

NATIONAL OCCUPATIONAL STANDARD DIAMOND DRILLER



INTRODUCTION

For more information on the NOS and CMCP, please visit www.miningcertification.ca.

National Occupational Standards (NOS) establish clear, objective benchmarks of the skills and knowledge required for workers to perform in a particular occupation. In other words, they list the competencies a fully experienced worker can perform on the job.

The Mining Industry Human Resources Council (MiHR) develops and maintains the suite of NOS for the Canadian mining sector. The development and maintenance of each National Occupational Standard is led by a stakeholder committee called the *National Occupational Standard Development Committee (NOSDCs)* which is made up of subject-matter experts from various groups across Canada, including industry, labour, and education. NOS development committees undertake a regular review (3-5 years) of the NOS to ensure they remain current and relevant to the Canadian mining industry.

NOS also form the basis for workforce development, driving curriculum development within educational institutes, and the alignment of company training programs by establishing learning outcomes and thereby contributing to the attraction, recruitment and retention of a skilled and safe workforce.

UNDERSTANDING THE NOS

Each National Occupational Standard reflects a complete list of competencies required to perform a specific job. All areas of competence and their tasks for the entire suite of seven NOS have been pulled together in MiHR's Master Competency List. The Master Competency List allows you to understand those competencies and tasks that are common across multiple occupations versus the specialties that set them apart.

Competency areas that are common across multiple occupations within the mining industry are referred to as *common competencies*. They are the foundational competencies and skills required to work in the mining industry, and include tasks such as working safely, and knowledge of workplace policies and legislation.

Each NOS builds on the common competencies by including additional competencies that are unique to each occupation. Both types of competencies are referenced in the NOS document with multiple tasks and sub-tasks to provide a deeper context and

understanding of each area of competency. Each task is further defined by its general frequency. References and examples of abilities and knowledge are included to ensure adequate interpretation of each sub-task.

MiHR's Master Competency List reflects all areas of competency for MiHR's suite of NOS and each area of competency and its related tasks keep the same identification number regardless of the NOS in which they are included.

Should an area of competency or task not be included in an NOS, the related details for that area of competency or task will not be present in the NOS. In its place, there will be an indication that the task is not applicable to this NOS.

ACKNOWLEDGEMENTS

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AREA OF COMPETENCY 1: **POLICIES AND LEGISLATION**

TASK 1.1	<p>COMPLY WITH COMPANY POLICIES AND PROCEDURES</p> <p>1. Understand and follow company policies and procedures</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 1.2	<p>UNDERSTAND AND COMPLY WITH APPLICABLE WORKPLACE LEGISLATION AND REGULATIONS</p> <p>1. Understand and follow work processes mandated by legislation and regulations</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

AREA OF COMPETENCY 2: **WORK SAFELY**

TASK 2.1	<p>SELECT, USE AND MAINTAIN PERSONAL PROTECTIVE EQUIPMENT (PPE)</p> <p>1. Recognize situations that require use of personal protective equipment (PPE)</p> <p>2. Select, inspect, use, maintain, and store appropriate PPE for:</p> <ul style="list-style-type: none"> - head protection - eye protection - foot protection - hand protection - hearing protection - respiratory protection - specific conditions (fall protection, welding, radiation, handling chemicals, energized work, roasting, working over water, felling trees) <p>3. Wear clothing appropriate for work conditions and tasks</p> <p>4. Practice personal hygiene</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 2.2	<p>PRACTICE GOOD HOUSEKEEPING</p> <p>1. Maintain clean work area</p> <p>2. Take corrective action as required</p> <p>3. Appropriately dispose of waste materials</p> <p>4. Organize and classify materials</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

SUB TASKS

TASK 2.3	<p>IDENTIFY AND RESPOND TO WORKPLACE HAZARDS</p> <ol style="list-style-type: none"> 1. Recognize hazardous or potentially hazardous conditions 2. Follow safety precautions in hazardous conditions 3. Take corrective action 4. If hazardous condition cannot be immediately corrected: put up signs, barricade area or post guard, lock out and tag and de-energize 5. Record and report all hazardous or potentially hazardous conditions to appropriate personnel <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 2.4	<p>MANUALLY LIFT AND CARRY MATERIALS</p> <ol style="list-style-type: none"> 1. Assess the load 2. Inspect pathway and destination 3. Prepare to lift the load 4. Make the lift 5. Carry the load 6. Ground the load <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
<i>Task 2.5 is not applicable to this occupation.</i>		
TASK 2.6	<p>WORK AROUND MOBILE AND STATIONARY EQUIPMENT</p> <ol style="list-style-type: none"> 1. Work in authorized locations only 2. Communicate with equipment operator 3. Obey rules of conduct 4. Identify hazardous conditions <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 2.7	<p>WORK AROUND WATER HAZARDS</p> <ol style="list-style-type: none"> 1. Operate equipment safely in and around water hazards 2. Ensure safety of personnel working around water hazards <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 2.8	<p>WORK AROUND AIRCRAFT AND HELICOPTERS</p> <ol style="list-style-type: none"> 1. Complete orientation, provided by company and/or pilot 2. Ensure personal safety 3. Be aware of hazards 4. Complete training in sending and receiving loads <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

Task 2.9 is not applicable to this occupation.

SUB TASKS

TASK 2.10	<p>PREPARE FOR HOT WORK</p> <ol style="list-style-type: none"> 1. Recognize requirements for a hot work environment and obtain necessary permits 2. Inform appropriate personnel for fire watch 3. Prepare the site <p>REFERENCES & EXAMPLES ►</p>	Frequency: Rarely
TASK 2.11	<p>RECOGNIZE AUTHORIZED AREAS</p> <ol style="list-style-type: none"> 1. Recognize restricted areas 2. Complete necessary training for entry to restricted areas 3. Follow entry and exit protocols <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

AREA OF COMPETENCY 3: SIGNS, BARRICADES, TRAFFIC, PLANS AND DRAWINGS

TASK 3.1	<p>RECOGNIZE AND COMPLY WITH SIGNAGE, BARRICADES, AUDIBLE ALARMS, VISUAL ALARMS AND EQUIPMENT LIGHT INDICATORS</p> <ol style="list-style-type: none"> 1. Recognize and comply with signage 2. Recognize and comply with barricades 3. Recognize equipment and system audible and visual alarm signals 4. Recognize equipment and system indicator lights 5. Do not alter or remove warning signs, lights, audible alarms or barricades <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 3.2	<p>INSTALL, REMOVE, MAINTAIN AND STORE SIGNS AND BARRICADES</p> <ol style="list-style-type: none"> 1. Select correct sign/barricade for specific application (e.g. unsafe walkway, open hole) 2. Follow site policy and procedure for posting/installing signs and barricades 3. Maintain and store signs and barricades in proper locations <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 3.3	<p>RECOGNIZE AND COMPLY WITH TRAFFIC SIGNS, LIGHTS AND PATTERNS</p> <ol style="list-style-type: none"> 1. Recognize traffic signs and lights 2. Comply with traffic rules and patterns <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

SUB TASKS

TASK 3.4 **INTERPRET AND USE INFORMATION PRESENTED ON PLANS AND DRAWINGS** Frequency: Daily

1. Recognize symbols, abbreviations, colour coding
2. Interpret drawings

REFERENCES & EXAMPLES ►

AREA OF COMPETENCY 4: FIRE SAFETY

TASK 4.1 **BE PREPARED TO RESPOND TO FIRES** Frequency: Daily

1. Classify fires by hazard
2. Know location of fire extinguishers and fire hoses
3. Demonstrate knowledge of components and use of fire extinguishers
4. Inspect fire extinguishers
5. Report all discharged or defective fire extinguishers to appropriate personnel
6. Demonstrate knowledge of equipment fire suppression system
7. Know location of emergency evacuation/in-evacuation/muster points
8. Knowledge of location of fire suppression activation points

REFERENCES & EXAMPLES ►

TASK 4.2 **EXTINGUISH MINOR FIRES, IF SAFE TO DO SO** Frequency: Rarely

1. Report all fires and discharged or defective fire extinguishers to appropriate personnel
2. Know location of emergency evacuation/in-evacuation/muster points
3. Select and use appropriate fire extinguisher and/or suppression equipment
4. Use proper fire extinguishing techniques


REFERENCES & EXAMPLES ►

TASK 4.3 **FIRE PREVENTION** Frequency: Daily




1. Properly store combustible materials
2. Proper maintenance of equipment
3. Control sources of flame / ignition
4. Safely operate open flame equipment

REFERENCES & EXAMPLES ►

SUB TASKS

TASK 4.4	BE PREPARED FOR WILDFIRES <ol style="list-style-type: none"> 1. Demonstrate knowledge of wildfire procedures 2. Demonstrate knowledge and use of appropriate equipment 3. Track fire warnings 4. Report wildfires REFERENCES & EXAMPLES 	Frequency: Daily
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AREA OF COMPETENCY 5: EMERGENCY SITUATIONS

