, Maintenance & Repair; and Production & Transportation):

1. Minimum education required: (choose from the following options)
   - Less than high school
   - High school diploma or the equivalent
   - Some college, no degree
   - Post-secondary non-degree award
   - Associate’s degree
   - Bachelor’s degree
   - Master’s degree
   - Doctoral or professional degree

2. Minimum experience required:
   - No experience required
   - 1 – 2 years in a related field
   - 1 – 2 years in the Oil & Natural Gas industry
   - 3 – 5 years in a related field
   - 3 – 5 years in the Oil & Natural Gas industry
   - More than 5 years of experience

3. From a career path perspective, for what related functions or occupations might an individual in this occupation be considered?

4. Have you identified any crosswalks to Military Occupational Classifications (MOC)/ Military Occupational Specialties (MOS) for this occupation?

The survey was completed by 24 employers. Their responses are included on the following pages.
<table>
<thead>
<tr>
<th>Occupations</th>
<th>Min. Education</th>
<th>Min. Experience</th>
<th>Career Paths</th>
<th>MOCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-1011</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Architects</strong></td>
<td>Associate's degree</td>
<td>3-5 years experience in related field</td>
<td>Project Manager, Sales, Superintendent</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Some college, no degree</td>
<td>1-2 years experience in related field</td>
<td>Operations Coordinator, Senior Project Manager</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Associate's degree</td>
<td>1-2 years experience in related field</td>
<td>Executive Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Project manager, Sales, Superintendent</td>
<td></td>
</tr>
<tr>
<td>17-1022</td>
<td>Bachelor's degree</td>
<td>3-5 years experience in related field</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td><strong>Surveyors</strong></td>
<td>Bachelor's degree</td>
<td>1-2 years experience in related field</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>1-2 years experience in related field</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17-2051</td>
<td>Bachelor's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Executive Management</td>
<td>No</td>
</tr>
<tr>
<td><strong>Civil Engineers</strong></td>
<td>Bachelor's degree</td>
<td>1-2 years experience in related field</td>
<td>Field Engineer</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in related field</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Construction Superintendent</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>More than 5 years experience</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td></td>
<td>Yes - Civil Engineers</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>No experience required</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Job Title</td>
<td>Education Level</td>
<td>Experience Required</td>
<td>Experience Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------</td>
<td>-----------------</td>
<td>---------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>17-2071</td>
<td><strong>Electrical Engineers</strong></td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td>Power and controls for compressor and processing facilities</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Electronic Measurement remote data acquisition, Flow Control, Data Systems Design, O&amp;M industry, Odorization of gas, Corrosion control design and O&amp;M utility or midstream</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Executive Management</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td>Field Engineer</td>
<td>Yes - Field Engineers</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in related field</td>
<td>Must be an electrical engineer</td>
<td>No</td>
</tr>
<tr>
<td>17-2081</td>
<td><strong>Environmental Engineers</strong></td>
<td>Bachelor's degree</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Midstream position: Facilities Engineer (work on compressor station, meter station). For Environmental positions: Regulatory Compliance (permitting; controls - ie: air pollution; treatment - ie: wastewater, flowback treatment design)</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>HSE Personnel, Air Quality, Regulatory, Safety Performance</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>1-2 years experience in related field</td>
<td>Field Engineers</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in related field</td>
<td>Environmental Health and Safety</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>1-2 years experience in related field</td>
<td>No</td>
<td>Yes - Field Engineers</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td>No</td>
<td>Yes - Field Engineers</td>
</tr>
<tr>
<td>17-2141</td>
<td><strong>Mechanical Engineers</strong></td>
<td>Bachelor’s degree</td>
<td>No experience required</td>
<td>Midstream position: Facilities Engineer (work on compressor station, meter station).</td>
</tr>
<tr>
<td>----------</td>
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<td>------------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>3-5 years experience in related field</td>
<td>Engineering, Business Development</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Production, Environmental, Operations</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>1-2 years experience in related field</td>
<td>Pipeline Engineer</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Operations Foreman, Operations Engineer, Pipeline Tech</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>No experience required</td>
