

# Yukon Mining Careers Handbook

February 2008

**YMTA**



PARTNERSHIP  
PEOPLE  
PRODUCTION

# TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	2
INTRODUCTION.....	3
THE MINE CYCLE.....	4
CAREERS AND THE MINE CYCLE.....	6
TRAINING AND EDUCATION FOR MINING CAREERS.....	11
CAREERS IN THE MINING INDUSTRY.....	13

# ACKNOWLEDGEMENTS

The Yukon Mine Training Association would like to thank the following individuals for their contributions to the **Yukon Mining Careers Handbook**:

Craig Cornell.....Human Resources Manager, Ledcor CMI Ltd.  
Al Doherty.....Principal, Aurum Geological Consultants Inc.  
John Gryba.....A/Director, Training Programs, Department of Education, Yukon Government  
Janet Lee.....Project Manager, YMTA  
Stu Mackay.....Dean, Professional Studies, Yukon College  
Claudia Riveros.....Operations Leader, Alaska Highway Aboriginal Pipeline Coalition  
Ossie Venasse.....Chief Mines Safety Officer, Yukon Worker's Compensation Board  
Robin Round.....Robin Round Consulting

The Yukon Mine Training Association assumes full responsibility for any errors or omissions in the text. YMTA wishes to thank its funders, the Government of Canada, Yukon Government, and Yukon Workers' Compensation Board, for their support in the production of this document.

# INTRODUCTION

The potential for exploration, development, mining, as well as pipeline, oil, and gas development offers tremendous employment opportunities for Yukoners. Rapidly expanding exploration activity in the Yukon, coupled with mine development, is creating a strong demand for workers in a wide range of mining careers.

Resource development, particularly mining and oil and gas development, is one of the highest paying industrial sectors in Canada with wages often well above \$1,000/week. There are over 120 different careers in the mining and related resource industry, which employs over 390,000 Canadians.

The **Yukon Mining Careers Handbook** is designed to help Yukon communities, industries, and individuals prepare for mining and related resource development by informing them of:

- career opportunities;
- career placement in the life cycle of a resource project;
- required training and skills for the career opportunity;
- estimated salary ranges of each career.

The **Yukon Mining Careers Handbook** provides a listing of key career opportunities in the Yukon mining and related resource industries and includes the knowledge, abilities, and skill sets required for each as well as the education and training requirements and sources of additional information.

The **Yukon Mining Careers Handbook** is produced by the Yukon Mine Training Association (YMTA). YMTA is a partnership between the Yukon's mining and related resource industries and First Nations for the purposes of maximizing employment opportunities that are emerging in the North. The YMTA will work towards increasing the profile of employment and opportunities in the mining sector, assist in attraction and retention in the work force, and facilitate the delivery of targeted skills and training programs. YMTA also ensures that safety training is developed and delivered to national standards.

For more information contact:

Yukon Mine Training Association  
867.633.6463  
[info@yukonminetraining.com](mailto:info@yukonminetraining.com)  
[www.yukonminetraining.com](http://www.yukonminetraining.com)

# THE MINE CYCLE

There are many stages in the life cycle of a mine, with many types of activities and career opportunities within each. While the course of each mine's development is unique, the general steps taken are similar.

## STAGE 1: MINE EXPLORATION – 7-10 years

Searching for minerals (exploration) is the first step in the mine cycle. In the **Preliminary** stage of exploration, large areas of land are evaluated by airborne surveys or geological surveys of the Earth's surface. From large maps and data, specific areas are singled out for more detailed study on the ground. Studies may involve land clearing and mineral sampling by prospectors and geologists. If valuable mineral potential is anticipated a 'claim' is staked, which is often then sold to a larger mining company for further evaluation and exploration.

The second stage of exploration is a **Detailed** analysis of a specific area. This often involved detailed mineral sampling, detailed ground and geological surveys, mapping to determine the size and shape of the mineral deposit, diamond drilling (often at great depths) for more samples, and environmental studies. Field camps can be established at either stage of exploration, but tend to become larger and involve more people and equipment as exploration progresses.

## STAGE 2: MINE DEVELOPMENT – 5-10 years

Mine development starts with advanced exploration and the **Evaluation**, by geologists, mining engineers and metallurgists, of the mine's potential. This stage involves very detailed drilling and the removal of bulk samples, and requires the use of heavy equipment and the construction of access roads. Processing tests are conducted to evaluate mineral quality and quantity. Financial and minerals market studies are conducted to determine the mine's economic potential. Environmental assessments are undertaken and 'pre-feasibility' studies completed. The final step in the Evaluation phase is a decision on whether or not a mining company will go ahead with full scale mine development.

If the answer is yes, **Mine Planning** begins. In order to proceed, a mining company must ensure sufficient resources are available to develop the mine. Securing sufficient capital is essential as mine development is a very expensive proposition. At this time, the necessary permits and agreements with governments are negotiated as well as sales deals with prospective clients. The mine and associated buildings are designed and further feasibility studies are completed. Mine closure and reclamation plans are prepared.

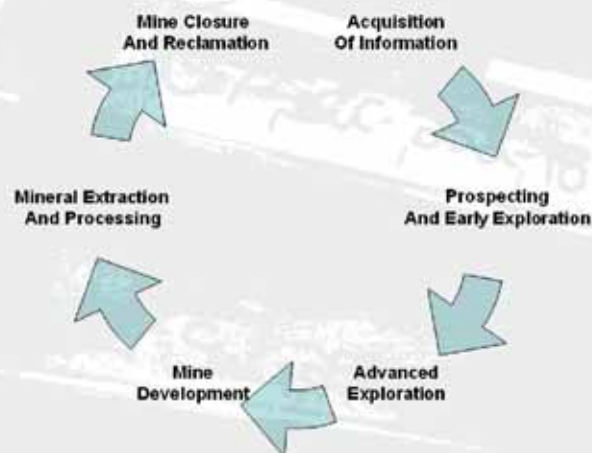
## THE MINE CYCLE (Cont.)

### STAGE 3: MINE OPERATION – 2-20 years

**Mine Operation** is the third phase of the Mine Cycle and involves the recruitment, hiring and training of a wide range of personnel. Marketing and sales activities are undertaken and include client establishment and servicing. At the mine itself, **Production** involves the extraction of ore, separation of minerals, disposal of waste and shipment of ore/minerals. If a mine expands during its lifetime, additional sampling, drilling, planning, and mapping is required.

### STAGE 4: MINE CLOSURE – 2-10 years

The closure of a mine is a multi-stage process. **Shutdown & Decommissioning** involves the removal of equipment, the dismantling of facilities, and the safe closure of all mine workings. **Reclamation** involves earth work and site restoration including re-vegetation of waste rock disposal areas. The final stage of mine closure is **Monitoring**, which includes environmental testing and structural monitoring.



## CAREERS AND THE MINE CYCLE

The various phases of the mine cycle generate employment opportunities for a wide range of different careers at different times. A Geologist, Accountant or Expediter, for example, may be active throughout the life of a mine, while Prospectors, Plumbers and Drafting Technologists are involved for specific periods.

Knowing when each career is active can help inform career choices and career planning. What follows is a chart of careers in the Yukon mining industry and where each fits broadly in the mine cycle. As noted previously, each mine is unique, so the chart offers general guidance.







# TRAINING AND EDUCATION FOR MINING CAREERS

There are many ways to prepare for a career in the mining industry. Some careers require a high school level of education while others require university, college, or industry trade education. What follows are lists of careers that can be found in the Yukon mining industry grouped by the level of education required for each career.

## ENTRY LEVEL CAREERS

These careers require little or no previous experience. On-the-job training is usually provided. You must be able to read and write and some require that you have completed Grade 10, 11, or 12. A “Helper” position is one in which you are directed and supervised by someone with specialized trades training and experience. Helper’s who are registered as Apprentices receive generally higher wages and have access to additional training and certification as a Tradesperson.

<ul style="list-style-type: none"> <li>• Accounting Clerk</li> <li>• Administrative Personnel</li> <li>• Assayer</li> <li>• Blaster’s Helper</li> <li>• Carpenter’s Apprentice/Helper</li> <li>• Cleaning &amp; Housekeeping Personnel</li> <li>• Cook’s Apprentice/Helper</li> <li>• Diamond Driller’s Helper</li> <li>• Electrician’s Apprentice/Helper</li> <li>• Expediter</li> <li>• Heavy Equipment Mechanic’s Apprentice/Helper</li> <li>• Heavy Equipment Operator</li> <li>• Industrial Equipment Technician Apprentice/Helper</li> </ul>	<ul style="list-style-type: none"> <li>• Labourer</li> <li>• Legal Assistant</li> <li>• Machinist’s Apprentice/Helper</li> <li>• Materials &amp; Warehouse Personnel</li> <li>• Millwright’s Apprentice/Helper</li> <li>• Miner – Surface</li> <li>• Miner – Underground</li> <li>• Painter’s Apprentice/Helper</li> <li>• Pipefitter/Steamfitter’s Apprentice/Helper</li> <li>• Plumber’s Apprentice/Helper</li> <li>• Prospector</li> <li>• Purchasing Clerk</li> <li>• Security Guard</li> <li>• Welder’s Apprentice/Helper</li> </ul>
--	---

## SKILLED CAREERS

These careers require that you complete specific training, licensing or certification at private schools, colleges, universities and/or mine sites. Some may require that you have previous experience in the career or the mining industry before you begin. Others require that you be registered with an industry association.

<ul style="list-style-type: none"> <li>• Blaster</li> <li>• Community Liaison</li> <li>• Construction Contractor</li> <li>• Diamond Driller</li> <li>• Estimator</li> <li>• First Aid Attendant</li> </ul>	<ul style="list-style-type: none"> <li>• Mill Operator</li> <li>• Mine Management</li> <li>• Nurse</li> <li>• Pilot</li> <li>• Purchasing Agent</li> <li>• Sales Representative</li> </ul>
--	--

# TRAINING AND EDUCATION FOR MINING CAREERS (Cont.)

<ul style="list-style-type: none"> <li>• Heavy Equipment Operator</li> <li>• Marketing, Advertising &amp; Public Relations Personnel</li> </ul>	<ul style="list-style-type: none"> <li>• Stationary Engineer</li> <li>• Surveyor</li> <li>• Truck Driver</li> </ul>
---	---

## TECHNICAL CAREERS

These careers require a college certificate or diploma. Generally, these are one to three year programs. With additional training, some technologist level graduates can receive university degrees. Some careers may require that you complete a period of supervised work experience prior to receiving provincial industry association certification.

<ul style="list-style-type: none"> <li>• Biological Technologist &amp; Technician</li> <li>• Chemical Technologist &amp; Technician</li> <li>• Civil Engineering Technologist &amp; Technician</li> <li>• Computer Programming &amp; Service Personnel</li> <li>• Drafting Technologist &amp; Technician</li> <li>• Electrical and Electronic Technologist &amp; Technician</li> <li>• Environmental Technologist &amp; Technician</li> <li>• Geographical Information Systems (GIS) Technician</li> </ul>	<ul style="list-style-type: none"> <li>• Geological / Geophysical Technologist &amp; Technician</li> <li>• Industrial Engineering Technologist &amp; Technician</li> <li>• Industrial Instrument Technician</li> <li>• Legal Assistant</li> <li>• Mechanical Engineering Technologist &amp; Technician</li> <li>• Metallurgical Technologist &amp; Technician</li> <li>• Mining Technologist &amp; Technician</li> <li>• Occupational Health and Safety Officer</li> <li>• Survey Technologist &amp; Technician</li> </ul>
--	--

## TRADES CAREERS

These careers generally require that you be a certified journeyman. To do so, you must either complete a three to four year apprenticeship program that includes on-the-job learning, classroom/shop training and an exam OR have 4.5 to 6 years of experience in your trade to pass the same exam. Those who pass the trade exam receive a journeyman “ticket” or certification. The completion of an additional “Red Seal” exam in your chosen trade allows you to work in other provinces and territories.

<ul style="list-style-type: none"> <li>• Carpenter</li> <li>• Cook</li> <li>• Electrician</li> <li>• Heavy Equipment Mechanic</li> <li>• Industrial Instrument Technician</li> </ul>	<ul style="list-style-type: none"> <li>• Machinist</li> <li>• Millwright</li> <li>• Painter</li> <li>• Plumber</li> <li>• Pipefitter/Steamfitter</li> <li>• Welder</li> </ul>
--	---

# TRAINING AND EDUCATION FOR MINING CAREERS (Cont.)

## UNIVERSITY LEVEL CAREERS

These careers require that you have a four year bachelor's university degree. Some careers require that you complete a period of supervised work experience and pass an exam prior to professional or industry certification. Master's level degrees generally take an additional two years.

<ul style="list-style-type: none"><li>• Accountant</li><li>• Biologist</li><li>• Chemist</li><li>• Engineers – Chemical, Civil, Electrical/Electronic, Geological, Industrial, Mechanical, Metallurgical, Mining.</li></ul>	<ul style="list-style-type: none"><li>• Environmental Scientist</li><li>• Financial /Investment Analyst</li><li>• Geologist</li><li>• Geophysicist</li><li>• Human Resources Personnel</li><li>• Hydrologist</li><li>• Lawyer</li></ul>
---	---

## Educational Institution Contact information

- Aurora College (Yellowknife, NWT): [www.auroracollege.nt.ca](http://www.auroracollege.nt.ca)
- Northern Alberta Institute of Technology (Edmonton, AB): [www.nait.ca](http://www.nait.ca)
- Northern Lights College (Dawson Creek, Fort Nelson, Fort St. John, BC): [www.nlc.bc.ca](http://www.nlc.bc.ca)
- Northwest Community College (Smithers, Terrace, Prince Rupert, BC): [www.nwcc.bc.ca](http://www.nwcc.bc.ca)
- University of Alberta (Edmonton, AB): [www.ualberta.ca](http://www.ualberta.ca)
- University of British Columbia (Vancouver, BC): [www.ubc.ca](http://www.ubc.ca)
- University of Northern British Columbia (Prince George, BC): [www.unbc.ca](http://www.unbc.ca)
- Yukon College (Whitehorse, YT): [www.yukoncollege.yk.ca](http://www.yukoncollege.yk.ca)

## Additional Information on Mining and Mining Careers

- Explore for More: [www.acareerinmining.ca](http://www.acareerinmining.ca)
- ROCKon!: [www.rock-on.ca/careers](http://www.rock-on.ca/careers)
- Skills Canada: [www.skillscanada.com](http://www.skillscanada.com)
- Yukon Apprenticeship Training: [www.education.gov.yk.ca/advanceded/apprenticeship](http://www.education.gov.yk.ca/advanceded/apprenticeship)
- Yukon Chamber of Mines: [www.ycmine.ca](http://www.ycmine.ca)
- Yukon Mine Training Association: [www.yukonminetraining.com](http://www.yukonminetraining.com)
- Yukonmining.com: [www.emr.gov.yk.ca/mining/](http://www.emr.gov.yk.ca/mining/)
- Yukon Women in Trades: [www.yukonwitt.org](http://www.yukonwitt.org)

# CAREERS IN THE MINING INDUSTRY

The list of careers in the Yukon mining industry is a long and diverse one and is not limited to those described in this handbook. Over 125 careers are profiled in the following pages and are clustered into fifty-nine career groups. Related careers are grouped together for simplicity, clarity and to indicate education pathways. Chemical Engineer, for example, is listed with Chemist, Chemical Technologist and Chemical Technician.

Short detailed “job descriptions” provide a simple summary of each career and include a list of knowledge, abilities, and skills as well as educational requirements and salary ranges. A final listing of industry association web links provides opportunities to seek more information.

Note that the salary range figures for each career are representative only, using the most current data available. Actual figures will vary depending upon a number of factors including:

- training and education;
- practical experience;
- job responsibilities;
- benefits;
- overtime and incentives;
- market demand for that career;
- type of mine;
- company involved; and,
- the location of employment.

Only a few supervisory or management positions are profiled in the following pages yet most careers listed provide the opportunity for advancement with experience, and in some cases, additional training.