TASK 5.1	PREPARE FOR EMERGENCY SITUATIONS <ol style="list-style-type: none"> 1. Know location of emergency evacuation/in-evacuation/muster points 2. Know the locations of fire extinguishers, hoses, equipment 3. Know the location of first aid kits and first aid station 4. Know the location of and how to use eye wash stations, emergency showers, Material Safety Data Sheets (MSDS), respiratory protection (e.g. self-contained breathing apparatus (SCBA), self-rescuer), gas detectors 5. Know the location of emergency tents, escape way locations, routes and markings, refuge stations 6. Know the location of equipment emergency stop devices 7. Know the location of spill kits 8. Know the emergency procedures 9. Complete mock drill REFERENCES & EXAMPLES 	Frequency: Daily
TASK 5.2	COMPLY WITH WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEMS (WHMIS) <ol style="list-style-type: none"> 1. Identify hazard symbol classifications 2. Access, understand and follow MSDS instructions 3. Maintain WHMIS certification REFERENCES & EXAMPLES 	Frequency: Daily
TASK 5.3	PARTICIPATE IN SAFETY PROGRAMS <ol style="list-style-type: none"> 1. Attend safety meetings 2. Follow company safety initiatives REFERENCES & EXAMPLES 	Frequency: Weekly

SUB TASKS

TASK 5.4	RESPOND TO AND REPORT EMERGENCIES	Frequency: Rarely
	<ol style="list-style-type: none"> 1. Respond to all emergencies 2. Secure incident/emergency site 3. Mitigate further risk 4. Report all incidents/emergencies 	
	REFERENCES & EXAMPLES ►	

AREA OF COMPETENCY 6: **ENERGY SOURCES**

TASK 6.1	WORK AROUND ENERGY SOURCES	Frequency: Daily
	<ol style="list-style-type: none"> 1. Recognize energy sources, stored and potential 2. Recognize when equipment is locked out and tagged and de-energized 	
	REFERENCES & EXAMPLES ►	

TASK 6.2	LOCK OUT, TAG AND DE-ENERGIZE EQUIPMENT	Frequency: Daily
	<ol style="list-style-type: none"> 1. Lock out equipment for repair or maintenance as per site policies and applicable regulations 2. Tag equipment for repair or maintenance as per site policies and applicable regulations 3. De-energize equipment and verify zero energy state for repair or maintenance 	
	REFERENCES & EXAMPLES ►	

AREA OF COMPETENCY 7: **WORKING AT HEIGHTS**

TASK 7.1	IDENTIFY, INSPECT AND STORE FALL PROTECTION SYSTEMS	Frequency: Daily
	<ol style="list-style-type: none"> 1. Identify types of fall protection systems 2. Select suitable fall protection system to match task 3. Inspect, maintain and store fall protection systems 4. Report and remove defective fall protection systems 5. Complete fall protection training 	
	REFERENCES & EXAMPLES ►	

SUB TASKS

TASK 7.2	<p>USE PERSONAL FALL ARREST SYSTEM</p> <ol style="list-style-type: none"> 1. Receive (certified) training for use of fall arrest system 2. Inspect fall arrest system 3. Ensure fall arrest system fits properly 4. Maintain and store fall arrest system 5. Use fall arrest system as per applicable legislation and site policies and procedures 6. Have and understand rescue plan <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 7.3	<p>USE PORTABLE LADDERS</p> <ol style="list-style-type: none"> 1. Identify types, sizes and grades of ladders 2. Check condition of ladder 3. Erect ladder 4. Ascend and descend ladder 5. Perform tasks on ladder 6. Inspect, clean and store ladder <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 7.4	<p>WORK ON SCAFFOLDS AND RAISED PLATFORMS</p> <ol style="list-style-type: none"> 1. Ascend and descend scaffold or raised platform 2. Perform work on scaffold or raised platform <p>REFERENCES & EXAMPLES ►</p>	Frequency: Weekly

AREA OF COMPETENCY 8: **COMMUNICATE**

TASK 8.1	<p>LISTEN ACTIVELY</p> <ol style="list-style-type: none"> 1. Pay attention to person giving the message 2. Ask person to repeat information if not understood completely 3. Confirm information by repeating or rephrasing <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 8.2	<p>SPEAK CLEARLY AND CONCISELY</p> <ol style="list-style-type: none"> 1. Give clear and concise directions 2. Use common language and terminology of work site 3. Confirm understanding <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

SUB TASKS

TASK 8.3	USE COMMUNICATION DEVICES	Frequency: Daily
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	REFERENCES & EXAMPLES ►	
TASK 8.4	CONVEY MESSAGE USING SIGNALS	Frequency: Daily
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	REFERENCES & EXAMPLES ►	
TASK 8.5	USE WORKPLACE TECHNOLOGIES	Frequency: Daily
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	REFERENCES & EXAMPLES ►	
TASK 8.6	COMPLETE WORKPLACE DOCUMENTATION	Frequency: Daily
	<ol style="list-style-type: none"> 1. Use appropriate form 2. Write legibly 3. Be specific 4. Use correct terminology 5. Submit or file as required 	
	REFERENCES & EXAMPLES ►	
TASK 8.7	COACH OR MENTOR OTHER EMPLOYEES	Frequency: Daily
	<ol style="list-style-type: none"> 1. Demonstrate proper technique 2. Check for understanding 3. Observe employee 4. Provide assistance and feedback 	
	REFERENCES & EXAMPLES ►	

SUB TASKS

AREA OF COMPETENCY 9: **BE PROFESSIONAL**

TASK 9.1	<p>WORK IN A TEAM ENVIRONMENT</p> <p>1. Respect team members 2. Respect clients and other site personnel 3. Be professional</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 9.2	<p>WORK IN A CULTURALLY DIVERSE ENVIRONMENT</p> <p>1. Respect practices of co-workers and local populations 2. Respect social differences</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 9.3	<p>MAINTAIN GOOD COMMUNITY RELATIONS</p> <p>1. Consider yourself an ambassador for the industry and the company 2. Support local businesses and events</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 9.4	<p>DEMONSTRATE HIGH STANDARDS OF CONDUCT</p> <p>1. Model safety leadership 2. Be both consistent and fair</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

AREA OF COMPETENCY 10: **EQUIPMENT KNOWLEDGE**

TASK 10.1	<p>DEMONSTRATE EQUIPMENT KNOWLEDGE</p> <p>1. Trained and authorized for proper use and operation of equipment 2. Inspect equipment for defects, hazards and potential hazards 3. Conduct pre-operational checks 4. Properly mount and dismount equipment 5. Start equipment 6. Conduct operational checks 7. Drive equipment to worksite, as required 8. Shut down equipment (normal situations) 9. Shut down equipment (emergency situations) 10. Conduct post-operational check 11. Knowledge of refueling procedure</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
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SUB TASKS

TASK 10.2 **WORKING WITH EQUIPMENT**

Frequency: Daily

1. Use appropriate personal protective equipment
2. Be cautious around moving parts of equipment
3. Identify potential pedestrian and traffic interaction
4. Avoid hazardous conditions
5. Demonstrate knowledge of working in vicinity of explosives

**REFERENCES
& EXAMPLES** ►

AREA OF COMPETENCY 11: **OPERATE HEAVY EQUIPMENT**

Task 11.1 is not applicable to this occupation.

TASK 11.2 **OPERATE UNDERGROUND LOCOMOTIVES**

Frequency: Rarely

1. Demonstrate equipment knowledge
2. Move equipment and material
3. Starting locomotive
4. Braking

**REFERENCES
& EXAMPLES** ►

Tasks 11.3 to 11.6 are not applicable to this occupation.

TASK 11.7 **OPERATE TRACK DOZER**

Frequency: Daily

1. Demonstrate equipment knowledge
2. Transport/relocate dozer
3. Push and/or rip materials
4. Conduct loading unit clean-up
5. Dump management
6. Live pile management
7. Road construction and maintenance

**REFERENCES
& EXAMPLES** ►

AREA OF COMPETENCY 12: **OPERATE SUPPORT EQUIPMENT**

TASK 12.1 **OPERATE LIGHT OR SERVICE VEHICLE**

Frequency: Daily

1. Demonstrate equipment knowledge
2. Load, transport and unload materials, supplies and/or personnel

**REFERENCES
& EXAMPLES** ►

SUB TASKS

TASK 12.2	<p>OPERATE UTILITY VEHICLES</p> <ol style="list-style-type: none"> 1. Demonstrate equipment knowledge 2. Move equipment and materials <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 12.3	<p>OPERATE FUEL OR LUBE TRUCK</p> <ol style="list-style-type: none"> 1. Demonstrate equipment knowledge 2. Transfer fuel and lube to equipment 3. Load fuel or lube truck <p>REFERENCES & EXAMPLES ►</p>	Frequency: See individual NOS
<i>Tasks 12.4 to 12.7 are not applicable to this occupation.</i>		
TASK 12.8	<p>OPERATE SKIDDER</p> <ol style="list-style-type: none"> 1. Demonstrate equipment knowledge 2. Move equipment and material 3. Operate winch <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 12.9	<p>OPERATE WINCH</p> <ol style="list-style-type: none"> 1. Demonstrate equipment knowledge 2. Move load <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
<i>Tasks 12.10 and 12.11 are not applicable to this occupation.</i>		
TASK 12.12	<p>OPERATE SUPPORT LOADER</p> <ol style="list-style-type: none"> 1. Demonstrate equipment knowledge 2. Select and utilize appropriate implement for selected task 3. Change implements as needed <p>REFERENCES & EXAMPLES ►</p>	Frequency: See individual NOS
<i>Tasks 12.13 and 12.18 are not applicable to this occupation.</i>		
TASK 12.19	<p>OPERATE ALL-TERRAIN VEHICLES</p> <ol style="list-style-type: none"> 1. Demonstrate equipment knowledge 2. Move equipment and materials 3. Transport all-terrain vehicle <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