<td>Compressor Station System Design, O&amp;M Utility, Pipeline, Measurement Design, Utility or Midstream O&amp;M</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>3-5 years experience in related field</td>
<td>Executive Management</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Field Engineer</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Must be a Mechanical Engineer</td>
<td>Yes - Field Engineers</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>No experience required</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>No experience required</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Code</td>
<td>Position</td>
<td>Education Level</td>
<td>Experience Required</td>
<td>Additional Notes</td>
</tr>
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<td>-------</td>
<td>-----------------------------------------------</td>
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<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>17-2171</td>
<td>Petroleum Engineer</td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td>Production Operator (2-4 years) then choose other areas: Completions, Drilling, Reservoir Engineering and Facilities Design (equipment); Advanced Degrees needed for Reservoir Simulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td>Environmental, Operations, Drilling Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Reservoir Engineer, Drilling Engineer, Operations Engineer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some college, no degree</td>
<td>No experience required</td>
<td>Reservoir Engineer, Drilling Engineer, Operations Engineer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>Field Engineers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td>Completions/Production/Drilling/Facilities Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor's degree</td>
<td>1-2 years experience in related field</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor's degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17-3011</td>
<td>Architectural and Civil Drafters</td>
<td>Bachelor's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Middle Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Associate's degree</td>
<td>No experience required</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postsecondary non-degree award</td>
<td>1-2 years experience in related field</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some college, no degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor's degree</td>
<td>1-2 years experience in related field</td>
<td></td>
</tr>
<tr>
<td>17-3022</td>
<td>Civil Engineering Technicians</td>
<td>Associate's degree</td>
<td>No experience required</td>
<td>Civil Engineering Technician</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor's degree</td>
<td>1-2 years experience in related field</td>
<td>Site Selection and Project Management, Water Sourcing for well completions</td>
</tr>
<tr>
<td>Position</td>
<td>Education Level</td>
<td>Experience Required</td>
<td>Field of Experience</td>
<td>Requires Previous Field Experience</td>
</tr>
<tr>
<td>----------------------------------------------</td>
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<td>-----------------------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Front Line Management</td>
<td>Associate's degree</td>
<td>3-5 years experience in related field</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Field Engineers</td>
<td>Associate's degree</td>
<td>1-2 years experience in related field</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Field Engineers</td>
<td>Associate's degree</td>
<td>No experience required</td>
<td></td>
<td>Yes - field engineers</td>
</tr>
<tr>
<td>Field Engineers</td>
<td>Bachelor's degree</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field Engineers</td>
<td>Some college, no degree</td>
<td>No experience required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field Engineers</td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17-3023 Electronics Engineering Technicians</td>
<td>Associate's degree</td>
<td>No experience required</td>
<td>Automation Technician</td>
<td>Yes - Electronics Technicians</td>
</tr>
<tr>
<td>17-3023 Electronics Engineering Technicians</td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>Metering or Instrumentation Tech, Pipeline Tech</td>
<td>No</td>
</tr>
<tr>
<td>17-3023 Electronics Engineering Technicians</td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Electronic Measurement, Flow Control Installations, Project Management, Utility O&amp;M, Corrosion Control Technicians, Automation Technicians</td>
<td>No</td>
</tr>
<tr>
<td>17-3023 Electronics Engineering Technicians</td>
<td>Associate's degree</td>
<td>1-2 years experience in related field</td>
<td>Field Engineers</td>
<td>Yes - Field Engineers</td>
</tr>
<tr>
<td>17-3023 Electronics Engineering Technicians</td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17-3025 Environmental Engineering Technicians</td>
<td>Associate's degree</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Environmental Specialist (Level 1-3), Sr. Specialist, Staff Specialist, Sr. Staff Specialist (needs 2 year degree), Environmental Advisor (need Bachelor’s)</td>
<td>No</td>
</tr>
<tr>
<td>17-3025 Environmental Engineering Technicians</td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>CDL Driver, Equipment Operator</td>
<td>Yes - EOD, Demolition, Truck Driver</td>
</tr>
<tr>