The careers are:

1. Accountant & Related Clerks
2. Administrative Personnel
3. Biologist, Biological Technologist & Technician
4. Blaster & Helper
5. Camp Manager
6. Carpenter & Apprentice/Helper
7. Chemist, Chemical Engineer, Technologist & Technician
8. Civil Engineer, Civil Engineering Technologist & Technician
9. Cleaning & Housekeeping Personnel
10. Community Liaison Officer
11. Computer Programming & Service Personnel
12. Construction Contractor
13. Cook & Apprentice/Helper
14. Diamond Driller & Helper

## CAREERS IN THE MINING INDUSTRY (Cont.)

15. Drafting Technologist & Technician
16. Electrical and Electronic Engineer, Technologist & Technician
17. Electrician & Apprentice/Helper
18. Environmental Scientist, Technologist & Technician
19. Estimator
20. Expediter
21. Financial/Investment Analyst
22. First Aid Attendant
23. Geographical Information Systems (GIS) Technician
24. Geological Engineer
25. Geological/Geophysical Technologist, Technician & Assayer
26. Geologist
27. Geophysicist
28. Heavy Equipment Mechanic & Apprentice/Helper
29. Heavy Equipment Operator
30. Human Resources Personnel
31. Hydrologist
32. Industrial Engineer, Technologist & Technician
33. Industrial Instrument Technician & Apprentice/Helper
34. Labourer
35. Lawyer & Legal Assistant
36. Machinist & Apprentice/Helper
37. Marketing, Advertising & Public Relations Personnel
38. Materials & Warehousing Personnel
39. Mechanical Engineer, Technologist & Technician
40. Metallurgical Engineer, Technologist & Technician
41. Mill Operator
42. Millwright & Apprentice/Helper
43. Mine Management
44. Miner - Surface
45. Miner - Underground
46. Mining Engineer, Technologist & Technician
47. Nurse
48. Occupational Health and Safety Officer
49. Painter & Apprentice/Helper
50. Pilot
51. Pipefitter/Steamfitter & Apprentice/Helper
52. Plumber & Apprentice/Helper
53. Prospector
54. Purchasing Agent & Clerk
55. Sales Representative
56. Security Guard
57. Stationary Engineer
58. Surveyor, Surveying Technologist & Technician
59. Truck Driver
60. Welder & Apprentice/Helper

# ACCOUNTANT & RELATED CLERKS

**Accountants** are responsible for providing financial oversight of mine operations. They plan, set up, and administer accounting systems and prepare financial statements/reports. They also provide financial, business, and tax advice and prepare income tax returns. They may supervise and train students, other accountants, or clerks. Depending upon the training taken, accountants can be Chartered Accountants, Certified General Accountants, or Certified Management Accountants.

**Accounts Payable/Receivable Clerks** record and process the money coming in and going out of a company. They help ensure that mine personnel, suppliers, and contractors pay or are paid in a timely and accurate manner. They do general office duties associated with accounting including: payroll, invoice payment and control, updating accounting records, database entry, filing, and photocopying.

**Payroll Clerks** collect, verify, and process payroll information, and determine pay and benefits for mine employees. They keep records of employee attendance, leave, and overtime. They prepare employee payments and benefit cheques, and other forms including income tax, pension plans, medical insurance, union dues, etc. They also reconcile payroll statements to bank statements.

## KNOWLEDGE, ABILITIES & SKILLS

- aptitude in mathematics
- organizational, time management and multi-tasking skills
- analytical and problem solving skills
- people and communication skills
- high degree of accuracy
- attention to detail and deadlines
- ability to maintain confidentiality

## EDUCATION, TRAINING & CERTIFICATION

**Accountants** require a university degree as well as professional training at an approved institute of accountants. They also require on-the-job training and membership at a provincial institute.

**Accounts Payable/Receivable Clerk** and **Payroll Clerks** are entry level positions with on-the-job training in many cases. Yukon College offers a one year certificate in Office Administration that provides training in communications, administrative procedures, computer applications and accounting. Additional education such as a two year Yukon College diploma in Business Administration may be required.

## SALARY RANGE

Accountants: \$41,000 - \$95,000/year, averaging \$66,000/year.

Accounting Clerks: \$35,000 – \$56,000/year.

# ADMINISTRATIVE PERSONNEL

**Administrative Personnel** perform a mix of secretarial and administrative functions. They compile, verify, record, and process forms and documents. These documents may include applications, licenses, permits, contracts, registrations, and requisitions. They maintain inventory of office supplies and order supplies as required. Administrative Personnel may organize and co-ordinate the flow of work for general office clerks and data entry clerks.

## **KNOWLEDGE, ABILITIES & SKILLS**

- ability to adapt and work under pressure
- time management and multi-tasking ability
- excellent interpersonal and communication skills
- computer skills including spreadsheets and databases

## **EDUCATION, TRAINING & CERTIFICATION**

A high school diploma is generally required for these entry level positions. Yukon College offers a one year certificate in Office Administration that provides training in communications, administrative procedures, computer applications and accounting. Additional education such as a college diploma in Business Administration may be required and is an asset.

## **SALARY RANGE**

Receptionist: \$23,000 - \$55,000/year, averaging \$40,000/year.

Administrative Assistant: \$35,000 - \$59,000/year, averaging \$47,000/year.

# BIOLOGIST, BIOLOGICAL TECHNOLOGIST & TECHNICIAN

**Biologists** study living organisms. They conduct studies of the environment, population, distribution, structure, and behaviour of plants and animals. These studies can help determine the environmental effects of the use of land and water in, and around, mines.

Biologists are required to stay up-to-date on environmental regulations and legislation as well as technological changes. They conduct environmental impact studies and prepare reports and plans for the management of renewable resources. They may supervise Biological Technologists and Technicians and other scientists.

**Biological Technologists and Technicians** help biologists, scientists, engineers and other professionals to conduct tests and studies.

## KNOWLEDGE, ABILITIES & SKILLS

- interest in living things
- ability to theorize, plan and conduct experiments
- analytical, problem-solving and decision-making skills
- attention to detail
- oral and written communication skills
- ability to work independently or as part of a team.

## EDUCATION, TRAINING & CERTIFICATION

A university bachelor's degree in Biology or in a related discipline is required to become a **Biologist**.

Completion of a two year college program in a field related to agriculture, biology, microbiology, wildlife or resource management is usually required for employment as a **Biological Technologist**. Completion of a one year college program in a related field is required for employment as a **Biological Technician**.

## SALARY RANGE:

Biologists: \$48,000 to \$104,000/year, averaging \$73,000/year.

Technologists: \$48,000 - \$56,000/year.

Technicians: \$24,000 - \$56,000/year.

# BLASTER & HELPER

**Blasters** handle, load, and detonate the explosives used to dislodge ore and rock. They load explosives in a blast hole by hand or by operating a truck or track mounted drill. Blasting may be done using safety fuses and dynamite or by electrical detonators connected by electric wires to a blasting machine situated at a safe distance from the blast.

Blasters also handle, store and transport explosives. They work in surface or underground mining environments. Blastors and drillers often perform both blasting and drilling duties. Blaster's supervise and train Blaster's Helpers. They are employed by mining, quarrying, and construction companies and by drilling and blasting contractors.

**Blaster's Helpers** help load dynamite into shot holes. They are responsible for safe explosive handling and helping the Blaster as required.

## KNOWLEDGE, ABILITIES & SKILLS

- physical fitness and a willingness to work outdoors in bad weather
- respect for explosives
- knowledge of surface or underground mining operations
- knowledge of safety procedures and first aid
- criminal record check

## EDUCATION, TRAINING & CERTIFICATION

All **Blasters** in the Yukon must possess a valid Yukon blaster's permit. A permit is valid for five years and may be endorsed with restrictions. Examples of such restrictions are validation for surface blasting only or the use of safety fuses only.

A candidate for a Blaster's permit must be at least eighteen years of age, be physically capable of carrying out the duties of a Blaster, and have at least six months on-the-job training experience with a licensed Blaster. A candidate is required to achieve at least 70% correct on a written exam given by the Chief Mines Safety Officer.

**Blaster's Helper** are trained on-the-job and may be required to take safety and equipment training courses. After approximately six months and the recommendation of his/her employer, a Blaster's Helper will have the opportunity to become a Blaster.

## SALARY RANGE

The Yukon Fair Wage Schedule rate for Blaster's is \$24.33/hour and for Blaster's Helpers is \$21.50 per hour. Wages in the private sector may be higher. Blaster's can make between \$50,000 - \$140,000/year.

# CAMP MANAGER

**Camp Managers** are responsible for keeping mining camps with over fifteen employees running smoothly. A Camp Manager's day might include fixing a generator, loading and unloading aircraft, radio or electronic contact, ordering supplies and organizing a shipment of ore samples. Managers coordinate flights in and out of camp and work closely with Expeditors to ensure all supply needs are met.

Camp Managers are responsible for the safety of camp personnel as well as their on-site training and supervision. The Camp Manager addresses a wide range of work problems that may arise and recommends ways to increase productivity. They write production and other reports.

## KNOWLEDGE, ABILITIES & SKILLS

- logistical and organizational skills
- ability to multi-task
- anticipatory planning and decision-making skills
- ability to work under pressure
- people and communication skills
- management and leadership experience
- detailed knowledge of the mining industry
- willingness to work long hours in remote areas

## EDUCATION, TRAINING & CERTIFICATION

There is no formal training for Camp Managers. The project **Geologist**, with oversight of the exploration project, can be Camp Manager. Someone who began as a **Labourer** can also become Camp Manager with experience and the right skills. Occupational first aid certification is often required to become a Camp Manager.

Northwest Community College offers an eighteen day Camp Manager course. Students will get hands-on practical training in the various aspects of moving, setting up, managing and operating a camp. An additional 8 days training in-town provides certifications in occupational first aid and safety training including transportation of dangerous goods, helicopter safety, bear awareness, chainsaw safety, cross cultural sensitivity, and supervision skills development.

**SALARY RANGE:** Camp Managers are generally paid on a daily basis while in camp, at a rate of \$350/day or up to \$90,000/year. As with other camp personnel, their transportation to and from the camp, as well as meals and accommodations are paid for by the mining company.

# CARPENTER & APPRENTICE/HELPER

**Carpenters** construct, maintain, and repair buildings and other objects made of wood and wood substitutes like drywall, plywood, plaster, and tile. A Carpenter's job starts with the drawings or instructions that define a specific project. They may measure, cut, shape, assemble, and join materials to build foundations, install floor beams, and to erect walls and roofing systems. Carpenters also build stairways, wall partitions, or install and trim prefabricated fixtures. They also make cost estimates for clients. Carpenters may supervise apprentices and other construction workers.

**Apprentices and Helpers** assist skilled tradespeople by performing specialized support duties. They measure and cut wood and lend a hand with other carpentry tasks.

## KNOWLEDGE, ABILITIES & SKILLS

- ability to work with your hands
- math and problem solving skills
- interest in hand and power tools
- physical fitness and stamina
- willingness to work outdoors in all types of weather
- ability to think in three dimensions
- attention to detail

## EDUCATION, TRAINING & CERTIFICATION

**Carpenter's Helpers** require no previous experience, but may take a five month program in Carpentry Pre-Employment at Yukon College to prepare for their career.

To become a **Carpenter Apprentice**, you must have at least academic Grade 10 or equivalent education to enter the four year apprenticeship program. Those who have graduated from the Carpenter Pre-Employment course can take an exam and receive credit that will shorten their apprenticeship period. Apprenticeship programs include both paid on-the-job learning and shop/classroom training.

To become a **Certified Carpenter** in the Yukon, a candidate must pass an exam after completing his/her apprenticeship or after six years in the trade. Interprovincial trade certification (Interprovincial Standards Red Seal) is also available to qualified Carpenters, which allows them to practice their trade in any province or territory after passing an exam.

**SALARY RANGE:** The Yukon Fair Wage Schedule rate for certified Carpenters is \$27.03/hour. Carpenters can make up to \$42/hour or approximately \$68,000/year. Apprentices make 50 per cent or more of the certified rate.

# CHEMIST, CHEMICAL ENGINEER, CHEMICAL TECHNOLOGIST & TECHNICIAN

**Chemists** analyze the chemical properties of waste water, tailings, and concentrate. They use tests to determine if processes and equipment are operating efficiency and to diagnose malfunctions. They work with scientists and engineers to analyze research projects, interpret test results, or develop special tests. Chemists also write technical papers and reports. They may be involved in the research and development of standards and specifications for processes, facilities, products, and tests.

**Chemical Engineers** research, design, and develop chemical processes and equipment for the mining industry. They also oversee the operation and maintenance of industrial chemical processing plants. They perform duties related to chemical quality control and environmental protection that ensure standards for raw materials, products, waste products, and/or emissions are met. Chemical Engineers supervise technicians, technologists and other engineers.

**Chemical Technologists** conduct chemical experiments, tests, and analyses using specialized equipment and techniques. They may be involved in the development of chemical engineering processes, studies, standards, procedures, and health and safety measures.

**Chemical Technicians** assist in setting up and conducting chemical experiments, tests, and analyses. They operate and maintain lab equipment, compile records, and prepare solutions for tests.

## KNOWLEDGE, ABILITIES & SKILLS

- interest in science and chemistry
- inquisitive and analytical mind
- problem solving skills
- oral and written communication skills
- ability to work independently or as a team member

## EDUCATION, TRAINING & CERTIFICATION

To become a **Chemist**, a four year university degree in Chemistry is required. To become a **Chemical Engineer**, a four year university degree in Chemical Engineering is required. Only individuals licensed by Association of Professional Engineers of Yukon are permitted by law to undertake and assume responsibility for engineering projects in Yukon.

**Chemical Technologists** usually require completion of a two year college program in Chemical, Biochemical, or Chemical Engineering Technology, or a closely related discipline. **Chemical Technicians** usually require completion of a similar one year college program. The Association of Science and Engineering Technology Professionals of Alberta (ASET) certify and register Yukon's applied science technology

# CHEMIST, CHEMICAL ENGINEER, CHEMICAL TECHNOLOGIST & TECHNICIAN (Cont.)

## **SALARY RANGE**

Chemist: \$50,000 – \$106,000/year, averaging \$70,000/year.

Engineer: up to \$191,000/year, averaging \$101,000/year.

Technologists: \$33,000 - \$99,600/year.

Technician: \$40,000 - \$84,000/year

## **LINKS**

Canadian Society for Chemical Technology: [www.chem-tech.ca/1/1/6/0/index1.shtml](http://www.chem-tech.ca/1/1/6/0/index1.shtml)

Canadian Council of Professional Engineers: [www.engineerscanada.ca/index.cfm](http://www.engineerscanada.ca/index.cfm),

Association of Professional Engineers of Yukon: [www.apey.yk.ca](http://www.apey.yk.ca)

The Association of Science and Engineering Technology Professionals of Alberta  
[www.aset.ab.ca](http://www.aset.ab.ca)

Canadian Council of Technicians and Technologists: [www.cctt.ca](http://www.cctt.ca)

# CIVIL ENGINEER, CIVIL ENGINEERING TECHNOLOGIST & TECHNICIAN

**Civil Engineers** plan, develop, and manage projects for the construction or repair of buildings, earth structures, powerhouses, roads, airports, bridges, tunnels, dams, and water/sanitation systems. Civil Engineers plan and design programs to monitor air, water, and soil quality and develop procedures to clean contaminated sites. They may inspect and evaluate industrial facilities and programs to assess their compliance with environmental regulations. They may work with environmental scientists to prepare mine closure and rehabilitation plans.

**Civil Engineering Technologists** provide technical support and services to scientists, engineers, and other professionals. They develop engineering designs and drawings from preliminary concepts and sketches. They prepare construction specifications, cost and material estimates, project schedules, and reports. They supervise or conduct field surveys, inspections or technical investigations to provide data for engineering projects. They supervise inspection, testing, and monitoring of construction materials and projects.

**Civil Engineering Technicians** assist engineers and technologists. Technicians conduct materials testing and analysis, and prepare reports on test results. They may survey project sites to obtain details of sites, using maps and surveying equipment. They draft detailed dimensional drawings, such as those needed for highway plans, structural steel fabrication, and water control projects. They also perform duties as described under Drafting Technician.

## KNOWLEDGE, ABILITIES & SKILLS

- math, science and physics aptitude
- ability to visualize in three dimensions
- good colour vision
- analytical and technical problem-solving skills
- ability to work independently or as a team member
- good oral and written communication and negotiation skills

## EDUCATION, TRAINING & CERTIFICATION

To become a **Civil Engineer**, a four year university degree in Civil Engineering is required. Only individuals licensed by the Association of Professional Engineers of Yukon are permitted by law to undertake and assume responsibility for engineering projects in Yukon.

Completion of a two year college program in Civil Engineering Technology or a closely related discipline is usually required for **Civil Engineering Technologists**. Completion of a one year college program in civil engineering technology is usually required for **Civil Engineering Technicians**. The Association of Science and Engineering Technology Professionals of Alberta certify (ASET) and register Yukon's applied science and engineering technology professionals. All technologists and technicians are

# CIVIL ENGINEER, CIVIL ENGINEERING TECHNOLOGIST & TECHNICIAN (Cont.)

required to complete a two – three year period of internship prior to registering with ASET.