SUB TASKS

TASK 12.20	<p>OPERATE SNOWMOBILES</p> <ol style="list-style-type: none"> 1. Demonstrate equipment knowledge 2. Move equipment, material and personnel 3. Transport snowmobile <p>REFERENCES & EXAMPLES ►</p>	Frequency: Rarely
TASK 12.21	<p>OPERATE WATERCRAFT</p> <ol style="list-style-type: none"> 1. Demonstrate equipment knowledge 2. Load and unload 3. Move equipment and personnel <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
<i>Task 12.22 is not applicable to this occupation.</i>		
TASK 12.23	<p>OPERATE PUMPS</p> <ol style="list-style-type: none"> 1. Demonstrate equipment knowledge 2. Install pump 3. Monitor pump operation 4. Switch pumps <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 12.24	<p>OPERATE MIXERS</p> <ol style="list-style-type: none"> 1. Demonstrate equipment knowledge 2. Conduct operational checks <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 12.25	<p>OPERATE FLUID RECYCLING SYSTEMS</p> <ol style="list-style-type: none"> 1. Demonstrate equipment knowledge 2. Conduct operational checks 3. Perform maintenance 4. Handle cuttings <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

SUB TASKS

AREA OF COMPETENCY 13: **PROTECT THE ENVIRONMENT**

TASK 13.1	<p>COMPLY WITH ENVIRONMENTAL POLICIES, PROCEDURES AND PERMITS</p> <ol style="list-style-type: none"> 1. Minimize environmental impact of operations 2. Follow appropriate handling and clean-up procedures for various substances 3. Follow site abandonment and reclamation practices 4. Comply with permit conditions <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 13.2	<p>INSTALL CONTAINMENT MEASURES</p> <ol style="list-style-type: none"> 1. Identify when containment is required 2. Select appropriate type of containment 3. Install containment <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 13.3	<p>MANAGE WASTE</p> <ol style="list-style-type: none"> 1. Manage solid waste 2. Manage liquid waste 3. Manage recycling waste <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 13.4	<p>MANAGE FUELS AND OTHER HAZARDOUS MATERIALS</p> <ol style="list-style-type: none"> 1. Identify types of fuels and other hazardous materials 2. Transfer fuels and other hazardous materials 3. Use spill prevention measures 4. Store fuels and other hazardous materials 5. Transport fuel/propane and other hazardous materials <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 13.5	<p>RESPOND TO SPILLS</p> <ol style="list-style-type: none"> 1. Assess spill situation 2. Manage spill 3. Complete follow-up <p>REFERENCES & EXAMPLES ►</p>	Frequency: Rarely

SUB TASKS

AREA OF COMPETENCY 14: **USE HAND AND POWER TOOLS**

TASK 14.1	<p>DEMONSTRATE HAND AND POWER TOOL KNOWLEDGE</p> <p>1. Trained in proper use and application of hand and power tools 2. Inspect tool for defects 3. Maintain tools 4. Store tools</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 14.2	<p>USE POWER, PNEUMATIC, POWDER-ACTUATED AND HYDRAULIC POWERED TOOLS</p> <p>1. Select appropriate tool 2. Use tool 3. Demonstrate hand and power tool knowledge</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Rarely
TASK 14.3	<p>OPERATE GROUTING EQUIPMENT</p> <p>1. Select grouting equipment 2. Demonstrate hand and power tool knowledge 3. Perform grouting 4. Use specialized PPE, if required</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 14.4	<p>OPERATE CHAINSAWS</p> <p>1. Demonstrate hand and power tool knowledge 2. Cut, notch, back-cut, fell, de-limb trees</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Rarely
<i>Task 14.5 is not applicable to this occupation.</i>		
TASK 14.6	<p>OPERATE MOBILE GENERATORS</p> <p>1. Demonstrate hand and power tool knowledge 2. Operate generator under no load conditions 3. Operate generator under load conditions</p> <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

SUB TASKS

AREA OF COMPETENCY 15: **WORKING UNDERGROUND**

TASK 15.1 **TAG IN, TAG OUT** Frequency: Daily

1. Report to supervisor
2. Obtain tag and time worksheet
3. Tag into appropriate workplace location
4. Tag out at end of shift

**REFERENCES
& EXAMPLES** ►

TASK 15.2 **INSPECT VENTILATION** Frequency: Daily

1. Inspect ventilation
2. Report deficiencies

**REFERENCES
& EXAMPLES** ►

AREA OF COMPETENCY 16: **SCALE LOOSE ROCK**

TASK 16.1 **RECOGNIZE LOOSE OR ABNORMAL GROUND CONDITIONS** Frequency: Daily

1. Determine ground conditions
2. Determine guarding and reporting procedures
3. Take corrective actions
4. Describe methods of ground control monitoring

**REFERENCES
& EXAMPLES** ►

TASK 16.2 **RECOGNIZE FAULTY GROUND SUPPORT** Frequency: Daily

1. Describe ground support systems
2. Determine when abnormal conditions are present
3. Take corrective actions

**REFERENCES
& EXAMPLES** ►

TASK 16.3 **WASH ROCK SURFACES** Frequency: Rarely

1. Select correct hoses to suit specific application
2. Demonstrate equipment knowledge
3. Wash rock back and walls

**REFERENCES
& EXAMPLES** ►

SUB TASKS

TASK 16.4	SCALE ROCK	Frequency: Daily
	<ol style="list-style-type: none"> 1. Select scaling bar 2. Scale loose rock 3. Maintain scaling bars 	
	REFERENCES & EXAMPLES ►	

AREA OF COMPETENCY 17: **PERFORM GENERAL SERVICES**

TASK 17.1	INSTALL AND MAINTAIN SYSTEMS AND LINES	Frequency: Weekly
	<ol style="list-style-type: none"> 1. Plan and prepare for installation of lines and systems 2. Install lines and systems 3. Conduct housekeeping activities 	
	REFERENCES & EXAMPLES ►	

AREAS OF COMPETENCY 18 AND 19 ARE NOT APPLICABLE TO THIS OCCUPATION.

AREA OF COMPETENCY 20: **INSTALL STAGING**

TASK 20.1	PLAN FOR STAGING	Frequency: Rarely
	<ol style="list-style-type: none"> 1. Check mine prints, layouts and standards 2. Determine type of staging 3. Determine required tools 	
	REFERENCES & EXAMPLES ►	
TASK 20.2	INSPECT AND CONSTRUCT STAGING	Frequency: Weekly
	<ol style="list-style-type: none"> 1. Receive and store materials in staging area 2. Select required tools 3. Select ladders 4. Install ladders 5. Construct or place staging 	
	REFERENCES & EXAMPLES ►	
TASK 20.3	INSPECT AND CONSTRUCT MECHANICAL STAGING	Frequency: Weekly
	<ol style="list-style-type: none"> 1. Demonstrate knowledge of inspecting and constructing staging 2. Set up equipment 	
	REFERENCES & EXAMPLES ►	

SUB TASKS

TASK 20.4 REMOVE AND STORE STAGING

Frequency: Weekly

1. Dismantle staging
2. Move and store staging

**REFERENCES
& EXAMPLES** ►

AREA OF COMPETENCY 21: CONDUCT LIFTING OPERATIONS

TASK 21.1 OPERATE LIFTING EQUIPMENT

Frequency: Daily

1. Describe rigging and lifting equipment
2. Demonstrate equipment knowledge
3. Select and use proper rigging/lifting equipment
4. Trained in appropriate lift mechanisms and rigging programs

**REFERENCES
& EXAMPLES** ►

TASK 21.2 PLAN AND SET UP LIFT

Frequency: Daily

1. Obtain authorization to conduct lift
2. Select lifting equipment
3. Set up lifting equipment
4. Prepare workplace for lift

**REFERENCES
& EXAMPLES** ►

TASK 21.3 RIG AND SECURE LOAD

Frequency: Daily

1. Rig load
2. Secure load

**REFERENCES
& EXAMPLES** ►

TASK 21.4 MAKE THE LIFT

Frequency: Daily

1. Test lift
2. Move, place and secure load

**REFERENCES
& EXAMPLES** ►

TASK 21.5 DISMANTLE AND STORE LIFTING EQUIPMENT

Frequency: Daily

1. Remove lifting equipment
2. Return workplace to normal condition
3. Inspect and replace damaged or defective lifting equipment

**REFERENCES
& EXAMPLES** ►

SUB TASKS

AREA OF COMPETENCY 22: **SURFACE SITE SET-UP**

TASK 22.1	<p>FOLLOW LAND USE PLANS AND PERMIT GUIDELINES</p> <ol style="list-style-type: none"> 1. Identify type of set up 2. Interpret guidelines <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 22.2	<p>CONSTRUCT ACCESS ROUTES</p> <ol style="list-style-type: none"> 1. Determine access route 2. Clear trees and brush 3. Build road/access route 4. Ensure completed road/access route is inspected <p>REFERENCES & EXAMPLES ►</p>	Frequency: Rarely
TASK 22.3	<p>BUILD AND MAINTAIN CAMPS</p> <ol style="list-style-type: none"> 1. Determine type of camp required 2. Select location of camp site 3. Build camp 4. Install toilet and waste facilities 5. Maintain camp 6. Restore camp location to acceptable environmental conditions <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

AREA OF COMPETENCY 23: **PERFORM DRILLING OPERATIONS**

Task 23.1 is not applicable to this occupation.