<td>17-3025 Environmental Engineering Technicians</td>
<td>Some college, no degree</td>
<td>No experience required</td>
<td></td>
<td>Yes - Field Engineer</td>
</tr>
<tr>
<td>17-3025 Environmental Engineering Technicians</td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Occupation</td>
<td>Education Level</td>
<td>Experience Required</td>
<td>Qualification Required</td>
</tr>
<tr>
<td>---------</td>
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<td>------------------------</td>
</tr>
<tr>
<td>17-3027</td>
<td>Mechanical Engineering Technicians</td>
<td>Bachelor's degree</td>
<td>1-2 years experience in related field</td>
<td>Project Manager, Field Supervisor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some college, no degree</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Front Line Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td>Field Engineer</td>
</tr>
<tr>
<td>17-3031</td>
<td>Surveying and Mapping Technicians</td>
<td>Bachelor's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>GIS Specialist/Analyst, Engineering Tech, Project Manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Associate's degree</td>
<td>1-2 years experience in related field</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Associate's degree</td>
<td>No experience required</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Less than high school</td>
<td>No experience required</td>
<td>No</td>
</tr>
<tr>
<td>19-4031</td>
<td>Chemical Technicians</td>
<td>Associate's degree</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Laboratory Tech to analyze liquid and gas vapor samples, various other industry lab analysis technician</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td>Field Engineer</td>
</tr>
<tr>
<td>Occupations</td>
<td>Min. Education</td>
<td>Min. Experience</td>
<td>Career Path</td>
<td>MOCs</td>
</tr>
<tr>
<td>----------------------</td>
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<td>----------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>11-9021 Construction Managers</td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Field Foreman, Senior Field Foreman, Superintendent</td>
<td>Yes - Mechanic</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Site Supervisor, Construction Manager</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Specialist to Superintendent</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Senior Project Manager</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Some college, no degree</td>
<td>3-5 years experience in related field</td>
<td>Project Managers for facility stations, tank farm systems, metering interconnects for custody transfer of product</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Front Line Management</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Associate's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Entry-level Operators</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Some college, no degree</td>
<td>No experience required</td>
<td>Construction Foreman/Superintendent</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Occupation</td>
<td>Education</td>
<td>Experience</td>
<td>Position</td>
</tr>
<tr>
<td>-------</td>
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<td>---------------------------------------</td>
</tr>
<tr>
<td>47-1011</td>
<td>Supervisors of Construction and Extraction Workers</td>
<td>High school diploma or equivalent</td>
<td>More than 5 years experience</td>
<td>Construction Supervisor, Field Supervisor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some college, no degree</td>
<td>3-5 years experience in related field</td>
<td>Oilfield Services Coordinator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postsecondary non-degree award</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Front Line Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Entry-level Operators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td></td>
</tr>
<tr>
<td>47-2031</td>
<td>Carpenters</td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>Installer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>Entry-level Operators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td></td>
</tr>
<tr>
<td>47-2061</td>
<td>Construction Laborers</td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Entry-level Operators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td></td>
</tr>
<tr>
<td>47-2071</td>
<td>Paving, Surfacing and Tamping Equipment Operators</td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Entry-level Operators</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47-2073</td>
<td>Operating Engineers</td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Equipment Operator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postsecondary non-degree award</td>
<td>1-2 years experience in related field</td>
<td>Entry-level Operators</td>
</tr>
<tr>
<td>Occupation</td>
<td>Min. Education</td>
<td>Min. Experience</td>
<td>Career Paths</td>
<td>MOCs</td>
</tr>
<tr>
<td>------------------------------------------------</td>
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</tr>
<tr>
<td>Pipelayers</td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plumbers, Pipefitters, and Steamfitters</td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Pumper, Well Tender</td>
<td>No</td>
</tr>
<tr>
<td>Construction and Building Inspectors</td>
<td>Some college, no degree</td>