## **SALARY RANGE**

Engineers: \$45,000 - \$136,000/year, averaging \$88,000/year.

Technologists and Technicians: \$23,000 - \$89,000/year, averaging \$65,000/year.

## **LINKS**

Canadian Council of Professional Engineers: [www.engineerscanada.ca/index.cfm](http://www.engineerscanada.ca/index.cfm),

Association of Professional Engineers of Yukon: [www.apey.yk.ca](http://www.apey.yk.ca)

The Association of Science and Engineering Technology Professionals of Alberta: [www.aset.ab.ca](http://www.aset.ab.ca)

Canadian Council of Technicians and Technologists: [www.cctt.ca](http://www.cctt.ca)

# CLEANING & HOUSEKEEPING PERSONNEL

**Cleaning and Housekeeping Personnel** are responsible for ensuring the cleanliness of mine facilities and mining camps. They perform a wide range of duties including:

- Sweep, mop, wash, wax and polish floors;
- Dust furniture and vacuum carpeting, rugs, draperies and upholstered furniture;
- Clean and disinfect kitchens, bathrooms, and public areas;
- Make beds, change sheets, and distribute clean towels and toiletries;
- Maintain cleaning supplies;
- Pick up debris and empty waste containers;
- Wash windows, walls and ceilings;
- Monitor building security and safety;
- Duties may also include tending certain pieces of equipment, performing routine maintenance activities, notifying management of the need for repairs, and cleaning snow or debris.

**A Dryman/woman** works in larger mines cleaning the “dryroom”, a room where men and women change into their mining clothing prior to entering an underground mine.

## **KNOWLEDGE, ABILITIES & SKILLS**

- good hand-eye coordination
- personal cleanliness and hygiene
- attention to detail
- ability to work with hand and power tools

## **EDUCATION, TRAINING & CERTIFICATION**

There are no specific education requirements for this entry level position. Training is often provided on the job. Yukon College periodically offers a hospitality skills course in association with the Yukon Tourism Education Council that includes housekeeping skills development.

**SALARY RANGE** \$16,000 - \$33,000/year, averaging \$24,000/year.

# COMMUNITY LIAISON OFFICER

Community Liaison Officers are responsible for ensuring good communication and relations between a mining company, the local communities, and governments, including First Nation governments. Officers work to build trust and respect between the mining industry and local communities and to help resolve disputes.

Community Liaison Officers provide education and information to different groups and raise awareness of the industry, including employment and business opportunities. They provide local residents and businesses with ongoing project information, while listening and responding to inquiries and concerns.

## **KNOWLEDGE, ABILITIES & SKILLS**

- knowledge of mining industry and local community
- strong people and communication skills
- facilitation skills
- negotiation and conflict resolution ability
- organizational skills
- ability to multi-task
- ability to work under pressure

## **EDUCATION, TRAINING & CERTIFICATION**

There are no formal education requirements to become a Community Liaison Officer. A depth of knowledge of local communities, including social, economic and cultural needs, are key as well as experience in the mining or a related industry. A strong background in communications is ideal.

Northwest Community College (Smithers, BC) offers an on-line course in Environmental Excellence in Exploration that offers guidelines on exploration activities, community engagement and environmental practices. The course provides an overview of the concepts, principles, and applications for building a positive relationship with the local community and other parties of interest to a mineral exploration project

**SALARY RANGE** \$22,000 - \$82,00/year, averaging \$45,000/year.

# COMPUTER PROGRAMMING & SERVICE PERSONNEL

**Computer Programmers** write, modify, and test computer software code to create or adjust specific programs for mining needs. They identify and communicate technical problems, processes, and solutions. Computer programmers prepare reports, manuals, and other documentation on the status, operation, and maintenance of software. They also assist in the collection and documentation of user's requirements.

**Computer Systems Analysts** solve computer problems and apply computer technology to meet the individual needs of a mining company. They improve or adjust computer information systems and develop new systems to improve production or workflow as required. They write detailed descriptions of user needs, program functions, and steps required to develop or adjust computer programs. Systems Analysts write technical reports and instructional manuals and may assist Computer Programmers. They may also coordinate work to develop, test, install, and modify programs.

**Computer Technicians and Service Personnel** maintain, troubleshoot, and administer the use of computers including networks, workstations, internet connections and other equipment. They evaluate and install computer hardware, networking software, operating system software, and software applications. They perform data backups and disaster recovery operations. They conduct tests, problem-solve, and perform security and quality controls.

## KNOWLEDGE, ABILITIES & SKILLS

- computer systems and technologies aptitude
- problem-solving and analytical skills
- ability to concentrate and attention to detail
- commitment to continual learning and skills upgrade
- good interpersonal skills

## EDUCATION, TRAINING & CERTIFICATION

To become a **Computer Programmer**, a four year university bachelor's degree in computer science or completion of a college program in computer science is usually required. Specialization in programming for engineering and scientific applications requires specific post-secondary study or experience.

**Computer Systems Analysts** generally have at least a university bachelor's degree in computer science, information science, or management information systems.

**Computer Technicians and Service Personnel** are required to complete a college or other program in computer science, network administration, web technology or a related field. Certification or training provided by software companies may be required.

## SALARY RANGE

Computer Programmers: \$39,000- \$76,000, averaging \$58,000/year.

Systems Analysts: \$28,000 - \$106,000, averaging \$72,000/year.

Computer Technicians: \$25,000 - \$74,000/year, averaging \$52,000/year.

# CONSTRUCTION CONTRACTOR

**Construction Contractors** plan, organize, direct, control, and evaluate construction projects from start to finish. They prepare and submit construction project budget estimates. They plan and prepare construction schedules and milestones and monitor progress against established schedules. They prepare contracts and negotiate revisions with architects, consultants, clients, suppliers, and subcontractors. They also prepare work schedules and progress reports for clients.

Construction contractors subcontract specialized work, such as electrical, structural steel, concrete, carpentry, and plumbing to companies or self-employed trades persons. Contractors direct the purchase of building materials and land. They hire and supervise activities of subcontractors.

## **KNOWLEDGE, ABILITIES & SKILLS**

- knowledge of construction industry
- organizational skills
- ability to multi-task
- budgeting and financial management skills
- ability to work under pressure
- strong people and communication skills
- management and leadership experience

## **EDUCATION, TRAINING & CERTIFICATION**

Journeyman status in one of the construction trades is usually required for smaller firms involved in industrial, commercial, institutional or heavy construction. Depending on the type of construction work being managed and the size of the employer, contractors may need a university degree and professional license in civil engineering, or a college diploma in construction technology.

**SALARY RANGE** \$33,000 - \$80,000/year, averaging \$58,000/year.

# COOK & APPRENTICE/HELPER

**Cooks** prepare, cook, and serve a wide variety of foods for workers in mines or exploration camps. They are familiar with sanitation standards, safe work practices and health regulations pertaining to food preparation and service. Cooks oversee kitchen operations including the supervision of cook's helpers and other kitchen staff. Cooks may also order supplies, and oversee inventory, costs, and menus.

**Cook's Apprentices and Helpers** make sure all the necessary ingredients are available to the Cook and other food preparers. Responsibilities include washing, cutting or peeling, weighing, measuring, and arranging various ingredients, stocking goods, cleaning and assisting kitchen staff whenever they need it.

## KNOWLEDGE, ABILITIES & SKILLS

- strong organizational and memory skills
- good hand-eye coordination and motor skills
- personal cleanliness and hygiene
- ability to work under pressure
- problem solving skills

## EDUCATION, TRAINING & CERTIFICATION

**Cook's Helpers** require no previous experience, but may take an eight month program in Culinary Arts at Yukon College to prepare for their career. To become an **Apprentice**, you must have at least academic Grade 10 or equivalent education to enter the three year apprenticeship program. Those who have graduated from the Culinary Arts program can take an exam and receive credit that will shorten their apprenticeship period. Apprenticeship programs include both paid on-the-job learning and kitchen/classroom training.

To become a **Certified Cook** in the Yukon, a candidate must pass an exam after completing his/her apprenticeship or after four and a half years in the trade. Interprovincial trade certification (Interprovincial Standards Red Seal) is also available to qualified Cooks, which allows them to practice their trade in any province or territory after passing an exam. Occupational First Aid training is often required of Camp Cooks and is available at Yukon College, St. John's Ambulance or the Canadian Red Cross.

**SALARY RANGE:** The Yukon Fair Wage Schedule rate for Certified Head Cook ranges from \$24.33/hour to \$27.03/hour for camps over 100 persons. In exploration camps, however, a Cook can make \$350/day or up to \$90,000/year. The rate for Cook's Helpers and other kitchen help is \$19.50 per hour. Apprentices make 50 per cent or more of the certified rate.

# DIAMOND DRILLER & HELPER

**Diamond Drillers** move, set up, operate, and maintain diamond drilling rigs and related equipment that drills holes to obtain mineral (core) samples. The drill holes can be several thousand metres deep. Diamond Drillers also operate secondary equipment, including pumps and equipment used to prevent and correct problems. They also carry out minor maintenance and repairs. Diamond Drillers specialize in surface or underground drilling.

**Diamond Driller's Helpers** are entry level workers. They service drills and pumps and maintain a clean and safe work area. They handle core samples according to specifications, maintain toolboxes and maintain supplies. With training and experience, they can become Diamond Drillers.

## KNOWLEDGE, ABILITIES & SKILLS

- physical fitness and mechanical interest
- willingness to work outdoors in remote areas in all types of weather
- attention to detail and a focus on safety
- teamwork approach
- first aid training & bear awareness
- interest in travel

## EDUCATION, TRAINING & CERTIFICATION

A **Diamond Driller's Helper** is an entry level position with on-the-job training. Some courses in safety and first aid may be required.

There is no standard education requirement to become a **Diamond Driller**, but a high school diploma is often necessary. College or industry courses combined with on-the-job training are required. A ten week training course for Diamond Driller Assistant is available at Northern College (Kirkland Lake) or Northwest Community College (Smithers) that includes certification in health and safety training.

## SALARY RANGE

The Yukon Fair Wage Schedule rate for Driller's is \$24.23/hour and for Driller's Helpers is \$19.50 per hour. A Diamond Driller in the Yukon can make over \$100,000/year due to incentive bonuses for depth of holes drilled. A Driller's Helper makes approximately \$20 – 30/hour.

**LINKS** Canadian Diamond Drilling Association [www.canadiandrilling.com/contact.html](http://www.canadiandrilling.com/contact.html)

# DRAFTING TECHNOLOGIST & TECHNICIAN

**Drafting Technologists and Technicians (or Draftspersons)** prepare accurate and detailed drawings that describe the size, shape, mechanics or function of objects and structures. These drawings are used in the construction, engineering, mining and manufacturing industries.

Draftspersons start with preliminary concepts, sketches, and calculations. They use computer-aided drafting and design (CADD) technology to develop and prepare design drawings. Drawings must conform to specifications and are checked by an engineer or architect. Draftspersons work with production or construction teams, explaining or adjusting the drawings as work progresses. Draftspersons write technical reports, prepare contracts, and do materials costs estimates. They may supervise and train other technologists, technicians and drafters.

## **KNOWLEDGE, ABILITIES & SKILLS**

- interest in architecture, engineering, building materials, and computers
- artistic flair and ability to visualize in three dimensions
- analytical mind
- well organized
- attention to detail and accuracy
- ability to work as part of a team
- good communication skills

## **EDUCATION, TRAINING & CERTIFICATION**

Completion of a one to three year college program in Engineering Design and Drafting Technology or in a related field is usually required. Certification through provincial associations of engineering/applied science technologists and technicians may be required by employers. A period of supervised work experience, usually two years, is required before certification.

**SALARY RANGE** \$20,000/year- \$116,000/year, averaging \$51,000/year.

# ELECTRICAL AND ELECTRONIC ENGINEER, TECHNOLOGIST & TECHNICIAN

**Electrical and Electronic Engineers** research and design electrical and electronic equipment and systems. They supervise and inspect the installation, modification, testing, and operation of those systems. Electrical and Electronic Engineers develop maintenance and operating standards for electrical systems and equipment. They also investigate electrical or electronic failures. They prepare contract documents and evaluate tenders for construction or maintenance. They also prepare material cost and timing estimates, reports, and design specifications. They supervise technicians, technologists, programmers, analysts, and other engineers.

**Electrical and Electronic Engineering Technologists** provide technical support and services in the design, development, testing, production, and operation of electrical and electronic equipment and systems. They conduct or supervise the installation, start-up, and operation of electrical and electronic equipment. Technologists carry out applied research in fields of electrical and electronic engineering and physics under the direction of scientists or engineers. They set up and operate specialized and standard test equipment to diagnose, test, and analyze the performance of electrical and electronic components, assemblies, and systems. They write specifications, schedules, technical reports, control schedules, and budgets.

**Electrical and Electronics Engineering Technicians** assist in the design, development, testing, and repair of electrical and electronic components, equipment, and systems. They carry out a limited range of technical functions in support of research in electrical and electronic engineering and physics. They also help prepare reports, budgets, specifications, and estimates.

## KNOWLEDGE, ABILITIES & SKILLS

- interest in logic, mathematics and science
- ability to think in three dimensions
- analytical and technical problem-solving skills
- creativity and design skills
- the ability to work independently or as a team member
- oral and written communication and negotiation skills,
- good colour vision

## EDUCATION, TRAINING & CERTIFICATION

To become an **Electrical Engineer**, a four year university degree in Electrical Engineering is required. Only individuals licensed by Association of Professional Engineers of Yukon are permitted by law to undertake and assume responsibility for engineering projects in Yukon.

Completion of a one year college program in Electrical Engineering Technology is usually required for **Electrical Engineering Technicians** or two years for **Electrical**

# ELECTRICAL AND ELECTRONIC ENGINEER, TECHNOLOGIST & TECHNICIAN (Cont.)

## **SALARY RANGE**

Engineer: \$21,000 to \$131,000 a year, averaging \$75,000/ year.

Electrical Engineering Technologist: \$40,000 - \$76,000/year.

Electronic Engineering Technologist: \$45,000 - \$66,000/year.

Electrical/Electronic Engineering Technician: \$44,000 - \$87,000, averaging \$65,000/year.

## **LINKS:**

Canadian Council of Professional Engineers: [www.engineerscanada.ca/index.cfm](http://www.engineerscanada.ca/index.cfm)

Association of Professional Engineers of Yukon: [www.apey.yk.ca](http://www.apey.yk.ca)

The Association of Science and Engineering Technology Professionals of Alberta:  
[www.aset.ab.ca](http://www.aset.ab.ca)

Canadian Council of Technicians and Technologists: [www.cctt.ca](http://www.cctt.ca)

# ELECTRICIAN & APPRENTICE/HELPER

**Electricians (Construction/Industrial)** install, test, repair, and maintain electrical systems and equipment. They read blueprints and wiring diagrams to plan the layout of wiring systems. They install wiring and circuits for extensions and additions to work sites. They carry out electrical fitting and high voltage switching and do electrical calculations. They also ensure safe work practices near electrical outlets. They maintain communications and telecommunications systems.

Trades **Apprentices and Helpers** assist skilled tradespeople by performing specialized support duties. They assist in the installation, maintenance and repair of a variety of electrical equipment. They perform heavy, physical work, and operate a variety of hand and power tools as assigned.

## KNOWLEDGE, ABILITIES & SKILLS

- ability to work under pressure
- physical fitness attention to detail
- verbal communication skills
- keen focus on safety

## EDUCATION, TRAINING & CERTIFICATION

**Electrician's Helpers** require no previous experience, but may take a five month program in Construction/Industrial Electricity Pre-Employment at Yukon College to prepare for their career. To become an **Apprentice**, you must have at least academic Grade 12 or equivalent education to enter the four year apprenticeship program. Those who have graduated from the Construction/Industrial Electricity Pre-Employment program can take an exam and receive credit that will shorten their apprenticeship period. Apprenticeship programs include both paid on-the-job learning and shop/classroom training.

To become a **Certified Construction/Industrial Electrician** in the Yukon, a candidate must pass an exam after completing his/her apprenticeship or after six years in the trade. Interprovincial trade certification (Interprovincial Standards Red Seal) is also available to qualified Electricians, which allows them to practice their trade in any province or territory after passing an exam.