TASK 23.2	<p>DEMONSTRATE HAND DRILL KNOWLEDGE</p> <ol style="list-style-type: none"> 1. Train and become authorized for proper use and operation of all hand drills 2. Identify type and size of drill bits and their applications 3. Identify types and applications of drill steel and drill rods 4. Select appropriate type and size of pipe and fittings 5. Visually inspect drill 6. Set up drill 7. Conduct pre-operational checks before air and water are hooked up 8. Conduct pre-operational checks after air and water are turned on 9. Mount drill steel 10. Dismantle drill 11. Maintain drill 12. Store drilling equipment <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
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SUB TASKS

TASK 23.3	<p>OPERATE STOPER</p> <ol style="list-style-type: none"> 1. Demonstrate hand drill knowledge 2. Drill rock <p>REFERENCES & EXAMPLES ►</p>	Frequency: Rarely
TASK 23.4	<p>OPERATE JACKLEG</p> <ol style="list-style-type: none"> 1. Demonstrate hand drill knowledge 2. Drill rock <p>REFERENCES & EXAMPLES ►</p>	Frequency: Rarely
<i>Task 23.5 is not applicable to this occupation.</i>		
TASK 23.6	<p>DEMONSTRATE DIAMOND DRILL KNOWLEDGE</p> <ol style="list-style-type: none"> 1. Train and become authorized for proper use and operation of diamond drill 2. Prepare drill site 3. Set up drill 4. Install safety equipment 5. Conduct pre-operational checks 6. Start drill 7. Shut down drill 8. Maintain drill 9. Refuel drill 10. Tear down drill 11. Environment <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 23.7	<p>OPERATE DIAMOND DRILL</p> <ol style="list-style-type: none"> 1. Demonstrate diamond drill knowledge 2. Read and maintain daily drill report/logbook 3. Drill bore holes 4. Complete core tube activities 5. Trip drill rods and casing 6. Complete testing requirements <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 23.8	<p>MAINTAIN DIAMOND DRILL SUPPORT SERVICES</p> <ol style="list-style-type: none"> 1. Manage water supply 2. Maintain inventory <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

SUB TASKS

TASK 23.9	<p>RECOVER CORE SAMPLE</p> <ol style="list-style-type: none"> 1. Remove core sample from core tube 2. Place core in core box tray 3. Prepare core box(es) for transportation <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 23.10	<p>PREPARE AND MAINTAIN ALL IN-HOLE TOOLS</p> <ol style="list-style-type: none"> 1. Identify components of in-hole tools 2. Prepare in-hole tools 3. Maintain in-hole tools <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 23.11	<p>GROUT DIAMOND DRILL HOLES</p> <ol style="list-style-type: none"> 1. Select grouting equipment 2. Demonstrate hand and power tool knowledge 3. Perform grouting 4. Maintain grouting equipment 5. Tear down and store grouting equipment <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 23.12	<p>DRILL ON ICE</p> <ol style="list-style-type: none"> 1. Monitor ice conditions 2. Adapt support services for operating on ice 3. Sling casings 4. Environment <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 23.13	<p>DRILL FROM A BARGE</p> <ol style="list-style-type: none"> 1. Monitor marine conditions 2. Adapt set up process 3. Adapt support services for operating on barge 4. Environment <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily
TASK 23.14	<p>TRANSPORT DIAMOND DRILL</p> <ol style="list-style-type: none"> 1. Plan surface move 2. Plan underground move 3. Move drill and supplies <p>REFERENCES & EXAMPLES ►</p>	Frequency: Daily

SUB TASKS

Tasks 12.15 to 12.18 are not applicable to this occupation.

TASK 23.19 **PERFORM DIRECTIONAL DRILLING**

Frequency: Daily

1. Test direction of the hole
2. Review plan with the client
3. Correct the deviation

**REFERENCES
& EXAMPLES** ►

AREA OF COMPETENCY 25: **OPERATE PROCESSING EQUIPMENT**

Tasks 25.1 to 25.15 are not applicable to this occupation.

TASK 25.16 **MAINTAIN HOSES**

Frequency: Daily

1. Describe hoses
2. Use hoses
3. Repair hoses

**REFERENCES
& EXAMPLES** ►

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 1.1 COMPLY WITH COMPANY POLICIES AND PROCEDURES

- Includes Standard Operating Procedures (SOP)
- Includes policies on the use of personal electronic devices, wearing jewellery, contact lenses, long hair, incident reporting procedure, new hire orientation, etc.
- Includes procedures on operation of equipment, use and handling of chemicals, care and maintenance of sumps and ventilation
- Understand and apply human resource policies, procedures and collective bargaining agreements
- Comply with drug and alcohol policy
- Comply with updates and revisions to policies and procedures

TASK 1.2 UNDERSTAND AND COMPLY WITH APPLICABLE WORKPLACE LEGISLATION AND REGULATIONS

- Includes Mine Health and Safety Act and Regulations, Workers' Compensation Regulations, Labour Standards, Hoisting Regulations, Environmental legislation
- Comply with updates and revisions to legislation and regulations

TASK 2.1 SELECT, USE AND MAINTAIN PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Select appropriate PPE
 - understand the minimum PPE requirements
 - wear PPE approved by recognized authority (Canadian Standards Association [CSA], American National Standards Institute [ANSI], Underwriters Laboratories [UL])
 - identify limitations of PPE
 - workers may not be aware of approved PPE and/or the PPE may be assigned by the company
 - contractors can be required to select their own PPE
 - ensure PPE is appropriate for the assigned work task
- Inspect PPE
 - inspect PPE for wear, damage, and defects before using
 - replace worn, damaged, or defective PPE
 - report defects to appropriate personnel
- Use PPE
 - ensure PPE fits correctly and is adjusted properly
 - follow manufacturer's instructions and specifications for proper use and maintenance of PPE
 - maintain and store PPE
- Wear clothing appropriate for work conditions and tasks
 - high visibility work wear
 - do not wear loose or torn clothing
 - ensure all clothing adequately covers body to protect against hazards, contaminants, work and weather elements
 - dispose of contaminated clothing in compliance with company policies and legislation
 - use appropriate eye protection in place of contact lenses
 - wear high visibility PPE as required
- Practice personal hygiene
 - keep work clothes separate from street clothes if required
 - change and clean work clothes regularly

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 2.2 PRACTICE GOOD HOUSEKEEPING

- Maintain clean work area
 - ensure priority areas are clear first as identified in policies and procedures
 - use appropriate equipment for task (e.g. broom, scraper, water hose, vacuum, blow pipe or air lance, mobile equipment)
 - keep work areas free from clutter
 - keep work areas free of ice, grease and mud
 - clean, maintain and return tools and equipment to storage immediately after use
 - report and/or remove defective equipment
- Take corrective action as required
 - clean all spills and/or leaks
 - ensure work area is free of obstructions
- Dispose of waste materials
 - follow environmental plan
- Organize and classify materials
 - use shadow boards for storing equipment
 - use tool cribs, bins and dedicated areas for storing similar materials

TASK 2.3 IDENTIFY AND RESPOND TO WORKPLACE HAZARDS

- Recognize hazardous or potentially hazardous conditions
 - use risk assessment tools as per site policies and procedures
 - types of hazardous conditions may include: dangerous weather and environmental conditions, heat and cold stress, wildlife, poor ground conditions (loose rock, swamp, ice), overhead hazards (trees, power lines, screen, vent tubing), underground hazards (gas lines, power lines), open holes (sumps, chutes, shafts, trapdoors), protruding objects (nails, anchors), tripping or slipping hazards (hoses, rocks, muck, hoses, ice, lichen, spills), moving equipment (trucks, loaders, forklifts, aircraft), explosives (dangerous gases, e.g., oxy-acetylene, methane, propane, H₂S, HCN, chlorine), inadequate ventilation (ripped or torn vent tubing, non-operating fans), lack of or inadequate safety guards on equipment with moving or rotating parts, energy sources, reagents, engulfment, potential chemical reactions, dust, confined space, flocculants
- Take corrective action
 - isolate or eliminate hazard or potential hazard
 - guard all identified hazards using barricades and signs
 - post guard, if required
 - stop work if there are unsafe conditions
 - evacuate area if necessary
- Complete job hazard analysis
- If hazardous condition cannot be immediately corrected
 - ensure safety of self and others
 - lock out, tag and de-energize as per site policies and procedures