<td>1-2 years experience in related field</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>No experience required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Derrick Operators, Oil and Gas</td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>Operations Manager, Rig Manager</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Associate's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Service Company Roustabouts</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Entry-level Operators</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Less than high school</td>
<td>No experience required</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotary Drill Operators</td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Operations Manager, Rig manager</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Less than high school</td>
<td>No experience required</td>
<td>Entry-level Operators</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Unit Operators, Oil, Gas, and Mining</td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Operations Manager, Rig Manager, Company Man</td>
<td>No</td>
</tr>
<tr>
<td>INSTALLATION, MAINTENANCE AND REPAIR OCCUPATIONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td><strong>Occupations</strong></td>
<td><strong>Min. Education</strong></td>
<td><strong>Min. Experience</strong></td>
<td><strong>Career Path</strong></td>
<td><strong>MOCs</strong></td>
</tr>
<tr>
<td>49-1011</td>
<td>Supervisors of Installers, Mechanics, and Repairers</td>
<td>Some college, no degree</td>
<td>3-5 years experience in related field</td>
<td>Foreman</td>
</tr>
<tr>
<td>Code</td>
<td>Occupation</td>
<td>Education</td>
<td>Experience</td>
<td>Job Title</td>
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<tr>
<td>49-3042</td>
<td>Mobile Heavy Equipment Mechanics</td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>Mechanic (i.e. - for compressor station)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postsecondary non-degree award</td>
<td>More than 5 years experience</td>
<td>Lead Mechanic</td>
</tr>
<tr>
<td></td>
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<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Team lead</td>
</tr>
<tr>
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<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Entry-level Operators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Associate's degree</td>
<td>No experience required</td>
<td>Can be an Aircraft, Truck, or Car Mechanic</td>
</tr>
<tr>
<td>49-9041</td>
<td>Industrial Machinery Mechanics</td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>Mechanic (i.e. - for compressor station)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some college, no degree</td>
<td>1-2 years experience in related field</td>
<td>Mud Motor Technician</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Compressor Tech</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Team Lead</td>
</tr>
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<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Entry-level Operator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Associate's degree</td>
<td>1-2 years experience in related field</td>
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<tr>
<td>Occupation</td>
<td>Education</td>
<td>Experience</td>
<td>Relevant Positions</td>
<td>Training Requirements</td>
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<tr>
<td>49-9051 Electrical Power-Line Installers and Repairers</td>
<td>No Responses</td>
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<tr>
<td>49-9052 Telecommunications Line Installers</td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>Automation Technician or ITS Analyst</td>
<td>Yes – Communications Specialist (i.e. on mine sweeper)</td>
</tr>
<tr>
<td></td>
<td>Associate's degree</td>
<td>3-5 years experience in related field</td>
<td>Automation Technician, VSAT Systems O&amp;M</td>
<td>No</td>
</tr>
<tr>
<td>49-9071 Maintenance and Repair Workers, General</td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>Fieldman</td>
<td>Yes - Anything in mechanical field of work</td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Station Operator, Compressor Mechanic</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Shop Hand, Mud Motor Rebuild Tech</td>
<td>Yes - Navy nuclear technician</td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Team Lead</td>
<td>No</td>
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<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Entry-level Operators</td>
<td></td>
</tr>
<tr>
<td>49-9098 Helpers - Installation, Maintenance and Repair Workers</td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>For midstream: Roustabout, Automation Installer</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Shop Helper</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Mechanic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Associate's degree</td>
<td>No experience required</td>
<td>Entry-level Operators</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Entry-level Operators</td>
<td></td>
</tr>
<tr>
<td>Occupations</td>
<td>Min. Education</td>
<td>Min. Experience</td>
<td>Career Paths</td>
<td>MOCs</td>
</tr>
<tr>
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<tr>
<td>11-9199 Supply Chain Managers</td>
<td>Bachelor's degree</td>
<td>1-2 years experience in related field</td>
<td>Logistics Coordinator, Procurement Representative, Materials Management</td>
<td>Yes - logistics coordinator</td>
</tr>
<tr>
<td></td>
<td>Associate's degree</td>
<td>More than 5 years experience</td>
<td>Purchasing Manager</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Senior Management</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in related field</td>