## SALARY RANGE

The Yukon Fair Wage Schedule rate for Electrician is \$27.03 per hour. Electricians' salaries can range from \$20,000 - \$103,000/year, averaging \$60,000/year. Apprentices make 50 per cent or more of the certified rate.

# ENVIRONMENTAL SCIENTIST, TECHNOLOGIST & TECHNICIAN

**Environmental Scientists** work to regulate, control, and prevent air, land, and water pollution. They conduct research and develop plans to minimize the impact of mining on the environment and human health. Some key issues they face include waste water management and purification, tailings control, acid leaching, air quality, and emissions, as well as mine closure and reclamation. Environmental Scientists may also do environmental impact studies or design monitoring systems. They may also provide advice on proper standards and regulations for the development of laws for environmental management. Environmental Scientists supervise environmental technologists and technicians.

**Environmental Technologists** develop and implement air, water, or soil quality measurement plans, design recycling and waste minimization programs, develop emergency planning methods, and take inventory of locally-generated pollution. They are familiar with environmental law, workplace health and safety, and hazardous goods handling methods. They use different laboratory techniques and instruments to prepare and analyze samples.

**Environmental Technicians** collect samples of air, soil, water, and/or other materials in and around mine sites. They weigh, measure, and analyze samples and test for environmental pollutants using technical instruments and equipment. Environmental Technicians also maintain and repair environmental testing equipment and write reports that interpret test results.

## KNOWLEDGE, ABILITIES & SKILLS

- interest in environment and natural science
- critical thinking and problem solving skills
- physical fitness and a willingness to work outdoors in bad weather
- willingness to work with potentially dangerous substances
- hand-eye coordination
- people and communications skills

## EDUCATION, TRAINING & CERTIFICATION

A university bachelor's degree in Environmental Science is required to become an **Environmental Scientist**.

Completion of a two year college program in Environmental Technology or a closely related discipline is usually required for **Environmental Technologists**. Completion of a one year college program in environmental technology is usually required for **Environmental Technicians**. The Association of Science and Engineering Technology Professionals of Alberta certify and register Yukon's applied science technology professionals. Northern Alberta Institute of Technology in Edmonton offers a 17 week course Water & Wastewater Technician Program by distance education.

# ENVIRONMENTAL SCIENTIST, TECHNOLOGIST & TECHNICIAN (Cont.)

## **SALARY RANGE**

Technician: \$32,000 - \$67,000/year, averaging \$57,000/year.

## **LINKS**

The Association of Science and Engineering Technology Professionals of Alberta:

[www.aset.ab.ca](http://www.aset.ab.ca)

Canadian Council of Technicians and Technologists: <http://www.cctt.ca>

# ESTIMATOR

**Estimators** prepare cost estimates for construction projects or services. Construction estimators use blueprints and other documentation to prepare time, cost, materials, and labor estimates. They consult with clients, vendors, engineers, architects, owners, contractor, and subcontractors to discuss and formulate estimates and monitor costs. They advise on tendering procedures, recommend tender awards, and conduct negotiations.

Estimators assess cost effectiveness of products, projects or services as the project develops. They also prepare cost and expenditure statements and forecasts at regular intervals for the duration of a project. They prepare and maintain a directory of suppliers, contractors, and subcontractors and may conduct economic feasibility studies for the mining industry.

## **KNOWLEDGE, ABILITIES & SKILLS**

- math skills
- attention to detail
- decision-making and problem solving skills
- knowledge of construction industry and building supplies costs
- organizational, planning, prioritizing and negotiating skills
- people and communication skills
- stress tolerance

## **EDUCATION, TRAINING & CERTIFICATION**

Completion of high school is required. Completion of a two or three-year college program in Civil or Construction Engineering Technology or several years of experience as a qualified tradesperson in a construction trade such as plumbing, carpentry or electrical are required. Certification by the Canadian Institute of Quantity Surveyors is usually required as well.

**SALARY RANGE** \$41,000 - \$54,000/year.

## **LINKS**

Canadian Institute of Quantity Surveyors: [www.ciqs.org](http://www.ciqs.org)

# EXPEDITER

Expeditors are responsible for transporting people and goods to and from the mining exploration camps and mine sites. They are generally based in a nearby community.

Expeditors work closely with the Camp or Mine Manager to ensure the smooth running of mining operations. They buy food, building supplies, and personal effects for camp personnel. They also charter and load the aircraft transporting the goods, and provide transportation and accommodation to any camp personnel in the nearest community. Expeditors ensure that all supplies, materials, and personnel are ready to go for a mining operation that runs 24 hours a day, seven days a week.

## **KNOWLEDGE, ABILITIES & SKILLS**

- excellent organizational skills
- task and detail oriented
- knowledge of sources of supply and materials
- ability to multi-task and work under pressure
- willingness to work long hours
- people and communication skills
- bondable (no criminal record)

## **EDUCATION, TRAINING & CERTIFICATION**

There are no formal educational requirements to become an Expediter. An appropriate driver's license to transport people is required.

**SALARY RANGE** \$50,000 - \$55,000/year, averaging \$53,000/year.

# FINANCIAL AND INVESTMENT ANALYST

**Financial and Investment Analysts** collect and analyze financial information to help mining companies make investment and financial decisions. This information may include economic forecasts, trading volumes, the movement of capital, financial backgrounds of companies, and historical performances of stocks, bonds, and other investment instruments. Studies and evaluations may cover areas such as takeover bids, private placements, mergers, or acquisitions.

Financial analysts:

- evaluate financial risk, prepare financial forecasts, financing scenarios, and other documents concerning capital management;
- plan short and long-term cash flows and assess financial performance;
- analyze investment projects;
- advise on financial aspects of contracts and calls for tender;
- follow-up on financing projects with financial backers;
- develop, implement, and use tools for managing and analyzing financial portfolio;
- prepare a regular risk profile for debt portfolios;
- assist in preparing operating and investment budgets.

Investment analysts:

- collect financial and investment information about companies, stocks, bonds, and other investments;
- examine and analyze information collected;
- provide investment advice and recommendations to clients, senior company officials, pension fund managers, securities agents, and associates;
- prepare economic outlooks, analytical reports, and briefing notes.

## **KNOWLEDGE, ABILITIES & SKILLS**

- interest in business affairs and financial markets
- organizational skills
- numerical and analytical ability
- decision-making skills
- respect for client confidentiality
- communications skills

## **EDUCATION, TRAINING & CERTIFICATION**

A four year university bachelor's degree in commerce, business administration or economics and on-the-job training and industry courses and programs are usually required.

**SALARY RANGE** \$41,000 to \$192,000 /year, averaging \$83,000/year.

# FIRST AID ATTENDANT

**First Aid Attendants** administer pre-hospital emergency medical care to patients and transport them to hospitals or other medical facilities for further medical care. They assess extent of injuries or illness of trauma victims, overdose and poisoning victims, industrial accident victims, and other ill or injured individuals to determine emergency medical treatment. Attendants administer pre-hospital emergency care and medications and provide other advanced emergency treatment to patients.

First Aid Attendants transport patients by air, land or water to hospital or other medical facility for further medical care. They also document and record the nature of the injuries and treatment provided and assist hospital personnel, if necessary.

## **KNOWLEDGE, ABILITIES & SKILLS**

- desire to help those in need
- physical fitness and stamina
- ability to deal calmly with crisis
- ability to work as part of a team
- decision-making skills under pressure
- communication skills
- willingness to work outdoors and in bad weather

## **EDUCATION, TRAINING & CERTIFICATION**

**First Aid Attendant** training requirements vary by size of mine, distance from a hospital, the hazards involved at the site etc. A minimum requirement for any First Aid Attendant is an advanced first aid designation recognized by the Yukon Worker's Compensation Board. Courses can be taken at community colleges, including Yukon College, and by recognized first aid training agencies such as St. John's Ambulance or the Canadian Red Cross. Typically, these courses are 80 – 100 hours in length and are completed over a two week period. Courses are generally offered at Yukon College in the spring and fall.

**SALARY RANGE** \$150 – \$300/day, averaging around \$200/day or approximately \$52,000/year.

# GEOGRAPHICAL INFORMATION SYSTEMS (GIS) TECHNICIAN

**Geographical Information Systems (GIS) Technicians** operate specialized computer hardware and software to model, manage, analyze, and display geographic data and information. GIS is computer-based mapping and analysis of objects and events.

GIS Technicians compile geographic, political, and cultural information to prepare all types of maps. They measure, map, and chart the Earth's surface, which involves everything from geographical research and data compilation to map production. They also develop specialized computer software and databases to customize geographical information.

GIS Technicians perform data entry and maintenance operations. They train and provide technical support for GIS users.

## **KNOWLEDGE, ABILITIES & SKILLS**

- aptitude in mathematics (geometry, trigonometry)
- analytical and data entry skills
- ability to think in three dimensions and read maps

## **EDUCATION, TRAINING & CERTIFICATION**

A high school diploma is usually required to enter a one to two year community college diploma course in geographical information systems or geomatics technology to become GIS Technician. The Association of Science and Engineering Technology Professionals of Alberta certify and register Yukon's applied science, information and engineering technology professionals.

**SALARY RANGE** \$30,000 to \$84,000/year.

## **LINKS**

The Association of Science and Engineering Technology Professionals of Alberta: <http://www.aset.ab.ca>

Canadian Council of Technicians and Technologists: [www.cctt.ca](http://www.cctt.ca)

# GEOLOGICAL ENGINEER

**Geological Engineers** are involved in the planning, design, construction, operation and maintenance of mines including roads, bridges, buildings, tunnels, and water and sewage facilities. They conduct geological studies to assess suitability of locations for civil engineering, mining, and oil and gas projects.

Geological Engineers plan, design, develop, and supervise programs to gather and analyze geological data. They also prepare geological engineering reports and recommendations. They may also be involved in environmental impact assessments.

## **KNOWLEDGE, ABILITIES & SKILLS**

- scientific curiosity with specific interest in rocks, minerals and mathematics
- the ability to think logically in analyzing, solving problems, and making decisions
- detail and precision focus
- practical, mechanical inclination
- oral and written communication skills
- ability to work in a team or independently
- ability to work outdoors in sometimes rugged conditions

## **EDUCATION, TRAINING & CERTIFICATION**

A four year bachelor's university degree in Geological Engineering is required. Only individuals licensed by Association of Professional Engineers of Yukon are permitted by law to undertake and assume responsibility for engineering projects in Yukon.

**SALARY RANGE** Averaging \$91,000/year.

## **LINKS**

Canadian Council of Professional Engineers: [www.engineerscanada.ca/index.cfm](http://www.engineerscanada.ca/index.cfm),  
Association of Professional Engineers of Yukon: [www.apey.yk.ca](http://www.apey.yk.ca)

# GEOLOGICAL/GEOPHYSICAL TECHNOLOGIST, TECHNICIAN & ASSAYER

**Geological/Geophysical Technologists** assist geologists, engineers, and other scientists to find, develop, and monitor mineral and fuel resources. They conduct or direct geological, geophysical, geochemical, and other surveys. They also undertake prospecting field trips, exploratory drilling, and well logging or underground mine survey programs. They prepare notes, sketches, geological maps, and cross sections. They analyze data derived from chemical and physical tests. They may conduct or supervise studies and programs related to mine development, mining methods, mine ventilation, lighting, drainage, and ground control.

**Geological/Geophysical Technicians** assist Technologists with surveys and participate in prospecting field trips, exploratory drilling, well logging or underground mine survey programs. They make observations, collect rock, mineral or metal samples, conduct laboratory tests, record information, and look after geophysical equipment and instruments. Technicians also assist in environmental audits and related environmental protection activities.

The entry level positions in this field are **Assayers**, individuals who prepare rock samples in the laboratory for a range of tests. These tests are critical as they help a mine determine if there is enough of a valuable mineral in the rock to justify the high cost of production.

## KNOWLEDGE, ABILITIES & SKILLS

- scientific curiosity with specific interest in rocks, minerals and chemistry
- computer skills
- able to prepare accurate records and reports
- able to work as part of a team
- physically fit
- willing to work in remote locations often for long hours on a rotational basis

## EDUCATION, TRAINING & CERTIFICATION

**Assayers** require no previous experience and are trained on the job. A high school education may be required to start.

Completion of a one year college program in Geological Technology, Petroleum Technology, Petroleum Engineering Technology, Hydrogeology or groundwater technology, Mining Technology, Mining Engineering Technology, Mineralogy, Metallurgical Technology, or Welding Technology is usually required for **Geological/Geophysical Technicians**. Completion of a two year college program is usually required for **Geological/Geophysical Technologists**. The Association of Science and Engineering Technology Professionals of Alberta certify and register Yukon's applied science, information and engineering technology professionals.

**SALARY RANGE** \$47,000 - \$68,000, averaging \$56,000/year.

# GEOLOGICAL/GEOPHYSICAL TECHNOLOGIST, TECHNICIAN & ASSAYER (Cont.)

## **LINKS**

The Association of Science and Engineering Technology Professionals of Alberta:

[www.aset.ab.ca](http://www.aset.ab.ca)

Canadian Council of Technicians and Technologists: [www.cctt.ca](http://www.cctt.ca)

# GEOLOGIST

Geologists examine rocks and minerals in search of large deposits that can be developed into mines. They plan, direct, and participate in research and exploration including field studies, core sample analysis, and drilling and testing programs. They develop software for the analysis and interpretation of data. Geologists assess the size, orientation, and composition of mineral ore bodies and hydrocarbon deposits. They identify and anticipate natural risks such as slope erosion, landslides, soil instability, subsidence, earthquakes, and volcanic eruptions.

Geologists may supervise and co-ordinate well drilling and mining activities. At the mine, they are usually responsible for mine planning with the Mining Engineer. Geologists may also assess the movement of ground and surface waters and advise in areas such as waste management, route and site selection, and the restoration of contaminated sites. They may specialize in many areas including Exploration Geology, Development or Environmental Geology, Structural Geology, etc.

## KNOWLEDGE, ABILITIES & SKILLS

- scientific curiosity with specific interest in rocks, fossils, and minerals
- math and science aptitude
- problem solving skills
- enjoy outdoor work in all types of weather
- bear awareness and wilderness first aid
- communication and writing skills
- willing to travel to work in remote locations and bush camps

## EDUCATION, TRAINING & CERTIFICATION

A four year university bachelor's degree in Geology, Geochemistry or Geophysics is required. To practice in the Yukon, all Geologists must be licensed by a professional association of professional engineers and geoscientists. A license allows professional geologists to write official reports to stock markets.

## SALARY RANGE

**Mine Geologist:** \$50,000 – \$90,000/year, averaging \$69,000/year.

## LINKS

Geological Association of Canada: [www.gac.ca](http://www.gac.ca)

Association of Professional Engineers and Geoscientists of British Columbia:  
[www.apeg.bc.ca/](http://www.apeg.bc.ca/)

# HEAVY EQUIPMENT MECHANIC & APPRENTICE/HELPER

**Heavy Equipment Mechanics** are responsible for keeping excavators, backhoe/loaders, graders, bulldozers, front-end loaders, and gravel dump trucks in good working order at the mine site. Maintenance and servicing includes engines and hydraulic, transmission, and electrical systems. Mechanics perform routine maintenance work, inspect equipment to detect faults and malfunctions, replace parts and test equipment for proper performance. Due to the sophistication of modern heavy equipment, mechanics are trained in electronics and the use of hand-held diagnostic computers to make adjustments and diagnose problems.

**Apprentices and Helpers** assist mechanics by performing duties including using, supplying or holding materials or tools, and cleaning the work area and equipment.

**Pneumatic Mechanics** specialize in hydraulic, pneumatic or fluid systems, controls and components. Hydraulic and pneumatic mechanics are sometimes called fluid power technicians, because they maintain and repair equipment and machines that use pressurized fluids to carry power from one place to another. Hydraulic systems use "wet" fluids, such as oil and water. Pneumatic systems use "dry" fluids, such as pressurized air or other gases.

## KNOWLEDGE, ABILITIES & SKILLS

- mechanical interest and aptitude
- physical fitness and a willingness to work outdoors in all weather conditions
- good hand/eye coordination
- Class 5 Driver's license

## EDUCATION, TRAINING & CERTIFICATION

**Heavy Equipment Mechanic's Helpers** require no previous experience, but may take an eight month General Mechanics Pre-Employment program at Yukon College to prepare for their career. To become an **Apprentice**, you must have at least academic Grade 11 or equivalent education to enter the four year apprenticeship program. Those who have graduated from the General Mechanics Pre-Employment program can take an exam and receive credit that will shorten their apprenticeship period. Apprenticeship programs include both paid on-the-job learning and shop/classroom training.