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 2.4 MANUALLY LIFT AND CARRY MATERIALS

- Assess the load
 - estimate size, weight, centre of gravity and dimensions of load
 - determine if assistance is required
 - determine if mechanical lifting equipment is needed
- Inspect pathway and destination
 - identify and remove hazards, where possible
 - identify resting places, if needed
 - ensure safe path to travel
- Prepare to lift the load
 - work within personal physical limits and limits identified in policies and procedures
 - ensure good footing and well balanced stance
 - select safe and comfortable hand holds
 - grip with full palm of hand
 - use sit down position and keep back straight
- Make the lift
 - ensure back is kept straight, use leg muscles to lift
 - use properly lifting technique to avoid muscular skeletal injuries
- Ground the load
- Keep back straight and use leg muscles to lower load

TASK 2.6 WORK AROUND MOBILE AND STATIONARY EQUIPMENT

- Communicate with equipment operator/ skip tender/ cage tender/ dispatch
 - communicate with equipment operator and verify acknowledgement
 - be aware of locations of communication equipment
- Obey rules of conduct
 - maintain safe working distance
- Identify hazardous conditions
 - use designated travel ways around equipment
 - avoid blind spots
 - do not cross guards or barricades
 - recognize and utilize safety bays
 - be aware of trailing cables
 - obey signage and established right of way policies

TASK 2.7 WORK AROUND WATER HAZARDS

- Operate equipment safely in and around water hazards
 - follow legislation and company policies and procedures as outlined
 - collect samples from tailings pond
 - utilize appropriate fall protection
 - use re-claim pumps
 - maintain berms
- Ensure safety of personnel working around water hazards
 - use personal floatation devices (PFDs)
 - monitor water levels
 - adhere to environmental standards
 - perform dam monitoring
- Recognize sumps and associated hazards

TASK 2.8 WORK AROUND AIRCRAFT AND HELICOPTERS

- Ensure personal safety
 - wear hard hats with straps, ear muffs and goggles
 - carry tools and equipment at or below waist level
 - keep within visual range of pilot
- Be aware of hazards
 - be aware of power of rotary wash, debris, rotors
 - keep clear of propellers, do not walk under wings
- Complete training in sending and receiving loads
 - review of sign offs
 - proof of competency

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 2.10 **PREPARE FOR HOT WORK**

- Recognize requirements for a hot work environment and obtain necessary permits
 - welding, cutting, grinding, soldering, using electrical equipment not suitable for a hazard location, combustible engine, “frost fighting”
- Inform appropriate personnel for fire watch
 - post guard and check environment after work as per site policies and procedures
- Prepare the site
 - remove combustibles, wet down the area, ensure necessary firefighting equipment is present
 - follow site policies and procedures
 - ensure proper ventilation

TASK 2.11 **RECOGNIZE AUTHORIZED AREAS**

- Recognize restricted areas
 - examples include: reagent room, electrical rooms, leach plant, hot work, confined spaces, explosive magazines, active lifting areas
- Complete necessary training for entry to restricted areas
 - training could include applicable respiratory protection training (e.g. SCBA), WHMIS, Transportation Dangerous Goods, Arc flash training
- Follow entry and exit protocols
 - follow notification process
 - utilize sign-in, sign-out sheets

TASK 3.1 **RECOGNIZE AND COMPLY WITH SIGNAGE, BARRICADES, AUDIBLE ALARMS, VISUAL ALARMS AND EQUIPMENT LIGHT INDICATORS**

- Recognize and comply with signage
 - includes: informational signs and tags, cautionary and danger signs (e.g. electrical hazard), directional signs, labels (e.g. Workplace Hazardous Materials Information System [WHMIS])
- Recognize and comply with barricades
 - includes: cautionary tape and tag, danger/do not enter tape, physical barriers (i.e. berms, concrete stoppers, steel cable) and protective barriers (i.e. snow fence, environmental)
- Recognize equipment and system audible and visual alarm signals
 - includes: bells, buzzers, horns, whistles, sirens, shaft signals
 - includes: ready lights, fault indicators, emergency indicators
- Recognize equipment and system indicator lights
 - includes: shaft warning lights, open hole lights, transportation of explosives, strobe light, equipment audible alarms, blast warning signs and lights, gaseous alarms, equipment start up, mixing alarms, amperes meter, pressure gauges, fault finder alarms
- Recognize flagging and buggy whips

TASK 3.2 **INSTALL, REMOVE, MAINTAIN AND STORE SIGNS AND BARRICADES**

- Understand site specific flagging procedures

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 3.3 **RECOGNIZE AND COMPLY WITH TRAFFIC SIGNS, LIGHTS AND PATTERNS**

- Recognize traffic signs and lights
 - includes: traffic signs, blasting signs, directional signs, restricted area sign
- Comply with traffic rules and patterns
 - includes: traffic lights, restricted traffic area, right of way, right and left hand drive areas, emergency vehicle movement
 - follow site policies and procedures (e.g. call-in protocols, ramp protocols, designated parking)

TASK 3.4 **INTERPRET AND USE INFORMATION PRESENTED ON PLANS AND DRAWINGS**

- Recognize symbols, abbreviations, colour coding
 - includes direction, scale, elevation, depth
- Interpret drawings
 - includes drill patterns, hole alignment, evacuation routes, shaft compartments, services (electrical, air, water, ventilation, etc.)

TASK 4.1 **BE PREPARED TO RESPOND TO FIRES**

- Classify fires by hazard
 - rubber, compressor rooms, electrical, grease, oil, equipment, chemical, concentrate
- Demonstrate knowledge of components and use of fire extinguishers
 - identify classes of fires: A - paper, wood, trash; B - flammable liquids, lubricants, paints; C - electrical; D - combustible metals
 - recognize potential for explosion (e.g. equipment fire, tire fire)
 - identify standard types, sizes and applications of fire extinguishers
- Identify names and functions of principal components of fire extinguishers
 - identify ranges and limitations of fire extinguishers
 - understand safety precautions for fire extinguishers, including CO² hazards due to misuse
- Demonstrate knowledge of equipment fire suppression system
 - activate fire suppression system
 - ability to dismount safely after activation if needed

TASK 4.2 **EXTINGUISH MINOR FIRES, IF SAFE TO DO SO**

- Select and use appropriate fire extinguisher and/or suppression equipment
 - 10 pound or 20 pound extinguisher
 - fire suppression system
 - know manual bypass of suppression system
- Use proper fire extinguishing techniques
 - point directly at base of fire, use sweeping motion
 - follow operational instructions

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 4.3 FIRE PREVENTION

- Properly store combustible materials
 - combustible wastes in covered bins or other designated containers
 - oily rags, oil, empty grease tubes, waste paper, coal, sulphide, wood and timber
- Proper maintenance of equipment
 - ensure fire suppression is intact
 - portable fire extinguisher working properly
 - clean grease build up
 - clean diesel filters
 - don't over fill fluid levels
- Control sources of flame / ignition
 - cigarettes, sparks, electrical discharges, friction, foreign material near exhaust, open flame
- Safely operate open-flame equipment
 - includes: acetylene torch, tiger torch, coil torch, diesel heater and stove
 - follow manufacturer's instructions for use (e.g. use for intended purpose only, follow lighting and extinguishing procedures, follow re-fueling procedures, adhere to maintenance procedures and inspections)
 - have appropriate class of fire extinguisher available

TASK 4.4 BE PREPARED FOR WILDFIRES

- Demonstrate knowledge of wildfire procedures
 - surrounding area cleared of flammable debris
 - adequate supply of water
 - understand definition of forest area
- Demonstrate knowledge and use of appropriate equipment
 - serviceable shovel, axe, back pump with fire hose
- Use spark arrestor or muffler
- If discharging a firearm, leave no residue
- Do not place hot saw on flammable material
- No smoking while walking or working in a forest area during fire season

TASK 5.1 PREPARE FOR EMERGENCY SITUATIONS

- Know location of equipment emergency stop devices
 - e.g. pull cord on conveyors, fuel shut offs, positive air shut offs
- Know the emergency procedures
 - e.g. alarm procedure, communication protocol and emergency response
 - emergency contact number, appropriate radio channel to report emergency

TASK 5.2 COMPLY WITH WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEMS (WHMIS)

- Identify hazard symbol classifications
 - hazard symbols include: Class A: compressed gas, Class B: flammable and combustible material, Class C: oxidizing material, Class D: poisonous and infectious material, Class E: corrosive material, Class F: dangerously reactive materials
- Access, understand and follow MSDS instructions
 - knowledge of location of further instructions and key contact personnel

TASK 5.3 PARTICIPATE IN SAFETY PROGRAMS

- Attend safety meetings
 - identify types of safety meetings (site orientation, work area orientation, tool box meeting, joint health and safety committee meeting)
- Follow company safety initiatives
 - safety initiatives include (zero harm, five point safety, behavioural-based safety)
 - implement safety practices such as Internal Responsibility System (IRS), Job Task Observations
 - conduct risk assessments