<td>Field Buyer/ Planner</td>
<td>Yes</td>
</tr>
<tr>
<td>13-2099 Risk Management Specialists</td>
<td>Bachelor's degree</td>
<td>More than 5 years experience</td>
<td>Director of EH &amp; S</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>More than 5 years experience</td>
<td>Senior Management</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>More than 5 years experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>51-1011 Supervisors of Production and Operating Workers</td>
<td>Some college, no degree</td>
<td>3-5 years experience in related field</td>
<td>Foreman</td>
<td>Yes - anything with supervisory experience</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>More than 5 years experience</td>
<td>Area Supervisor, Station Supervisor</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Postsecondary non-degree award</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Oilfield Services Manager</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Bachelor's degree</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Middle Management</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Occupation</td>
<td>Education</td>
<td>Experience</td>
<td>Role</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------------------------------------</td>
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</tr>
<tr>
<td>43-5061</td>
<td>Production, Planning, and Expediting Clerks</td>
<td>Bachelor’s degree</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Logistics Coordinator, Procurement Representative, Materials Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Team Lead</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bachelor’s degree</td>
<td>3-5 years experience in related field</td>
<td></td>
</tr>
<tr>
<td>51-4041</td>
<td>Machinists</td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Team lead</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Associate’s degree</td>
<td>1-2 years experience in related field</td>
<td></td>
</tr>
<tr>
<td>51-4121</td>
<td>Welders, Cutters, Solderers, and Brazers</td>
<td>Postsecondary non-degree award</td>
<td>More than 5 years experience</td>
<td>Welder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postsecondary non-degree award</td>
<td>1-2 years experience in related field</td>
<td></td>
</tr>
<tr>
<td>51-4193</td>
<td>Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic</td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Will train the right person</td>
</tr>
<tr>
<td>53-7071</td>
<td>Gas Compressor and Gas Pumping Station Operator</td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in the Oil &amp; Natural Gas industry</td>
<td>Plant Operator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Station Operator, Station Mechanic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Compressor Tech</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>Natural Gas or Liquid Compressor Station Operator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
<td>Team Lead</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td></td>
</tr>
<tr>
<td>53-7073</td>
<td>Wellhead Pumpers</td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td>Roustabout, Lease Operator, Analyst, Field Foreman, Superintendent</td>
</tr>
<tr>
<td>Code</td>
<td>Position</td>
<td>Education</td>
<td>Experience</td>
<td>Other Qualifications</td>
</tr>
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<tr>
<td>53-3032</td>
<td>Heavy-Truck and Tractor-Trailer Drivers</td>
<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
<td>Pumper, WellTender</td>
</tr>
<tr>
<td></td>
<td>Less than high school</td>
<td>No experience required</td>
<td></td>
<td>Team Lead</td>
</tr>
<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td></td>
<td></td>
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<tr>
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<td>Associate's degree</td>
<td>No experience required</td>
<td></td>
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</tr>
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<td></td>
<td>High school diploma or equivalent</td>
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</tr>
<tr>
<td>53-3051</td>
<td>Industrial Truck and Tractor Operators</td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
<td>Wireline Operator, CDL Driver, Gyro Surveyor</td>
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<tr>
<td></td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
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<td></td>
<td>High school diploma or equivalent</td>
<td>1-2 years experience in the Oil &amp; Natural Gas industry</td>
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<td>Lead Driver, Truck Boss</td>
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<td>High school diploma or equivalent</td>
<td>1-2 years experience in related field</td>
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<td>Water Truck Drivers</td>
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<td></td>
<td>High school diploma or equivalent</td>
<td>No experience required</td>
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<td>Team Lead</td>
</tr>
<tr>
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<td>High school diploma or equivalent</td>
<td>No experience required</td>
<td></td>
<td>Entry-level Operators</td>
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<tr>
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<td>High school diploma or equivalent</td>
<td>3-5 years experience in related field</td>
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102