To become a **Certified Heavy Equipment Mechanic** in the Yukon, a candidate must pass an exam after completing his/her apprenticeship or after six years in the trade. Interprovincial trade certification (Interprovincial Standards Red Seal) is also available to qualified Mechanics, which allows them to practice their trade in any province or territory after passing an exam.

# HEAVY EQUIPMENT MECHANIC & APPRENTICE/HELPER (Cont.)

## **SALARY RANGE**

The Yukon Fair Wage Schedule rate for Heavy Equipment Mechanic is \$27.03/hour. Heavy equipment mechanics can make \$22,000 to \$83,800/year, averaging \$61,000/year. Apprentices make 50 per cent or more of the certified rate.

# HEAVY EQUIPMENT OPERATOR

**Heavy Equipment Operators** are responsible for excavating, land clearing, grading, and road building at the mine or exploration site, or nearby. Equipment includes excavators, backhoe/loaders, graders, bulldozers, front-end loaders, and gravel dump trucks. Operators also service and maintain their equipment.

In the mining industry, heavy equipment operators are critical to the construction and maintenance of roads, bridges, airports, gas and oil pipelines, tunnels, buildings, and other structures. Specifically:

- **Back-hoe Operators** run backhoes equipped with scoops, shovels, or buckets, to excavate and load loose materials. They may also dig trenches, load heavy materials, vibrate and break rock or concrete, and back-fill excavations. They may shape and grade earth walls or slopes and remove trees and debris.
- **Bulldozer Operators** use the bulldozer blade and other attachments to gouge out and move rock, earth and other materials. They remove overburden (trees and bushes) to clear sites for exploration, clear land for mine construction, and clear obstructions on roads.
- **Excavator Operators** use excavators to dig, move and load earth, rock, or other materials. They may work from drawings to excavate to specific heights, levels, or alignments.
- **Front End Loader** operators pick up loads of earth and rock then move and dump them into trucks or piles.
- **Grader Operators** control the height and angle of grader blades to spread and level earth or other materials. They may be required to level surfaces to a specific grade. For example, "finish" grader operators in road construction are required to accurately and consistently level surfaces to within a centimetre or two of surveyors' marks on grade stakes.
- **Rock Truck Drivers** operate the giant dump trucks used to haul large loads of ore in surface mine operations.
- **Scraper Operators** use scrapers to pick up, haul, deposit, and level earth on mining sites. Scraper operators scrape surfaces to a given depth by following the guidance of survey pegs.

## KNOWLEDGE, ABILITIES & SKILLS

- mechanical interest and aptitude
- physical fitness
- driver's license
- willingness to work outdoors
- good hand/eye/foot coordination
- good vision and depth perception
- attention to detail and precision

# HUMAN RESOURCES PERSONNEL

**Human Resources Personnel** help mining companies find and keep employees. They identify job vacancies, conduct hiring processes, evaluate job descriptions, and conduct interviews to hire new employees. They oversee the training of new staff and programs to upgrade the skills and develop the careers of current staff. They advise management on the best policies and practices to help keep employees safe and satisfied in their jobs.

Human Resources Personnel help resolve staff problems, difficulties, or conflicts. They may also participate in labour-management negotiations or arbitration. They advise management on how to interpret labour contracts, administer disciplinary procedures, or deal with grievances. Human Resources Personnel also conduct performance appraisals and advise management on adjusting job descriptions and pay scales. They may also be involved in special projects including day-care, services to persons with disabilities, and employee awards.

Positions in the industry include **Human Resources Clerks/Coordinators/Managers and Recruitment and Employment Counselors.**

## **KNOWLEDGE, ABILITIES & SKILLS**

- verbal, written and presentation skills
- inter-personal skills
- conflict resolution and negotiation skills
- ability to work under pressure
- knowledge of labour acts and regulations
- analytical and detail-oriented
- computer skills

## **EDUCATION, TRAINING & CERTIFICATION**

A university business degree or college diploma in a field related to personnel management, such as Business Administration, Industrial Relations, Commerce or Psychology is generally required. Alternatively, the completion of a professional development program in personnel administration is required.

**SALARY RANGE** \$30,000 - \$105,000/year, averaging \$54,000/year.

**LINKS** Canadian Council of Human Resources Associations: [www.cchra-ccarh.ca](http://www.cchra-ccarh.ca)

# HYDROLOGIST

**Hydrologists** study water and how it moves in the atmosphere, on land, and underground. They work with mining companies and other scientists to help discover, plan, and develop mines, as well as in mine production and closure.

Hydrologists conduct investigations of the flow and storage of water in order to reduce or eliminate sources of pollutants or hazards that affect the environment. They use instruments and techniques to take samples of water, soil, sediment, and rocks and analyse them in laboratories. They also track changes in the water cycle using remote sensing equipment. Hydrologists conduct environmental impact assessments of mining projects on water quantity and quality.

Hydrologists develop water and drainage management plans and prepare technical reports. They also help clean up contaminated sites and can be involved in the development of new laws to protect groundwater.

## **KNOWLEDGE, ABILITIES & SKILLS**

- interest and background in science, mathematics and the environment
- analytical and inquisitive mind
- problem solving skills
- oral and written communication skills
- physical stamina for field work
- knowledge of environmental acts and regulations

## **EDUCATION, TRAINING & CERTIFICATION**

The minimum education requirement for this job is a four year university degree in Hydrology, Geography, Environmental Science, or a related subject. Hydrologists who provide geological input must have a degree in Geology and Professional Geologist status. Professional positions including research or college teaching require a master's or doctoral degree.

**SALARY RANGE** \$42,000 - \$198,000/year, averaging \$111,000/ year.

## **LINKS**

International Association of Environmental Hydrology: [www.hydroweb.com](http://www.hydroweb.com)

Canadian Geophysical Union: [www.cgu-ugc.ca](http://www.cgu-ugc.ca)

# INDUSTRIAL ENGINEER, TECHNOLOGIST & TECHNICIAN

**Industrial Engineers** analyze how equipment, people, technology, and materials work together in order to increase the efficiency and productivity in a mine. They plan mine layouts and select the most efficient machines and equipment. They evaluate existing mines and adjust inventory, production, and resources including machinery and materials.

Industrial Engineers study how to make work simpler, train personnel, and develop standards for performance and evaluation. They conduct studies to increase health and safety and to address fire and other hazards. Industrial Engineers supervise technicians, technologists, analysts, administrative staff, and other engineers.

**Industrial Engineering Technologists** gather and analyze information about how people, machines, and materials are used in organizations to ensure that products and services are delivered in the most cost effective and timely manner possible. They design plant layouts and production facilities and carry out work study and related programs. They prepare industrial health, safety, and fire prevention plans and programs. They conduct safety training programs.

**Industrial Engineering Technicians** assist in solving problems of industrial layout or manufacturing production, under the direction of engineering staff. They may study and record time, motion, method, and speed involved in performance of production, maintenance, clerical, and other worker operations to help improve efficiency.

## KNOWLEDGE, ABILITIES & SKILLS

- problem solving and analytical skills
- data analysis ability
- ability to work on a team
- good writing and communication skills

## EDUCATION, TRAINING & CERTIFICATION

To become an **Industrial Engineer**, a four year university degree in Industrial Engineering is required. Only individuals licensed by Association of Professional Engineers of Yukon are permitted by law to undertake and assume responsibility for engineering projects in Yukon.

Completion of a one year college program in industrial engineering technology is usually required for **Industrial Engineering Technicians**. Completion of a two year college program in industrial engineering technology or a closely related discipline is usually required for **Industrial Engineering Technologists**. The Association of Science and Engineering Technology Professionals of Alberta certify and register Yukon's applied science, information and engineering technology professionals.

## SALARY RANGE

Engineer: \$26,000-\$113,000/ year, averaging \$69,000/year.

# INDUSTRIAL ENGINEER, TECHNOLOGIST & TECHNICIAN (Cont.)

**LINKS:**

Canadian Council of Professional Engineers: [www.engineerscanada.ca/index.cfm](http://www.engineerscanada.ca/index.cfm),

Association of Professional Engineers of Yukon: [www.apey.yk.ca](http://www.apey.yk.ca)

The Association of Science and Engineering Technology Professionals of Alberta:

[www.aset.ab.ca](http://www.aset.ab.ca)

Canadian Council of Technicians and Technologists: [www.cctt.ca](http://www.cctt.ca)

# INDUSTRIAL INSTRUMENT TECHNICIAN & APPRENTICE/HELPER

**Industrial Instrument Technicians** install, maintain, and repair a wide variety of pneumatic, electronic, and electrical instruments used in mines. These instruments are used to measure and control variables such as pressure, flow, temperature, level, motion, force, and chemical composition.

Industrial Instrument Technicians also calibrate, repair, maintain, and adjust control and metering system components or remove and replace defective parts. They install instruments on new or existing plant equipment and processes. They do risk assessments and work with engineers on basic design.

**Apprentices and Helpers** assist Technicians.

## KNOWLEDGE, ABILITIES & SKILLS

- mathematical, scientific and mechanical aptitude
- problem solving skills
- attention to detail
- hand-eye coordination
- willing to work in challenging environments (noisy, high places, dusty, cold or hot conditions, high pressure equipment, exposure to chemicals)
- ability to work independently

## EDUCATION, TRAINING & CERTIFICATION

**Industrial Instrument Technician's Helpers** require no previous experience. To become an **Apprentice**, you must have at least academic Grade 12 or equivalent education to enter the four year apprenticeship program. Apprenticeship programs include both paid on-the-job learning and technical training.

To become a **Certified Industrial Instrument Technician** in the Yukon, a candidate must pass an exam after completing his/her apprenticeship or after six years in the trade. Interprovincial trade certification (Interprovincial Standards Red Seal) is also available to qualified Industrial Instrument Technician, which allows them to practice their trade in any province or territory after passing an exam.

The Northern Alberta Institute of Technology in Edmonton and the Southern Alberta Institute of Technology in Calgary offer related training including a two – year Instrumentation Engineering Technology diploma program. Graduation from these programs can be credited towards an apprenticeship and certification.

**SALARY RANGE** \$31,000 to \$113,000/year, averaging \$66,000/year. Apprentices make 50 per cent or more of the certified rate.

# LABOURER

**Labourers** are in demand in the mining industry and are critical to every stage of the mine cycle. They help with construction, repair, cleanup, and maintenance. In an exploration camp, for example, they put up and take down tents and other camp structures. Labourers move, maintain, and repair equipment, move supplies and assist geologist in cutting samples, and/or preparing samples for shipment. Labourers in exploration camps with specific jobs include: **Line Cutters, Claim stakers, Core Splitters, Core Sawers, and Core Technicians.**

At a mine site, Labourers assist other mine workers and tradespersons with drilling, blasting, excavating, drill set up and machine operations. They clean rooms, roadways, spills, working areas, and mining equipment. They remove rubble and other debris at construction sites. Labourers load, move, sort, and pile materials and supplies. They also oil, grease, and help repair all kinds of mine equipment. They may also direct traffic at, or near, construction sites.

## **KNOWLEDGE, ABILITIES & SKILLS**

- physical fitness and stamina
- communication and listening skills
- ability to work as part of a team

## **EDUCATION, TRAINING & CERTIFICATION**

No previous experience required although a high school diploma and Class 5 driver's license may be necessary. On-the-job training is usually provided. Progression to **Miner** or other positions is possible with experience and training.

Northwest Community College (Smithers, BC) offers a Mining Exploration Field Assistant program that prepares individuals for the safety and physical demands of entry-level employment in exploration. Part of the course is in the classroom while the rest of the course is taught in a remote tent camp. The Mining Exploration Field Assistant program is a drug and alcohol free environment. Applicants must be 19 years or older at the time of the course and have completed occupational first aid Level 1 and transportation endorsement.

## **SALARY RANGE**

The Yukon Fair Wage Schedule rate for Labourer is \$19.50 per hour. A skilled labourer with knowledge and experience may receive a higher salary.

# LAWYER & LEGAL ASSISTANT

**Lawyers** advise mining companies on legal matters. During the mine exploration phase, Lawyers may prepare confidentiality agreements, partnership agreements with First Nations, stock exchange listings and offerings, and socio-economic impact assessment agreements. They may also prepare claims disputes and title opinions. During mine development, they may prepare project financing proposals and mineral production sales contracts. They may be involved in environmental assessment and regulatory hearings and permitting. They may prepare construction and other contracts for project partners.

When a mine is in production, Lawyers are involved in acquisitions and restructuring. They are involved in labour law including collective bargaining and human rights, termination, and severance. They may also be associated with environmental prosecutions and property tax assessments. During mine closure, Lawyers are engaged in mine reclamation approval, bonding, and/or funding. They are also involved in legal issues associated with site remediation and abandonment liabilities and certification.

**Legal Assistants** help lawyers to prepare legal documents, maintain records and files, and conduct research. They organize and prepare of the legal forms and documents for each case or deal on which a lawyer is working. They conduct research many of the activities in which a law firm may be involved. Legal Assistants ensure that all files, contracts and documents are correct and accurate.

## KNOWLEDGE, ABILITIES & SKILLS

- oral and written communication skills
- attention to detail
- organized and self motivated
- logical and analytical mind
- work well under pressure
- ability to ensure client confidentiality

## EDUCATION, TRAINING & CERTIFICATION

A high school diploma is required to enter a community college **Legal Assistant** or law clerk program.

To become a **Lawyer**, a three to four year undergraduate degree is required prior to entering a recognized law school. A law degree is a three year university bachelor's degree. New lawyers must also complete a bar examination and a period of "articling" (a type of internship) with a legal firm before they may practice law in any Canadian jurisdiction. This process generally lasts about a year. The Law Society of Yukon is the governing body for Yukon lawyers.

## LAWYER & LEGAL ASSISTANT (Cont.)

### **SALARY RANGE**

Lawyers: \$27,000 - \$186,000/year, averaging \$110,000/year.

Legal Assistant: \$28,000 - \$42,000/year.

### **LINKS**

Law Society of Yukon: [www.lawsocietyyukon.com/](http://www.lawsocietyyukon.com/)

# MACHINIST & APPRENTICE/HELPER

**Machinists** operate precision tools that cut or grind metal, plastic, or other materials to make or modify parts or products. The machining tools they use include lathes, drill presses, milling machines, and grinders. Machinist use blueprints and measurements to calculate dimensions, tolerances, and to determine the machining operations required.

Machinists select tools and materials and determine the size and position of cuts. To do the actual machining, they may use manually operated machining tools or computer numerically controlled (CNC) tools. To operate CNC tools, Machinists program detailed instructions. Once the program is set up, one or many copies of the same part can be cut automatically.

A **Machinist's Apprentices and Helper** assists the Machinist in areas including, machine tool maintenance and use of cutting tools as well as shop safety and cleaning tasks.

## KNOWLEDGE, ABILITIES & SKILLS

- mechanical ability and skills
- mathematical aptitude
- analytical and problem solving ability
- ability to estimate accurately and think in three dimensions
- attention to detail and precision
- concentration and careful planning

## EDUCATION, TRAINING & CERTIFICATION

**Machinist's Helpers** are trained on-the-job and require no previous experience. To become an **Apprentice**, a candidate must have a Grade 10 or equivalent education in order to enter a four-year apprenticeship program. Apprenticeship programs include both on-the-job learning and shop/classroom training.

To become a **Certified Machinist** in the Yukon, a candidate must pass an exam after completing his/her apprenticeship or after six years in the trade. Interprovincial trade certification (Interprovincial Standards Red Seal) is also available to qualified Machinist, which allows them to practice their trade in any province or territory after passing an exam.

**SALARY RANGE:** \$41,000 - \$65,000/year, averaging \$60,00/year. Apprentices make 50 per cent or more of the certified rate.

# MARKETING, ADVERTISING & PUBLIC RELATIONS PERSONNEL

**Marketing Personnel** design, direct, and evaluate the marketing strategies of mine companies. They initiate market research studies, analyze their findings, and assist in product development. They determine the demand for products and services offered by a mining company or mine supply company. They identify potential customers and establish distribution networks for products and services.

Marketing Personnel develop pricing strategies with the goal of maximizing the company's profits or share of the market while ensuring customers are satisfied. They also monitor trends that indicate the need for new products and services.

**Advertising Personnel** develop and implement advertising campaigns to promote the sales of products and services with a goal of increasing sales. They prepare advertising and promotional materials for customers, company officials, sales departments and advertising agencies. Advertising Personnel inspect layouts and advertising copy. They edit scripts, audio and video tapes, and other promotional materials. They prepare quotes and budgets, and negotiate advertising and sales contracts.