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 5.4 RESPOND TO AND REPORT EMERGENCIES

- Respond to all emergencies:
 - e.g. fire, medical, chemical, equipment, environmental (in-rush of water, major falls of ground, rush of muck), inadvertent stops, stray bells, dogging, high water shaft bottom, power failure
 - stay calm and assess situation
 - interpret alarms and other indicators to determine type of emergency and need for evacuation
 - activate emergency protocol, release stench gas (if applicable)
 - follow emergency response plan
 - evacuate if necessary
 - follow safest escape route
 - if unable to reach refuge station, barricade self in safe location, ensuring supply of air
 - await further instructions
 - follow instructions of designated emergency personnel
- Secure incident/emergency site
 - secure and freeze the scene
 - warn others
 - activate alarms
 - follow communication protocols
 - take corrective action if appropriate (e.g. emergency shutdown procedure)
- Report and document all emergencies and incidents
 - complete all required reports and forms
 - report emergency or incident to appropriate personnel according to policies and procedures

TASK 6.1 WORK AROUND ENERGY SOURCES

- Recognize energy sources, stored and potential
 - mechanical, hydraulic, kinetic, potential, pneumatic, electrical, thermal, chemical, nuclear
- Overhead and high voltage lines

TASK 6.2 LOCK OUT, TAG AND DE-ENERGIZE EQUIPMENT

- Lock out equipment for repair or maintenance as per site policies and applicable regulations
 - de-energize equipment
 - ensure safety of self and others
 - ensure safety of equipment
 - identify types of locks including: personal locks, enclosures, multi-locks, lock boxes
- Lock out and tag for commissioning and testing as per site policies and procedures
- Electrically powered equipment
 - isolate power supply by: disconnecting switch, shutting off breaker, using isolation bar/scissor locks, locking out equipment correctly, attaching required lock to isolation bar/scissor lock, ensuring appropriate key storage and handling
- Mechanical equipment
 - lock out by: ensuring that no material can enter equipment being repaired/maintained, shutting down process as required, shutting off valve nearest flange to be blanked, draining, purging, depressurizing or flushing lines before repair/maintenance to ensure that stored energy is dissipated or contained, locking out valves using chain lock where applicable
- Tag equipment for repair or maintenance as per site policies and applicable regulations
 - identify types of tags, the colours and their use
 - complete all required information on tag
 - record lock out
 - inform appropriate personnel of equipment lock out
- De-energize equipment for repair or maintenance
 - ensure zero energy state (ZES) for equipment (e.g. local and remote bump test)

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 7.1 IDENTIFY, INSPECT AND STORE FALL PROTECTION SYSTEMS

- Identify types of fall protection systems
 - hand rails, guard rails, travel restraint, fall arrest, anchor points
- Inspect, maintain and store fall protection systems
 - identify damaged or defective fall protection systems including loose or broken handrails or guard rails
 - defective systems should be taken out of service
 - store fall protection systems properly to prevent damage
- Report and remove defective fall protection systems
 - complete required documentation
 - report deficiencies to supervisor

TASK 7.2 USE PERSONAL FALL ARREST SYSTEM

- Ensure fall arrest system fits properly
 - select proper size, position on body, use of trauma straps and adjust correctly
 - follow manufacturer's specifications for use
- Use fall arrest system as per applicable legislation and site policies and procedures
 - working from heights (scaffold, scissor lift), open holes
- Have and understand rescue plan
 - properly retrieve fallen worker
 - time limitations

TASK 7.3 USE PORTABLE LADDERS

- Identify types, sizes, and grades of ladders
 - extension ladders, step ladders
 - made of different materials: metal, fibreglass, wood
 - different grades of ladders: Grade III, Grade II, Grade I, Industrial
 - select ladder appropriate for task and conditions
- Check condition of ladder
 - inspect ladder for faulty rungs or rails before, during and upon completion of job
 - tag out, remove or repair ladder, if needed
- Erect ladder
 - place feet of ladder on level surface
 - physically secure ladder
 - ensure proper angle of repose as per site policies and procedures
- Ascend and descend ladder
 - climb facing ladder
 - use 3 point contact
 - wear fall arrest system, as required
 - use assisted stabilization where required
- Perform tasks on ladder
 - work facing ladder and maintain contact with hand, whenever possible
 - maintain required distance from top of ladder
 - transport materials in suitable container using a rope
 - reposition ladder to prevent overreaching
- Inspect, clean and store ladder
 - record and report defect/damage to supervisor

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 7.4 WORK ON SCAFFOLDS AND RAISED PLATFORMS

- Ascend and descend scaffold or raised platform
 - ensure scaffold has been signed off by certified assembler and is current
 - ensure necessary guards are in place
 - use three-point contact
 - wear fall arrest system, as required
- Perform work on scaffold
 - identify any defects or damage
 - record and report defect/damage to supervisor
 - shut down raised platform if defective
 - fasten fall arrest system to appropriate anchorage point at or above shoulder
- Raised platforms include scissor lifts and aerial boom lifts
 - limited to working from raised platform and does not include operation of the equipment

TASK 8.1 LISTEN ACTIVELY

- Pay attention to person giving the message
 - reduce surrounding noises by stopping equipment and tools or moving away from noise
 - allow speaker to finish message before responding

TASK 8.2 SPEAK CLEARLY AND CONCISELY

- Give clear and concise directions
 - organize your thoughts before speaking
 - use appropriate volume and tone of voice
 - use appropriate body language
 - use sketches as required to assist in understanding
- Confirm understanding
 - ask questions to make sure directions were understood

TASK 8.3 USE COMMUNICATION DEVICES

- Familiarize self with equipment
 - includes: two-way radios, telephones, satellite phones, bells, pager phones, public address systems, CB radios, dispatch system (e.g. Modular, WENCO)
 - use only authorized communication systems
- Conduct pre-operational check
 - for two-way radios and pager phones, (prepare radio, ensure battery is fully charged, test radio)
- Use proper communication etiquette
 - use appropriate radio channels, language and codes
 - avoid unnecessary chatter
 - maintain radio silence as appropriate
 - reduce background noise, such as satellite radio
 - follow control room protocol

TASK 8.4 CONVEY MESSAGE USING SIGNALS

- Ensure visual contact
 - take signals from one person only
 - confirm signals
- Use appropriate signals for the job
 - includes visual and audible signals (e.g. hand signals, light signals, horns, bells, and whistles)
 - includes signals for : lifting devices (cranes, cage, skip), tramming, conveyance, aircraft and helicopters

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 8.5 USE WORKPLACE TECHNOLOGIES

- Use computer based training modules
 - interactive computer program, simulators
- Read and understand machine parameters
 - electronic warning cluster, warning lights and audible alarms, computer screens
 - includes heavy equipment status monitoring screens, in-plant diagrams, on-line references (MSDS pages, SOPs)
- Receive and follow dispatch instructions
 - dispatch screen (e.g. Modular, WENCO, Mine Star)
- Use computer software
 - electronic forms, databases, Internet, e-mail, word processors, spreadsheets

TASK 8.6 COMPLETE WORKPLACE DOCUMENTATION

- Use appropriate form
 - includes inspection checklists, log-books, shift reports, production reports, incident reports, safety system cards, time cards
- Be specific
 - include accurate information, appropriate details and complete report in full

TASK 8.7 COACH OR MENTOR OTHER EMPLOYEES

- No additional references or examples

TASK 9.1 WORK IN A TEAM ENVIRONMENT

- Respect team members
 - accommodate each other's communication needs (language differences)
 - cooperate with each other (need to be able to trust one another and rely upon each other)
- Respect each other
 - be tolerant of others
 - be willing to learn from others: be willing to mentor others
- Be professional
 - follow company social media protocols
 - understand requirements for the job
 - show up to work on time
 - demonstrate a strong work ethic
 - understand chain of command
 - follow, model, and promote safety and legislative requirements

TASK 9.2 WORK IN A CULTURALLY DIVERSE ENVIRONMENT

- Respect practices of co-workers and local populations
- Respect social differences
 - show interest in others (ask about work experience, family)
 - be a role model for others
 - cultural awareness training

TASK 9.3 MAINTAIN GOOD COMMUNITY RELATIONS

- Consider yourself an ambassador for the industry and the company
 - recognize that personal behavior affects public perception of employer
- Support local businesses
 - buy supplies locally

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 9.4 DEMONSTRATE HIGH STANDARDS OF CONDUCT

- Model safety leadership
- Lead by example, “walk the talk”
- Lead toolbox/ safety huddle and safety meetings
- Ensure safety of crew (fit for work, proper PPE)

TASK 10.1 DEMONSTRATE EQUIPMENT KNOWLEDGE

- Trained and authorized for proper use and operation of equipment
 - follow manufacturer’s recommendations
 - follow safe operating procedures
 - know capabilities and limitations of equipment
- Inspect equipment for defects, hazards and potential hazards
 - identify and assess severity of equipment defects
 - take corrective action to restore normal vehicle operation
 - record defect and corrective action taken in log-book
- Conduct pre-operational checks
 - damage to equipment
 - steering
 - test brakes
 - tires and undercarriage
 - fire suppression and extinguishers
 - bolts keepers and hoses
 - oil spills and/or excessive grease
 - pinions and ball gears
 - inspect layout of hoist
 - conveyance inspections
 - test all forms of communication – radio, bells, phones, pager phones
 - mechanical, electrical and HMI
- Properly mount and dismount equipment
 - use three-point contact
 - use grab handles and handrails
- Start equipment
 - neutralize controls (transmission, control levers)
 - activate power supply (master switch)
 - use warning signal before start-up
 - activate ignition
- Conduct operational checks
 - read and countersign log-book
 - fill out pre-operational check sheet
 - check gauges and alert indicators
 - ensure air and oil are at required levels
- listen for unusual noises (engine, power train)
 - check brakes and steering are functional
 - check warning systems and lights are operating
 - hoist testing (trial run, brake tests, conveyance checks, cage and skip checks)
 - test hoist limits of travel – overwind, underwind, track limit
- Drive equipment to worksite, as required
 - wear seat belts
 - use appropriate warning lights and signals
 - test service and emergency brakes
 - follow designated travel routes
 - observe speed limit, traffic signs, traffic patterns and rights-of-way
 - adjust speed according to road and weather conditions
 - listen for unusual noises (engine, power train)
- Operate equipment
 - wear seat belts
 - use appropriate warning lights and signals
 - test service and emergency brakes
 - follow designated travel routes
 - observe speed limit, traffic signs, traffic patterns and rights-of-way
 - adjust speed according to road and weather conditions
 - listen for unusual noises (engine, power train)
 - to maximize efficiency and ensure safety of other personnel and equipment
 - assess material and site conditions to determine appropriate operating techniques and speeds
 - monitor ammeter
- Shut down equipment (normal situations)
 - park in designated areas
 - set parking/emergency brake
 - shut off ignition and/or fuel supply
 - shut off master switch
 - set wheel chocks
 - lock out and tag as required

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

- Shut down equipment (emergency situations)
 - recognize and respond to alarms
 - shut down as prescribed for type of hazard
 - set off fire suppression system, as required
 - report incident to appropriate personnel
- Conduct post-operational check
 - fill out log-book

TASK 10.2 WORKING WITH EQUIPMENT

- Be cautious around moving parts of equipment
 - avoid pinch points
 - ensure appropriate guards are in place
 - stay clear of moving pulleys and belts
- Avoid hazardous conditions
 - identify blind spots
 - use designated travel ways
 - check for power, telephone and cable lines, guy wires and fences, low clearance areas
 - avoid debris resulting from work or movement of equipment

TASK 11.2 OPERATE UNDERGROUND LOCOMOTIVES

- Demonstrate equipment knowledge
 - types include diesel, battery operated, trolley
 - do not carry loose objects, operate with loose clothing or unlaced footwear
- Move equipment and material
 - transport materials on appropriate type of car, e.g., flat car
- Starting locomotive
 - ensure proper air pressure
- Braking
 - know and use proper hand and dynamic braking techniques

TASK 11.7 OPERATE TRACK DOZER

- Demonstrate equipment knowledge
 - travel up grade and down grade in an efficient manner
 - select correct gear and vehicle speed
 - position vehicle and ensure correct blade and/or attachment
 - observe signals and procedures (forward and backward movement)
 - lower attachments to ground
- Transport/relocate dozer
 - via lowboy, haul truck or walking according to site specifications
- Push and/or rip materials
 - load blade, carry material, dump material
 - follow proper ripping techniques according to material type
- Conduct loading unit clean-up
 - shovels, excavators, loaders, etc.
- Dump management
 - grade control
 - dump height and limit control
 - maintain berm height according to code
 - manage haul truck traffic, if required
- Live pile management
 - follow lock out procedure
 - develop and communicate plan to applicable parties
- Road construction and maintenance
 - construction of primary and/or secondary road
 - construction of a ramp
 - perform tasks according to engineered plans
 - fill and repair roads according to site policies and procedures

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 12.1 OPERATE LIGHT OR SERVICE VEHICLE

- Load, transport and unload materials, supplies and/or personnel
 - ensure protection of self and others
 - ensure non-movement of vehicle while loading
 - observe load limitations
- secure seats, safety bars and chains
- ensure proper hook-up of carrier
- secure loads

TASK 12.2 OPERATE UTILITY VEHICLES

- Demonstrate equipment knowledge
 - includes side-by-sides and track vehicles,
 - use helmets and seatbelts
 - check for emergency equipment (ABC fire extinguisher, first aid kit, vehicle permit, tool kit)
 - boom truck
- Move equipment and materials
 - do not overdrive headlight when driving
 - take precautions at ramps, corners and intersections
 - follow procedures when: towing trailers/carriers to transport materials (capacity, transporting materials on board, positioning and fastening)

TASK 12.3 OPERATE FUEL OR LUBE TRUCK

- Demonstrate equipment knowledge
 - ensure no smoking or open flame in and/or around vehicle
 - visually inspect chassis and attachments to verify integrity of tank
 - confirm presence of warning placards for dangerous goods
 - observe load limitations
- Transfer fuel and lube to equipment
 - approach equipment with operator in full view
 - ensure equipment has been stopped/parked and attachments grounded
 - ensure non-movement of vehicle while transferring
 - ensure proper hook-up of equipment

TASK 12.8 OPERATE SKIDDER

- Demonstrate equipment knowledge
 - carry load appropriate to the size of machine
 - use basket to carry materials
 - secure materials in basket appropriately
- travel with blade raised to avoid obstacles, but not blocking visibility
- operate only when both brake systems are working
- avoid spinning wheels

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 12.9 OPERATE WINCH

- Demonstrate equipment knowledge
 - consists of stationary turning drum wrapped with chain, cable or rope which is attached to the load being moved
 - keep cable rolled on winch when not hauling a load
 - ensure winch, cable, chains or rope and sling can handle load, check rating if available
 - use proper size and type of cable
 - check condition of winch roller, hooks, shackles, cable clamps
 - check condition of cable, chains or rope (cable free of frays and burns, hook not twisted, hook free of cracks, chain links are not broken and free of kinks)
 - check alignment of cable, chains or rope on drum
- do not handle cable while it is reeling back on to the drum/spool
- keep a safe distance away from cable, chain or rope that has a load in tow
- Move load
 - ensure load is properly aligned with hoisting equipment before winching
 - winch in as straight a line as possible
 - control play-out of cable (keep several cable wraps on drum)
 - move load to desired location and disconnect from cable, chains or rope
 - rewind cable, chains or rope onto winch drum

TASK 12.12 OPERATE SUPPORT LOADER

- Select and utilize appropriate implement for selected task
 - rock bucket, clean up bucket, forks, grapple, rock breaker
- Change implements as needed
 - follow appropriate procedures

TASK 12.19 OPERATE ALL-TERRAIN VEHICLES

- Demonstrate equipment knowledge
 - use helmets and seatbelts
 - identify hazardous or potentially hazardous conditions (water flows, extreme weather conditions, unsuitable ground/ice conditions, ground conditions of access to and from location)
 - do not overdrive headlight
 - take precautions (during spring and fall conditions, avoid heavily rutted trails/road, on hills, watch for tip-over risks, on blind hills and curves)
 - keep feet on foot rests
- Move equipment and materials
 - ensure vehicle permit, proof of insurance and valid driver's license are all with the vehicle
 - inform responsible person of travel plan (departure and estimated return time and route)
 - travel in pairs, especially on long trips or into remote areas
- Transport all-terrain vehicle
 - follow procedures when loading and unloading onto trailer or pick-up truck
 - follow procedures when towing trailers/carriers to transport materials (capacity, transporting materials on board, positioning and fastening)

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 12.20 OPERATE SNOWMOBILES

- Demonstrate equipment knowledge
 - use helmets and seatbelts
 - identify hazardous or potentially hazardous conditions: fences and guy wires, ice thickness on frozen lakes, rivers, streams, overhead branches, roads and vehicle traffic
 - do not overdrive headlight
- Move equipment, material and personnel
 - ensure vehicle permit, proof of insurance and valid drivers' license are with the vehicle
- pack tool kits and emergency kit (spark plugs, belt, flares, sounding device, first aid kit)
- avoid travelling on roads
- inform responsible person of travel plan (departure and estimated return time and route)
- travel in pairs, especially on long trips or into remote areas
- Transport snowmobile
 - follow procedures when loading and unloading onto trailer or pick-up truck

TASK 12.21 OPERATE WATERCRAFT

- Demonstrate equipment knowledge
 - identify hazardous or potentially hazardous conditions including waterway hazards (dead heads, sand bars, shallow channels), tripping hazards (ropes and containers), improperly marked fuel containers, sudden changes in weather and/or marine conditions
 - identify safety devices on watercraft (paddles, life jackets)
- Load and unload
 - ensure dock has capacity for watercraft (size, depth of water)
- position watercraft in designated/approved area (dock)
- comply with load limits
- distribute load evenly to prevent tipping
- secure loads and materials
- Move equipment and personnel
 - ensure vehicle permit, proof of insurance and valid operator's license are with the watercraft
 - ensure all personnel are wearing lifejackets/personal floatation devices
 - follow a designated route