**Public/Investor Relations Personnel** prepare communication strategies and information programs, publicize activities and events, and maintain media relations for mine companies. They help inform clients, employees, and the general public of initiatives and policies of the company. They do so by preparing educational and publicity programs and materials to increase public awareness of the mining industry.

Public/Investor Relations Personnel conduct public opinion and attitude surveys to identify the interests and concerns of key groups served. They also prepare or oversee preparation of reports, briefs, bibliographies, speeches, presentations, web sites, etc.

## KNOWLEDGE, ABILITIES & SKILLS

- communication and negotiating skills
- knowledge of human behavior
- creativity and artistic ability
- self-confidence, persistence, initiative and enthusiasm
- organizational and time management skills
- the ability to cope with uncertainty, stress, and long hours

## EDUCATION, TRAINING & CERTIFICATION

A university degree or college diploma in Business Administration (available at Yukon College), Public Relations, Communications, Marketing, Advertising, Journalism or a discipline related to a particular subject matter is usually required.

**SALARY RANGE** All these positions range from \$24,000 - \$146,000/year. Managers average \$85,000/year.

# MATERIALS & WAREHOUSING PERSONNEL

**Materials and Warehousing Personnel** handle, move, load, and unload materials by hand or using a variety of pieces of equipment. They may operate forklifts, winches and other loading equipment. They may operate industrial trucks, tractors and loaders that move materials around mine sites and warehouses. They also count, weigh, sort, pack, and unpack materials. They may also open containers and crates, fill warehouse orders, assist in taking inventory, and check orders.

**Shipper/Receivers** ship, receive, and issue goods. They are also responsible for repackaging of goods and assisting with driving. They often operate mechanical equipment including forklifts.

## KNOWLEDGE, ABILITIES & SKILLS

- physical strength
- systematic and well organized
- attention to detail
- good communication skills
- writing and math skills

## EDUCATION, TRAINING & CERTIFICATION

A high school education may be required. On the job training is usually provided. A driver's license may also be required. Northern Alberta Institute of Technology (Edmonton, AB) offers a distance education certificate in Warehouse Training.

To become an **Industrial Warehouse Worker Apprentice**, you must have at least academic Grade 10 or equivalent education to enter the three year apprenticeship program. Apprenticeship programs include both paid on-the-job learning and shop/classroom training. To become a **Certified Industrial Warehouse Worker** in the Yukon, a candidate must pass an exam after completing his/her apprenticeship or after four and a half years in the trade.

**SALARY RANGE** \$26,000 - \$55,000/year, averaging \$46,000/year.

# MECHANICAL ENGINEER, TECHNOLOGIST & TECHNICIAN

**Mechanical Engineers** research, design, and develop mine machinery and systems. These include heating, ventilating, air conditioning, power generation, transportation, processing, and manufacturing equipment and systems. Mechanical Engineers design power plants, machines, components, tools, fixtures, and equipment. They supervise and inspect the installation and modification of mechanical systems at new mine sites. They develop maintenance standards, schedules, and programs. They also provide guidance to industrial maintenance crews.

Mechanical Engineers prepare contract documents and evaluate tenders for industrial construction or maintenance. They also investigate mechanical failures or problems. They supervise technicians, technologists, and other engineers.

**Mechanical Engineering Technologists** prepare engineering designs, cost estimates, and project timelines for the development and installation of systems and machines used at mine sites. They conduct tests and analyses of machines, components, and materials to determine their performance, strength, response to stress, and other characteristics. They design moulds, tools, dies, jigs, and fixtures. They inspect mechanical installations and supervise mechanical maintenance programs.

**Mechanical Engineering Technicians** provide assistance to technologists and engineers in preparing drawings, conducting mechanical tests, designing items, and inspecting mechanical installations and construction projects. They also participate in the installation, repair, and maintenance of machinery and equipment.

## KNOWLEDGE, ABILITIES & SKILLS

- mechanical aptitude and math skills
- problem solving skills
- oral and written communication skills
- planning and organizing skills
- ability to work on a team
- ability to visualize in three dimensions

## EDUCATION, TRAINING & CERTIFICATION

To become a **Mechanical Engineer**, a four year university degree in Mechanical Engineering is required. Only individuals licensed by Association of Professional Engineers of Yukon are permitted by law to undertake and assume responsibility for engineering projects in Yukon.

Completion of a one year college program in Mechanical Engineering Technology is usually required for **Mechanical Engineering Technicians**. Completion of a two year program is usually required for **Mechanical Engineering Technologists**. The Association of Science and Engineering Technology Professionals of Alberta certify and register Yukon's applied science, information and engineering technology professionals.

# MECHANICAL ENGINEER, TECHNOLOGIST & TECHNICIAN (Cont.)

## **SALARY RANGE**

Engineer: \$37,000 - \$168,000/year, averaging \$81,000/year.

Technologist and Technician: \$23,000 - \$121,000/year, averaging \$63,000/year.

## **LINKS:**

Canadian Council of Professional Engineers: [www.engineerscanada.ca/index.cfm](http://www.engineerscanada.ca/index.cfm),

Association of Professional Engineers of Yukon: [www.apey.yk.ca](http://www.apey.yk.ca)

The Association of Science and Engineering Technology Professionals of Alberta:

[www.aset.ab.ca](http://www.aset.ab.ca)

Canadian Council of Technicians and Technologists: [www.cctt.ca](http://www.cctt.ca)

# METALLURGICAL ENGINEER, TECHNOLOGIST & TECHNICIAN

**Metallurgical Engineers (Metallurgists)** design and develop machinery and processes to separate metals from ore (rock containing minerals) and to purify and refine metals. Metals are separated from the ore by crushing and grinding (milling) or by using chemicals or electricity. Metallurgists test and analyze metal samples and conduct studies on their properties using sophisticated equipment. Metallurgists supervise technologists, technicians, and other engineers.

**Metallurgical Technologists** are involved in the many processes that transform natural mineral ores into finished metal products. Metallurgical Technologists conduct routine microscopic examinations of metals to determine their structure and other characteristics. They examine samples with x-ray, gamma-ray, and other special equipment to detect the properties, impurities, and defects in metals. They also write technical reports and maintain laboratory equipment.

**Metallurgical Technicians** assist Metallurgical Technologists in analyzing data, operating lab equipment and running tests.

## KNOWLEDGE, ABILITIES & SKILLS

- interest in science and chemistry
- analytical skills and curious mind
- keen observation skills and good recordkeeping
- problem solving ability

## EDUCATION, TRAINING & CERTIFICATION

To become a **Metallurgical Engineer**, a four year university degree in Metallurgical or Chemical Engineering is required. Only individuals licensed by Association of Professional Engineers of Yukon are permitted by law to undertake and assume responsibility for engineering projects in Yukon.

Completion of a one year college program in Engineering, Metallurgical Technology, Materials Engineering Technology is usually required for **Metallurgical Engineering Technicians** and two years for **Metallurgical Engineering Technologists**. The Association of Science and Engineering Technology Professionals of Alberta certify and register Yukon's applied science and engineering technology professionals.

## SALARY RANGE

Engineers: \$39,700 to \$103,000/year, averaging \$79,000/year.

Technologists: \$48,000 - \$111,000/year.

Technicians: \$45,000 - \$71,000/year.

## LINKS

Association of Professional Engineers of Yukon: [www.apey.yk.ca](http://www.apey.yk.ca).

The Association of Science and Engineering Technology Professionals of Alberta: [www.aset.ab.ca](http://www.aset.ab.ca)

Canadian Council of Technicians and Technologists: [www.cctt.ca](http://www.cctt.ca)

# MILL OPERATOR

**Mill Operators** (also known as **Mill Technician**) control and operate the complex mill machines that process minerals in a mine. The machines include conveyor belts, vibrating feeders, rod and ball mills, centrifugal separators, distributors, magnetic separators, and pumps. The machines grind, filter, mix, separate, and otherwise process mineral ores after they have been removed from the ground.

Mill Technicians regulate the flow of materials in and out of mill equipment to ensure a proper product is achieved. They monitor the flow of materials, water, and lubricants and observe temperature, vacuum, pressure, and electricity. They record the level of production and any equipment malfunctions. They are responsible for the routine maintenance, cleaning, and repair of mill equipment.

## **KNOWLEDGE, ABILITIES & SKILLS**

- mechanical aptitude
- good hand eye coordination and motor skills
- attention to detail and observation skills
- willingness to work in noisy or dusty environments

## **EDUCATION, TRAINING & CERTIFICATION**

Completion of high school is usually required and on the job training may be provided. Experience as a **Labourer** in mineral and metal processing is usually required for Mill Operators/Technicians. A one – three year diploma in Mining Technology is available at Northern colleges including Cambrian College in Sudbury, ON. Six month courses in Mineral Process Operator pre-employment are offered at some colleges as well.

**SALARY RANGE:** \$31,000/year on average.

# MILLWRIGHT & APPRENTICE/HELPER

**Millwrights** are responsible for the installation, maintenance and repair of a variety of stationary machinery. This machinery may include: mechanical, pneumatic, hydraulic, fuel, lubrication, cooling, and exhaust systems and equipment. Millwrights are responsible for assembling, installing, aligning, maintaining, repairing, troubleshooting, inspecting, dismantling, and moving this machinery and equipment. Other tasks that are performed may include welding, cutting, and machining as well as blueprint reading. Millwrights operate hoisting and lifting devices to install and repair equipment.

Millwrights specialize in two areas: **Construction Millwrights** are mostly engaged in the initial installation of industrial plant machinery and equipment. **Industrial Mechanics** maintain and repair of machinery and equipment after it has been installed.

A **Millwright's Apprentices and Helper** assists the Millwright in areas including equipment installation, maintenance and basic repair as well as cleaning tasks.

## KNOWLEDGE, ABILITIES & SKILLS

- mechanical interest and aptitude
- knowledge and use of hand and power tools
- problem solving ability
- planning and organizing skills
- manual dexterity and ability to visualize in three dimensions
- willingness to work in varied and challenging work environments (confined spaces, at heights)

## EDUCATION, TRAINING & CERTIFICATION

**Millwright's Helpers** are trained on-the-job and require no previous experience. To become an **Apprentice**, a candidate must have at least a Grade 10 or equivalent education in order to enter a four-year apprenticeship program. Apprenticeship programs include both on-the-job learning and shop/classroom training. Northern Lights College (Dawson Cree, BC) offers a twenty week entry level training program for Grade 11 and 12 students.

To become a **Certified Millwright** in the Yukon, a candidate must pass an exam after completing his/her apprenticeship or after six years in the trade. Interprovincial trade certification (Interprovincial Standards Red Seal) is also available to qualified Millwrights, which allows them to practice their trade in any province or territory after passing an exam.

**SALARY RANGE** The Yukon Fair Wage Schedule rate for Millwrights is \$27.03/hour. Millwrights can make \$28,000 - \$93,000/year, averaging \$62,000/year. Apprentices make 50 per cent or more of the certified rate.

# MINE MANAGEMENT

**Mine Managers** are responsible for overall mine operations, maintenance, engineering and geology, and oversight of a workforce that may number over 100 people. Mine Managers:

- plan, organize, direct, control, and evaluate the activities and operations of a mine;
- develop and implement policies, standards and procedures for the mine;
- prepare and negotiate contracts with consultants, clients, suppliers, and subcontractors;
- recruit personnel and oversee staff development including training;
- supervise, coordinate, and oversee activities of workers including Supervisors and Shift Bosses;
- recommend or initiate personnel actions such as hiring, promotions, transfers, discharges, and disciplinary measures;
- ensure production schedules are met;
- consult with managerial, technical, contract, and other personnel to in order to coordinate activities, meet targets, improve productivity, and resolve problems;
- oversee the safety of the mine;
- estimate, order, and inspect materials;
- develop and implement quality control programs;
- participate directly in the design, development, and inspection of technical projects;
- represent the mining company on matters such as business services and union contracts negotiation;
- Prepare progress and production reports for clients.

**Supervisory Personnel** in mines include: Mine Foreman/woman, Mine Captain, Shift Bosses, and Supervisors. These positions have a wide range of oversight duties and responsibilities and include the day-to-day supervision and coordination of activities of workers engaged in one or more occupations in a mine. They plan daily production levels for the mine and ensure that all equipment and supplies required by workers are available when needed. They undertake training and orientation of workers and schedule work shifts.

Supervisory Personnel are responsible for ensuring that mine personnel comply with safety regulations and emergency procedures. They regularly inspect mine sites both above and below ground. Supervisory Personnel ensure that roadways and machinery are in safe condition and that equipment safety regulations are met. They supervise the storage and use of explosives. They are responsible for the support structure in an underground mine. They may conduct tests to detect the presence of gas and ensure underground ventilation is adequate.

# MINE MANAGEMENT (Cont.)

## KNOWLEDGE, ABILITIES & SKILLS

- knowledge of, and experience in, the mining industry
- knowledge of business and management principles
- analytical problem solving skills
- leadership, judgment and decision making skills
- time management and organizational ability
- oral and written communication skills
- interpersonal skills including skills in conflict resolution
- ability to work in a team or independently
- ability to work under pressure to deadlines

## EDUCATION, TRAINING & CERTIFICATION

Requirements are specific to each mine company but in general include either a Bachelor's, Master's or Journeyman level education/certification as well as a number of years of experience in the field.

Demonstrated familiarity with concepts, practices, and procedures of mining is important as well as experience in other supervisory positions. Specific training is also required including Supervisor and/or Shift Boss certification and mine rescue training.

**SALARY RANGE:** Levels depend on the mine company, position and level of experience. Mine Manager salaries can range from \$78,000 – \$166,000/year, averaging \$130,000/year. Mine Foreman salaries ranged from \$45,000/year - \$107,000/year, averaging \$76,000/year.

# MINER - SURFACE

**Surface Miners** do a wide range of tasks in a surface mine. They operate mobile equipment, conduct blasting operations, operate service equipment, or operate portable production equipment depending on the type of mine. Open pit mining involves removing the overburden (topsoil and waste rock) by drilling holes with self-propelled drills in a blasting pattern. Strip mining uses draglines, cable, or hydraulic shovels to remove the overburden. Some specific jobs are noted below:

- **Blasters** handle, load, and detonate the explosives used to dislodge ore and rock.
- **Cable Reelers** operate equipment to pick up electrical or steel cables and transport them in a safe and efficient manner.
- **Crusher Operators** set up, operate, or tend machines to crush ore.
- **Dewatering Operators** run the filter that removes water from crushed rock before shipping.
- **Dragline Operators** run draglines, enormous excavators that swing or lower a bucket and a rope or chain (dragline) over land that is being cleared.
- **Explosive Packer and Handlers** handle, move, load and unload explosives by hand or using a variety of material handling equipment.
- **Flotation Operators** run the tanks that mix chemicals into crushed rock and water.
- **Grinder Operators** run the equipment that does the rock crushing.
- **Heavy Equipment Operators** are responsible for excavating, land clearing, grading and road building at the mine site or in its vicinity. Equipment includes excavators, backhoe/loaders, graders, bulldozers, front-end loaders, and gravel dump trucks.
- **Helpers or Labourers** assist earth drillers, blasters, and explosives workers and mining machine operators, by performing duties of lesser skill. Duties include supplying equipment or cleaning work area.
- **Hydraulic or Cable Shovel Operators** run machinery equipped with scoops, shovels, or buckets, to excavate and load ore.
- **Reagent Operators** work with a machine that mixes chemicals into tanks filled with powdered rock and water.

## KNOWLEDGE, ABILITIES & SKILLS

- mechanical aptitude and ability to perform routine maintenance on machines
- reasonable strength, agility and stamina (long hours)
- good hand-eye co-ordination, hearing, and eyesight
- good spatial perception for judging distances
- ability to remain alert while performing repetitive tasks
- willingness to work a variety of shifts and schedules
- comfortable working in high places.

## MINER - SURFACE (Cont.)

### EDUCATION, TRAINING & CERTIFICATION

There are no standard education requirements for Surface Miners, but you must be 16 years or older to work in an surface mine in the Yukon. Only workers 18 or older may work on the working face of a surface mine.

Equipment operators are often trained on-the-job, particularly as equipment is often unique or adapted to a specific mining environment. Employers generally prefer to hire applicants who have a high school diploma and experience working in a mine or operating heavy equipment in an industrial environment. A Class 5 driver's license is usually required. Applicants may be required to pass a medical exam and pre-employment drug screening test.

In addition to on-the-job training, some community colleges, in cooperation with local mines, offer 2-8 month courses to certify operators in various pieces of equipment specific to surface mines. Colleges include Keyano College (Fort McMurray, AB) and Northern Lights College (all campuses in Northern BC).

**SALARY RANGE** Salary levels depend upon the specific job, but in general, Surface Miners earn \$26,000 - \$99,000/year, averaging \$60,000/year. See separate entries for Blaster, Heavy Equipment Operator and Labourer.

# MINER – UNDERGROUND

**Underground Miners** do a wide range of tasks in an underground mine. They can be involved in the creation and development of a mine or in mine operations. There are many different types of jobs in each.

**Development Miners** operate and maintain mobile drilling and blasting equipment and remove the blasted rock (called muck) with specialized equipment. They also construct tunnels, passageways and shafts to expand mine operations. Some positions are noted below:

- **Blasters** handle, load, and detonate the explosives used to dislodge ore and rock.
- **Explosive Packer and Handlers** handle, move, load, and unload explosives by hand or using a variety of material handling equipment.
- **Helpers or Labourers** assist extraction workers including: earth drillers, blasters and explosives workers, and mining machine operators by performing duties of lesser skill. Duties include supplying equipment or cleaning work areas.
- **Jumbo and/or Jackleg Operators** set up and operate mobile drills and drilling machines that bore blasting holes in rock and ore.
- **Mine Cutting and Machine Operators** operate machinery to cut or channel along the face or seams of ore in mines to facilitate blasting, separating, or the removal of minerals or materials.
- **Raise Miners** operate self-propelled mining machines that remove ore from a rock wall and load it onto conveyors or into shuttle cars in a continuous operation.
- **Raise Boring Machine Operators** create connections between different mine levels.
- **Scooptram Operators** run or tend machinery equipped with scoops, shovels, or buckets, to gather ore and waste rock and dump it onto a conveyor belt, truck, or chute.

**Service and Support Miners** perform a range of duties related to the day-to-day operation of the mine. They operate chutes and conveyor systems. They construct underground structures, passages, and roadways using mechanical shovels, bulldozers, graders, and front-end loaders. They maintain the supply of materials and supplies to support underground mining. Some positions are noted below:

- **Cage Tenders** operate mineshaft elevators or ‘cages’ that are used to bring workers and materials in and out of an underground mine.
- **Helpers & Labourers** assist extraction workers, such as earth drillers, blasters and explosives workers, and mining machine operators by performing duties of lesser skill. Duties include supplying equipment or cleaning work areas.

## MINER – UNDERGROUND (Cont.)

- **Hoistpersons** operate or tend hoists or winches to lift and pull loads.
- **Nippers** switch and attach/remove cars being hauled or hoisted by cable or chain in mines or quarries.
- **Rock Splitters** split stone, using air hammers, wedges, and shims.
- **Roof Bolters** install supports for the walls and roof with special rock bolts and erect wooden or steel props, pillars and arches.
- **Shuttle Car Operators** drive a diesel or electric-powered shuttle car to transport materials from the working face to mine cars or conveyor.

### KNOWLEDGE, ABILITIES & SKILLS

- mechanical aptitude and ability to do perform routine maintenance on machines
- reasonable strength, agility, and stamina (long hours)
- hand-eye co-ordination
- spatial perception for judging distances
- ability to remain alert while performing repetitive tasks
- attention to detail and observant
- willingness to work in varied and challenging work environments (confined spaces underground, noisy and dirty environments) in remote locations
- problem solving ability
- ability to work as part of a team

### EDUCATION, TRAINING & CERTIFICATION

There are no standard education requirements for Underground Miners, but you must be 18 years or older to work in an underground mine in the Yukon. Equipment operators are often trained on-the-job, particularly as equipment is often unique or adapted to a specific mining environment. Employers generally prefer to hire applicants who have a high school diploma and experience working in a mine or operating heavy equipment in an industrial environment. A Class 5 driver's license is usually required. Applicants may be required to pass a medical exam and pre-employment drug screening test.

**SALARY RANGE** Salary levels depend upon the specific job, but in general, Underground Miners earn \$45,000 - \$90,000/year, averaging \$65,000/year. See separate entries for Blaster and Labourer.

# MINING ENGINEER, TECHNOLOGIST & TECHNICIAN

**Mining Engineers** have a role in every step of mine development and operations. They plan, organize, and supervise the development of mines and mine structures as well as the operation and maintenance of mines, working with Mine Management. They:

- conduct studies of mineral deposits to assess whether a mine will go ahead;
- determine drilling and blasting methods;
- design shafts, ventilation systems, mine services, haulage systems, and supporting structures;
- plan and design or select mining and mineral treatment equipment and machinery;
- prepare operations and project estimates, schedules, and reports;
- ensure mine safety and implement mine safety programs;
- supervise and coordinate the work of technicians, technologists, survey personnel, and other engineers and scientists;
- oversee staff hiring and equipment purchase.

**Mining Engineering Technologists** can be involved in the exploration and identification of mine sites, the evaluation of existing mines, or the day-to-day operations of a mine. Mining Engineering Technologists working in exploration perform duties such as interpreting maps and geological data, conducting or organizing surveys, and working with an exploration team of geologists and engineers. Those working in production may also work in an office interpreting data from the field to forecasting or budgeting. Some Mining Engineering Technologists perform other technical duties at a mine site such as environmental quality testing, supervising operations, or equipment operating.

**Mining Engineering Technicians** help the mine engineering team cope with the many and varied technical problems which arise daily in the field, office, or underground. Some typical fields of work include surveying, drafting, design, environmental studies, industrial, geological, and geophysical fieldwork, ventilation engineering, and rock mechanics.

## KNOWLEDGE, ABILITIES & SKILLS

- interest in chemistry, physics, math and engineering
- leadership and decision making skills
- inquisitive and analytical mind
- problem solving ability
- planning and organizing skills
- teamwork and communication skills

## EDUCATION, TRAINING & CERTIFICATION

To become a **Mining Engineer**, a four year university degree in Mining Engineering is required. Only individuals licensed by Association of Professional Engineers of Yukon are permitted by law to undertake and assume responsibility for engineering projects in Yukon.

## MINING ENGINEER, TECHNOLOGIST & TECHNICIAN (Cont.)

Completion of a two year college program in Mining Materials Engineering is usually required for **Mine Engineering Technicians**. Grade 12 English and Math or mature student status is a required to enter the program. Completion of a three year college program is usually required for **Mining Engineering Technologists**. The Association of Science and Engineering Technology Professionals of Alberta certify and register Yukon's applied science, information and engineering technology professionals.

### **SALARY RANGE**

Engineers: \$55,000 - \$140,000/year, averaging \$73,000/year.

Technologists: \$40,000 to \$72,000/year.

Technicians: \$24,000 – 62,000/year.

### **LINKS:**

Canadian Council of Professional Engineers: [www.engineerscanada.ca/index.cfm](http://www.engineerscanada.ca/index.cfm),

Association of Professional Engineers of Yukon: [www.apey.yk.ca](http://www.apey.yk.ca)

The Association of Science and Engineering Technology Professionals of Alberta:  
[www.aset.ab.ca](http://www.aset.ab.ca)

Canadian Council of Technicians and Technologists: [www.cctt.ca](http://www.cctt.ca)

# NURSE

**Nurses** (Registered) provide care to sick and injured people. They give patients medication and treatment for illnesses and wounds as prescribed by a doctor. Nurses monitor, assess, and deal with symptoms and changes in patients' conditions. They operate or monitor medical equipment.

Nurses may also assist in surgery and other medical procedures. Nurses also give emotional support to patients and their families. Nurses may supervise licensed practical nurses and other nursing staff. They may also teach and counsel patients and their families on health-related issues. Some nurses work in labs or fly-in to remote locations to treat patients.

Nurses are employed in a variety of settings from hospitals to remote mine sites to community clinics and nursing homes. Registered Nurses may specialize in areas such as surgery, obstetrics care, psychiatric care, critical care, pediatrics, geriatrics, community health, occupational health, emergency care, rehabilitation, or oncology.

## **KNOWLEDGE, ABILITIES & SKILLS**

- interest in biology, science, and health
- compassion, patience, tact, and diplomacy
- ability to work in stressful environments
- people and communication skills
- physical ability (lifting and transferring patients)
- attention to detail
- personal hygiene and attention to cleanliness

## **EDUCATION, TRAINING & CERTIFICATION**

Registered Nurses must complete a university, college, or other approved registered nursing program. Additional academic training or experience is required to specialize in a specific area of nursing. All persons intending to work as a Registered Nurse in the Yukon must be registered with the Yukon Registered Nurses Association prior to beginning work.

**SALARY RANGE** \$38,000 - \$91,000/year, averaging \$54,000/year.

## **LINKS**

Yukon Registered Nurses Association: [www.yrna.ca/](http://www.yrna.ca/)

Canadian Nurses Association: [www.cna-nurses.ca/CNA/default\\_e.aspx](http://www.cna-nurses.ca/CNA/default_e.aspx)

# OCCUPATIONAL HEALTH AND SAFETY OFFICERS

**Occupational Health and Safety Officers** coordinate health and safety systems to ensure a mine is in compliance with health and safety legislation. They identify and test work areas for potential accident and health hazards, and implement appropriate control measures. They also provide advice and training on accident prevention and safety to management and employees.

Occupational Health and Safety Officers inspect workplaces and test machinery and equipment to make sure they meet safety regulations. They make sure that personal protective equipment is being used in workplaces according to regulations. They make sure dangerous materials are correctly stored.

Occupational Health and Safety Officers coordinate emergency procedures, mine rescues, fire fighting, and first aid crews. They also investigate accidents, assist workers after injury, and make sure workers return to work satisfactorily.

**Mine Safety Inspectors** inspect mines to ensure government regulations are followed. These regulations may involve sanitation, pollution control, the handling and storage of hazardous substances, and workplace safety. They help develop ways to control or minimize risks in the workplace. They conduct surveys and monitor waste and potential pollution. They collect samples and measure physical, biological, and chemical workplace hazards. They conduct safety and environmental audits. Mine Safety Inspectors are employed by government.

## KNOWLEDGE, ABILITIES & SKILLS

- people and communication skills
- integrity and honesty
- ability to remain open minded and objective
- tact and diplomacy
- able to work independently and as part of a team

## EDUCATION, TRAINING & CERTIFICATION

A university bachelor's degree or college diploma in Environmental Studies, Chemistry or Health and Safety is usually required. In some situations, several years of related work experience and the completion of in-house training courses may substitute for formal education. The Board of Canadian Registered Safety Professionals offers the designation Canadian Registered Safety Professional (CRSP) to applicants who have been employed as safety professionals for at least three years and have successfully completed an evaluation, interview, and examination process.

**SALARY RANGE** \$41,000 - \$96,000, averaging \$67,000/year.

## LINKS

Board of Canadian Registered Safety Professionals: [www.acrsp.ca](http://www.acrsp.ca)

# PAINTER & APPRENTICE/HELPER

**Painters** apply various decorative and protective finishes to interior and exterior building surfaces. They may operate machines or use brushes and spray equipment to apply paint, varnish, stain, enamel, lacquer, paper, or fabric. Painters operate equipment to clean, wash, strip, sand remove corrosion, fill dents, or otherwise prepare items for application of paint. They select, mix, and thin paints to achieve specific desired effects. They erect scaffolding or ladders. They may use hand held or automatic spray guns and brushes or rollers for smaller surfaces or items.

Painters clean and maintain painting and coating, ventilation, compressed air, and personal protective equipment. They also provide cost estimates to clients and offer advice about colour schemes and designs.

**Painter's Apprentices and Helpers** assist Painters in preparation, application of finishes, and clean up.

## KNOWLEDGE, ABILITIES & SKILLS

- design or artistic aptitude
- good hand/eye coordination
- planning and organizing skills
- communication and people skills
- ability to work with arms over one's head – climbing, lifting, balancing
- comfortable with heights
- attention to detail and accuracy

## EDUCATION, TRAINING & CERTIFICATION

**Painter's Helpers** are trained on-the-job and require no previous experience. To become an **Apprentice**, you must have a Grade 10 or equivalent education in order to enter a three-year apprenticeship program. Apprenticeship programs include both on-the-job learning and shop/classroom training.

To become a **Certified Painter** in the Yukon, a candidate must pass an exam after completing his/her apprenticeship or after four and a half years in the trade. Interprovincial trade certification (Interprovincial Standards Red Seal) is also available to qualified Painters, which allows them to practice their trade in any province or territory after passing an exam.

## SALARY RANGE

The Yukon Fair Wage Schedule rate for Painters is \$24.23/hour. Painters can earn \$37,000 - \$60,000/year, averaging \$45,000/year. Apprentices make 50 per cent or more of the certified rate.

# PILOT

**Pilots** provide air transportation to and from a mine or exploration camp. Most exploration camps use helicopters for local travel and charter fixed wing aircraft for supply flights. Pilots:

- prepare flight plans based on weather forecasts and operational information;
- make sure aircraft are properly loaded;
- check fuel requirements and fuel quantities;
- check on maintenance status of aircraft;
- conduct checks of flight controls, instruments and aircraft engines;
- fly aircraft according to established operating and safety procedures including abnormal and emergency situations;
- take bookings, load aircraft, and generally assist in the promotion and running of the company.

## **KNOWLEDGE, ABILITIES & SKILLS**

- must pass a medical examination by a doctor approved by Transport Canada
- have good eyesight (can be corrected with glasses)
- able to make accurate judgments quickly
- remain calm in an emergency
- decision-making skills
- good communication skills
- attention to detail and safety

## **EDUCATION, TRAINING & CERTIFICATION**

Transport Canada has no educational prerequisite to study for a Commercial Pilot License. However, you must be either a "mature student" (over 19, and out of school at least 1 year) or have graduated from high school, to qualify for some programs. All entrants must pass the physical exam noted above.

Commercial Pilot (fixed wing aircraft) training takes between eight and eighteen months. The cost can range up from \$30,000 to more than \$55,000 depending on the aircraft ratings and academic components. Commercial Helicopter pilot's license courses take approximately ten to twelve weeks to complete at a cost of approximately \$46,000. As with the pilot's license, there is a minimum age and physical exam that must be passed prior to starting.

**SALARY RANGE** Pilots salaries vary by aircraft but can range from \$18,000 - \$80,000, averaging \$52,000/year.

## **LINKS**

Transport Canada: [www.tc.gc.ca/CivilAviation/general](http://www.tc.gc.ca/CivilAviation/general)

# PIPEFITTER/STEAM FITTER & APPRENTICE/HELPER

**Pipe Fitter/Steam Fitters** lay out, assemble, fabricate, maintain, troubleshoot, and repair piping systems. Those systems carry water, steam, chemicals, or fuel. Pipe Fitter/Steam Fitters work on heating, cooling, lubricating and other process piping systems. They are employed in the maintenance department of mines.

**Pipe Fitter/Steam Fitter's Helpers** assist plumbers, pipefitters, steamfitters, or pipelayers by performing duties including using, supplying, or holding materials or tools, and cleaning the work area and equipment.

## KNOWLEDGE, ABILITIES & SKILLS

- mechanical aptitude
- ability to concentrate and problem-solve
- physical strength (lifting and carrying pipes etc)
- ability to visualize in three dimensions
- ability to work independently
- interpersonal and communications skills

## EDUCATION, TRAINING & CERTIFICATION

**Pipefitter/Steamfitter Helpers** require no previous experience, but may take a six month Piping Trades Pre-Employment program at Yukon College to prepare for their career. To become an **Apprentice**, you must have at least academic Grade 10 or equivalent education to enter the four year apprenticeship program. Those who have graduated from the Piping Trades Pre-Employment program can take an exam and receive credit that will shorten their apprenticeship period. Apprenticeship programs include both paid on-the-job learning and shop/classroom training.

To become a **Certified Pipefitter/Steamfitter** in the Yukon, a candidate must pass an exam after completing his/her apprenticeship or after six years in the trade. Interprovincial trade certification (Interprovincial Standards Red Seal) is also available to qualified Pipefitter/Steamfitter, which allows them to practice their trade in any province or territory after passing an exam.

## SALARY RANGE

The Yukon Fair Wage Schedule rate for Plumbers and Steamfitters is \$27.03/hour. Salaries range from \$25,000 to \$71,000, averaging \$51,000/year. Apprentices make 50 per cent or more of the certified rate.

## LINKS:

United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada: [www.ua.org/](http://www.ua.org/)

# PLUMBER & APPRENTICE/HELPER

**Plumbers** install, repair, and maintain pipes, fixtures, and other plumbing equipment and systems. Plumbers measure, cut, bend, and thread pipes using hand and power tools or machines. They also join pipes using couplings, clamps, screws, bolts, cement, or soldering, brazing, and welding equipment. They must be able to read blueprints and understand plumbing and building codes and specifications. They test pipes for leaks using air and water pressure gauges. Plumbers may also prepare cost estimates.

**Plumber's Helpers** assist plumbers by performing duties including using, supplying, or holding materials, or tools, and cleaning the work area and equipment.

## KNOWLEDGE, ABILITIES & SKILLS

- mechanical aptitude
- ability to concentrate and problem-solve
- physical strength (lifting and carrying pipes, etc)
- ability to visualize in three dimensions
- ability to work independently
- interpersonal and communications skills

## EDUCATION, TRAINING & CERTIFICATION

**Plumbers Helpers** require no previous experience, but may take a six month Piping Trades Pre-Employment program at Yukon College to prepare for their career. To become an **Apprentice**, you must have at least academic Grade 10 or equivalent education to enter the four year apprenticeship program. Those who have graduated from the Piping Trades Pre-Employment program can take an exam and receive credit that will shorten their apprenticeship period. Apprenticeship programs include both paid on-the-job learning and shop/classroom training.

To become a **Certified Plumber** in the Yukon, a candidate must pass an exam after completing his/her apprenticeship or after six years in the trade. Interprovincial trade certification (Interprovincial Standards Red Seal) is also available to qualified Plumber, which allows them to practice their trade in any province or territory after passing an exam.

## SALARY RANGE

The Yukon Fair Wage Schedule rate for Plumbers and Steamfitters is \$27.03/hour. Salaries range from \$25,000 to \$71,000/year, averaging \$51,000/year. Apprentices make 50 per cent or more of the certified rate.

## LINKS

United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada: [www.ua.org](http://www.ua.org)

# PROSPECTOR

Prospectors explore for minerals and are often responsible for initial mineral discoveries. Prospectors are well-versed in geology and are often self-taught. They stake “claims” on areas of land, which gives them the right to excavate soil and rock for a specified time period. They then sample silt, soil, and rock, searching for tell-tale signs of mineralisation. Some areas are explored in greater detail using equipment including backhoes and high pressure water pumps. Prospectors dig and map trenches from which samples are taken and analyzed.

When a claim show promising results, a prospector will sell or “option” his claim to a junior mining company. The company will explore the prospector’s property in exchange for a combination of payment, company shares, and/or work commitments. Prospectors are sometimes employed by junior and major mining companies, but most prefer to work on their own to stake their own claims for later sale.

## **KNOWLEDGE, ABILITIES & SKILLS**

- self-sufficient and independent nature
- interest in rocks and minerals
- inquisitive and analytical mind
- research and database analysis skills
- heavy equipment operating knowledge
- sales and negotiation ability
- bush skills, bear awareness and physical fitness
- map and Global Positioning System (GPS) reading training

## **EDUCATION, TRAINING & CERTIFICATION**

There is no formal education required to become a Prospector and many are self taught. A Basic and Advanced Prospecting Course is available through the Yukon Chamber of Mines. Students are introduced to the principles of geology, exploration technology, geology and mineral deposits of the Yukon, and the identification and classification of minerals and rocks. The Basic Course is eighteen hours at a cost of \$200. The course is usually run annually in Whitehorse over an eight week period. A condensed five day version is offered in Yukon communities. Northwest Community College (Smithers, Terrace, Prince Rupert, BC) offers an eleven week Reclamation and Prospecting program for First Nation’s students up to age thirty-five.

## **SALARY RANGE**

Most Prospectors are self employed and their income varies with their experience, skills and interests. Yukon Prospectors can be either very well off or live a subsistence lifestyle.

# PURCHASING AGENT & CLERK

Purchasing agents buy machinery, equipment, tools, parts, supplies, or services necessary for the operation of a mine. They prepare purchase orders and solicit bid proposals for goods and services. They evaluate suppliers based on price, quality, availability, service, support, and the supplier's reputation and history. They analyze information to purchase the highest quality merchandise at the lowest possible price.

Purchasing agents negotiate and administer contracts with suppliers, vendors, and other representatives. They also track shipments and address shipping problems. They maintain records of items purchased, costs, delivery, product performance, and inventories. They hire, train, and supervise Purchasing Clerks.

**Purchasing Clerks** purchase and track materials. They prepare and maintain files, reports and price lists. They perform similar functions as a Purchasing Agent with less responsibility.

## KNOWLEDGE, ABILITIES & SKILLS

- research ability
- people and communications skills
- attention to detail and good memory
- organizing, planning and prioritizing work
- decision making and problem solving skills
- administrative and computer skills
- technical knowledge of the mining industry
- bondable (no criminal record)

## EDUCATION, TRAINING & CERTIFICATION

A university bachelor's degree or college diploma in Business Administration, Commerce or Economics is usually required to become a **Purchasing Agent**. They may be may required to have a related university degree or college diploma if purchasing specialized materials or business services. For example, a bachelor's degree or college diploma in engineering may be required for purchasers of industrial products. A certificate in purchasing from the Purchasing Management Association of Canada may be required.

**Purchasing Clerks** are entry level positions that are trained on the job. Some high school is required. Courses in purchasing management may be required for Purchasing Clerks.

**SALARY RANGE** \$33,000 - \$108,000/year, averaging \$59,000/year.

## LINKS

Purchasing Management Association of Canada: [www.pmac.ca](http://www.pmac.ca)

# SALES REPRESENTATIVE

**Sales Representatives** sell mining industry products to business and industrial clients around the world. They are sometimes called account executives, sales engineers, or account managers. They:

- identify sales opportunities and customer requirements;
- negotiate and close sales deals;
- coordinate shipping and delivery details;
- keep records of business transactions;
- following-up with customers to ensure customer satisfaction and expand business opportunities;
- maintain and update data about their territories and accounts.

Sales Representatives must know their company's business strategy and product lines, how these products are used, what their competitors' products and strategies are, as well as their customers' needs. Sales Representatives spend much of their time visiting prospective buyers and "prospecting" sales. The technical sales field is highly competitive. Companies may set goals or quotas and offer prizes to those who make the most sales.

## KNOWLEDGE, ABILITIES & SKILLS

- self-confidence, persistence, initiative and enthusiasm
- people, communication and negotiating skills
- organizational skills and self-discipline
- ability to work independently and as part of a team
- willingness to travel
- ability to cope with uncertainty, stress and long hours

## EDUCATION, TRAINING & CERTIFICATION

Sales training programs are offered by universities, colleges and technical institutes. Entrance requirements vary depending on the program and the institution. The completion of high school or equivalent is often a prerequisite. Most employers prefer to hire Sales Representatives who have technical qualifications plus several years of experience working with the type of product they sell. For example, employers may require job applicants to have a background in equipment operation, trades, business administration, engineering, or computer science. Employers often offer product-specific in-house training programs for Sales Representatives that may range in length from a few weeks to several months.

**SALARY RANGE** \$19,000 to \$140,000/year, averaging \$61,000/year.

## LINKS

Canadian Professional Sales Association: [www.cpsa.com](http://www.cpsa.com)

# SECURITY GUARD

**Security Guards** patrol and monitor mining property to protect against theft and vandalism, maintain order, resolve conflicts and enforce regulations. They control access to buildings and areas, issue passes, and direct visitors to appropriate areas. They patrol assigned areas on foot or in vehicles.

They also operate security control-room equipment to monitor establishment activities. Security Guards ensure that establishment safety and emergency procedures are followed, and respond to fire alarms, bomb threats, and other emergencies. They follow radio and emergency telephone procedures.

## **KNOWLEDGE, ABILITIES & SKILLS**

- keen powers of observation
- ability to work on your feet for long hours
- people and communication skills
- integrity and honesty
- bondable (no criminal record)
- able to work independently with little supervision

## **EDUCATION, TRAINING & CERTIFICATION**

A high school education is usually required, but training is generally done on-the-job. Community college courses in security are an asset. A driver's license may be required. If a Security Guard carries a firearm, a license is required.

**SALARY RANGE:** \$21,000 – 40,000/year, averaging \$28,000/year.

# STATIONARY ENGINEER

Stationary or Power Engineers supervise, operate, and maintain equipment that provides power, light, heat, refrigeration, and other utility services to mines. The equipment involved includes boilers, turbines, generators, pumps, compressors, pollution control devices, and other equipment. Stationary or Power Engineers:

- ensure that safety codes and other applicable regulations are followed;
- use automatic or manual controls to start, operate, and shutdown plant systems;
- monitor alarms, gauges, and other instruments;
- troubleshoot and take corrective action to prevent equipment or system failures;
- isolate equipment mechanically and electrically for inspection and repair;
- ensure that equipment and processes operate at maximum efficiency;
- assist in the development of operation, maintenance, and safety procedures;
- write reports about plant operations including maintenance and safety activities.

## KNOWLEDGE, ABILITIES & SKILLS

- mechanical and electrical aptitude
- physical fitness
- good vision, hearing and hand/eye- coordination
- oral and written communication skills
- organizational and decision-making skills
- ability to work well with others in a team environment.
- willingness to work in varied and challenging work environments (heat, high noise, humidity, dust, grease, hazardous chemicals, confined spaces, heights)

## EDUCATION, TRAINING & CERTIFICATION

A Grade 10 level high school education is minimally required to enter an apprenticeship program in Stationary or Power Engineering. Alternatively, on-the-job training and additional courses or a college training program in Stationary or Power Engineering or building systems operations are required.

Stationary Engineers are certified by provincial associations based on exams and standards accepted in all provinces except Quebec. There are five levels of certification, advancing from Fifth Class certificate to First Class certificate. Each level of certification has different training and employment experience requirements. There is no association in the Yukon but certification can be done through the Alberta Boilers Safety Association.

**SALARY RANGE** \$40,600 to \$80,000/year, averaging \$56,000/year.

## LINKS

Alberta Boilers Safety Association: [www.absa.ca](http://www.absa.ca)

# SURVEYOR, SURVEYING TECHNOLOGIST & TECHNICIAN

**Surveyors** take measurements to determine the locations and positions of natural features on or beneath the Earth's surface. Mine Surveyors measure underground and surface mine workings in detail in order to plan, direct, update, or create mining plans. Their measurements enable proposed new mine tunnels and channels to avoid older and possibly flooded ones, and allow connections to be made between different underground passages. They also establish the boundaries of mining claims.

Mine Surveyors accurately record measurements and create intricate and accurate drawings using electronic distance measuring equipment and global positioning systems (GPS) as well as specialized computer software. They review, analyze, manage and display all data, plans, charts, records, and documents related to surveys.

Mine Surveyors also certify and assume liability for surveys made to establish real property boundaries. They may advise, provide consultation services, and testify as an expert witness on matters related to legal surveys.

**Surveying Technologists** assist Surveyors in developing methods and procedures for conducting field surveys. They also record all measurements and information obtained. They analyze or assist in analyzing and computing measurements obtained. They also prepare or assist in preparing detailed drawings, charts, plans and survey notes.

**Surveying Technicians** operate survey instruments and computer equipment to measure distance, angles, elevations, and contours. They use this information to establish geographical locations and boundaries.

## KNOWLEDGE, ABILITIES & SKILLS

- aptitude in mathematics (geometry, trigonometry)
- organizational skills
- data entry and computer skills
- able to work neatly and accurately
- able to work independently and as part of a team
- interest in outdoor work

## EDUCATION, TRAINING & CERTIFICATION

To become a **Surveyor**, a university bachelor's degree in Geomatics Engineering or Survey Engineering is required. Alternatively, a college diploma in Survey Science or Geomatics Technology with additional academic credits and successful completion of equivalent examinations set by a regional board of examiners for land surveyors is required. Additional requirements including articling (a term of service with a licensed Surveyor) and professional examinations may be required to get a federal or provincial surveyor's license.

A high school diploma is usually required to enter a two-year community college diploma course in Survey Science or Geomatics Technology to become a **Survey**

## SURVEYOR, SURVEYING TECHNOLOGIST & TECHNICIAN (Cont.)

**Technician** or a three-year course to become a **Survey Technologist**. The Association of Science and Engineering Technology Professionals of Alberta certify and register Yukon's applied science, information and engineering technology professionals.

### **SALARY RANGE**

Surveyor: \$45,000 to \$73,000/year, averaging \$58,000 /year.

Technologist and Technician: \$32,000 - \$61,000/year, averaging \$43,000/year.

### **LINKS**

Association of Canada Lands Surveyors: [www.acls-aatc.ca/](http://www.acls-aatc.ca/)

Canadian Council of Professional Engineers: [www.engineerscanada.ca/index.cfm](http://www.engineerscanada.ca/index.cfm),

Association of Professional Engineers of Yukon: [www.apey.yk.ca](http://www.apey.yk.ca)

The Association of Science and Engineering Technology Professionals of Alberta:

[www.aset.ab.ca](http://www.aset.ab.ca)

Canadian Council of Technicians and Technologists: [www.cctt.ca](http://www.cctt.ca)

# TRUCK DRIVER

**Truck Drivers** operate gasoline or diesel-powered trucks or tractor trailers to transport goods and materials to and from mines. These materials may include gravel, explosives, construction materials, equipment, and food. Truck Drivers are responsible for the functioning of the vehicle, the condition of the equipment, and the safety of the cargo.

Truck Drivers record loading, unloading, and cargo delivery information. They keep track of times, destinations, mileage, fuel consumption, and any problems encountered. Owner-operator truckers are also responsible for the licensing and the permits that allow them to operate across provincial and international borders. Truckers may drive as part of a team or in a convoy. They may also transport hazardous or dangerous goods.

## **KNOWLEDGE, ABILITIES & SKILLS**

- interest in driving and travel
- mechanical ability & organizational skills
- mental stamina and ability to work long hours
- attention to safety
- ability to live, work and sleep in a confined space for several days at a time
- business knowledge for those truckers who own their own vehicles

## **EDUCATION, TRAINING & CERTIFICATION**

Some high school education is generally required. On-the-job training or short driving courses may be provided or required. Depending on size and weight of the truck, a provincial class 1, 3 or 5 driver's license is required. Drivers of heavy trucks (long haul) may be required to have a minimum of 3 to 5 years of light truck driving experience. An air brake endorsement is required for drivers who operate vehicles equipped with air brakes.

Transportation of dangerous goods certification is required for drivers who transport hazardous products or dangerous goods. Courses in driving are offered in Whitehorse through Mile 918 Driver Development (667-6837).

**SALARY RANGE** \$37,000 - \$75,000/year, averaging \$53,000/year.

# WELDER & APPRENTICE/HELPER

**Welders** operate equipment to weld various metals. They read and interpret blueprints or specifications. They operate flame-cutting equipment as well as brazing and soldering equipment. Welders operate metal shaping machines such as brakes, shears, and other metal straightening and bending machines. They repair worn parts of metal products by welding on extra layers. Welders may also operate production welding, brazing, and soldering equipment.

Trades helpers assist skilled tradespeople by performing specialized support duties. A **Welder's Helper** prepares equipment for use including pre-heating in a furnace, connects fuel hoses, and power sources and cleans the work area and equipment.

## KNOWLEDGE, ABILITIES & SKILLS

- mechanical aptitude
- physical fitness and strength to work with heavy tools in awkward places
- good hand/eye coordination
- attention to detail and precision
- willingness to work in varied and challenging work environments (heat, noise, confined spaces)
- safety focus

## EDUCATION, TRAINING & CERTIFICATION

**Welder's Helpers** require no previous experience, but may take a five month Welding Pre-Employment program at Yukon College to prepare for their career. To become an **Apprentice**, you must have at least academic Grade 10 or equivalent education to enter the three year apprenticeship program. Those who have graduated from the Piping Trades Pre-Employment program can take an exam and receive credit that will shorten their apprenticeship period. Apprenticeship programs include both paid on-the-job learning and shop/classroom training.

To become a **Certified Welder** in the Yukon, a candidate must pass an exam after completing his/her apprenticeship or after four and a half years in the trade. Interprovincial trade certification (Interprovincial Standards Red Seal) is also available to qualified Welders, which allows them to practice their trade in any province or territory after passing an exam.

## SALARY RANGE

The Yukon Fair Wage Schedule rate for Welders is \$27.03/hour. Welders can make \$15,000 - \$86,000/year, averaging \$53,000/year. Apprentices make 50 per cent or more of the certified rate.



Yukon Workers'  
Compensation  
Health and  
Safety Board



[www.yukonminetraining.com](http://www.yukonminetraining.com)