TASK 12.23 OPERATE PUMPS

- Demonstrate equipment knowledge
 - includes piston pumps, plunger pumps (grout pump), centrifugal pumps (trash or volume pump), progressive cavity pumps, diaphragm pumps
 - may be powered by internal combustion, diesel, hydraulic, air or electric motors
- Install pump
 - identify components required (pumps, water heaters, suction/discharge hoses, pressure relief valve)
 - place equipment at predetermined location(s)
 - secure pump and discharge lines
- Monitor pump operation
 - control volume, temperature, pressure, minimal vibration, direction of flow from discharge lines
 - ensure no excessive leaking of gland water
 - perform routine checks
 - troubleshoot pumping system
 - clear blockages
 - identify flow/head requirements and materials (i.e. slurry, reagent)
 - depressurize lines
- Switch pumps
 - switch to stand-by pump

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 12.24 OPERATE MIXERS

- Demonstrate equipment knowledge
 - set up mixer ensuring it is secure and on a flat level base
 - includes prop, arbour, submergible, venture, colloidal, paddle
- Conduct operational checks
 - check for vibrations

TASK 12.25 OPERATE FLUID RECYCLING SYSTEMS

- Demonstrate equipment knowledge
 - includes filter type, centrifuge, settling, cyclone
- Conduct operational checks
 - check for vibrations
 - monitor for effectiveness

TASK 13.1 COMPLY WITH ENVIRONMENTAL POLICIES, PROCEDURES AND PERMITS

- Minimize environmental impact of operations
 - minimize waste produced (use recommended quantities of additives, do not let equipment run/idle unnecessarily, recycle fluid returns)
 - use biodegradable and non-toxic additives and store and handle with caution to prevent loss
 - use appropriate waste disposal measures
 - be aware of restrictions for emissions and noise
 - avoid practices that may cause erosion, soft ground rutting
 - follow existing roads when possible
 - when constructing new access routes avoid sensitive areas (swamps, rivers, streams, lakes), avoid cutting, pushing or dumping debris into water courses, use proper bridging techniques, avoid recreational and historical/cultural/ archaeological sites, plantations, fish, wildlife and their habitats, and whenever possible, minimize tree cutting
 - when setting up work site avoid unnecessary stripping or grubbing of vegetation, neatly stockpile disturbed overburden for reclamation purposes, maintain required distance from water bodies and courses, ensure campsite construction conforms to regulations and safety practices (structure spacing, noise abatement, fire control)
- Follow appropriate handling and clean-up procedures for various substances
 - identify environmental issues
 - assess severity of environmental issue
 - take corrective action
 - report environmental issue and corrective action to appropriate personnel
 - record environmental issue and corrective action in log-book
- Follow site abandonment and reclamation practices
 - cement holes, if required
 - stop or cap artesian wells
 - return sumps to original ground condition
 - restore work site back to an acceptable environmental state

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 13.2 INSTALL CONTAINMENT MEASURES

- Identify when containment is required
 - containment is required for the storage and handling of fuel, cuttings, hazardous materials, liquid and solid wastes
- Select appropriate type of containment
 - types of containment include straw, berms, pits, portable plastic containers, ditches, silt fencing, secondary containers of required dimensions
- match type of containment to the area and material being contained
- Install containment
 - install containment best suited to material being contained (fuel drum inside another secondary container, fuel tank inside a berm, double walled fuel tanks)

TASK 13.3 MANAGE WASTE

- Manage solid waste
 - use approved septic or sewer system for sewage
 - use sumps to remove excess water from solids (ensure sumps are of adequate size and capacity; direct water to designated area with good drainage where natural percolation can occur without reappearance)
- Manage liquid waste
 - includes sewage, sludge, cuttings, waste oil
 - document and follow instructions for disposal of all effluent
- collect used petroleum products (transfer used oil into clean pails/containers marked “waste oil” and dispose of as required)
- use special precautions when working adjacent to lakes, rivers or creeks (do not direct excess fluid into any watercourse unless treated and approved by regulatory authorities)
- Manage recycling waste
 - cardboard, scrap metal, empty fuel drums, empty propane tanks and unused lumber, must be salvaged and recycled

TASK 13.4 MANAGE FUELS AND OTHER HAZARDOUS MATERIALS

- Identify types of fuels and other hazardous materials
 - types of fuels include gasoline, propane, diesel
 - types of hazardous materials include mill reagents (e.g. cyanide, collectors, frothers), oil, hydraulic fluid, antifreeze, battery acid, grease, solvents, fuel additives
- Transfer fuels and other hazardous materials
 - use closed systems
 - drain or seal transfer hoses
 - ensure emergency equipment is available and accessible (fire extinguisher, spill kits)
 - do not leave fuel, equipment or fuel pump nozzles unattended while refueling
- Use spill prevention measures
 - includes oil absorbent matting, drip trays
 - replace caps and nozzles on fuel cans immediately after use
- fill fuel tank to safe level; do not overfill
- identify and repair leaks immediately
- Store fuels and other hazardous materials
 - ensure all equipment used for storage of fuels and other hazardous materials are in good condition and/or properly installed
 - store cylinders and other fuel containers in an upright position in approved storage area
 - ensure proper labelling of containers and signage
- Transport fuel/propane and other hazardous materials
 - obtain certification to transport dangerous goods
 - ensure proper permits are in place
 - check bills of lading against supplies
 - use appropriate types and sizes of containers to transport hazardous materials

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 13.5 RESPOND TO SPILLS

- Assess spill situation
 - halt operations
 - identify substance
 - determine risk to self and others
 - take precautions if substance is highly volatile
- Manage spill
 - take action to stop a continuous spill (turn off pump, reposition overturned containers)
 - determine spill spread (into ground, run off into watercourse)
- initiate spill containment (initiate company contingency plan for specific situation, isolate and remove spill material and contaminated material under and around spilled material if possible)
- monitor safe, uncontained spill until relieved by appropriate personnel
- Complete follow-up
 - follow spill reporting procedures (notify proper authorities (Spill Line))
 - notify supervisor
 - complete required documentation (Spill Report form)

TASK 14.1 DEMONSTRATE HAND AND POWER TOOL KNOWLEDGE

- Trained in proper use and application of hand and power tools
 - includes wrenches (socket, adjustable, pipe, box-end, etc.), impact tools, electric tools, chainsaws, handsaws, hammers, screwdrivers, hose repair equipment, shovel
 - identify capabilities and limitations of tool
 - select appropriate type, size, shape and capacity of hand tools for type of task to be completed, type of material to be used, necessary force to be applied, most efficient usage
 - assemble and adjust hand tools according to manufacturer's recommendations
 - follow procedures for start-up, operation, shut-down, disconnect and use/replacement of attachments
 - position tool properly
 - use safety features
- Inspect tool for defects
 - identify any defective, broken or damaged tools and attachments
 - assess severity of defect/damage
 - do not use defective tools
 - do not remove or modify safety devices
 - remove and/or lock out and tag any defective, broken or damaged tools and attachments
 - report defect/damage to appropriate personnel
- Maintain tools
 - clean and inspect tool before returning to storage
 - ensure tool is unplugged when replacing worn or dull drill bits, saw blades
- Store tools
 - store in appropriate designated place

TASK 14.2 USE POWER, PNEUMATIC, POWDER-ACTUATED AND HYDRAULIC POWERED TOOLS

Are we missing a bullet here?

- generators, chainsaws, hydraulic tools (jacks, air tugger, winch), impact wrenches, air nailers
- clean tools according to manufacturer's instructions
- Demonstrate hand and power tool knowledge
 - use proper extension cords and secure them in safe location
 - inspect extension cords before using
 - use ground fault protector
 - place hoses and lubricators properly to avoid tripping and other hazards
 - connect tools to air lines following procedures
 - follow proper pneumatic or hydraulic tool shut-down procedures

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 14.3 OPERATE GROUTING EQUIPMENT

- Select grouting equipment
 - includes pump, pressure rated hoses, plugs, grout type, additives
- Perform grouting
 - prepare grout mixture, including cement, chemicals, water, additives
 - mix to prescribed ratios
 - install grout plugs when required
 - pump grout mixture into the hole as specified
 - flush grouting system

TASK 14.4 OPERATE CHAINSAWS

- Cut, notch, back-cut, fall, de-limb trees
 - watch for dangerous trees or limbs (“widow-makers”), if applicable
- cut and notch timber to size
- cut plastic pipe and other materials as needed

TASK 14.6 OPERATE MOBILE GENERATORS

- Demonstrate hand and power tool knowledge
 - portable generators can be diesel driven, gas driven, air driven
- set up equipment, ensuring it is secure and on a flat, level base
- ground generator

TASK 15.1 TAG IN, TAG OUT

- Report to supervisor
 - to receive work instructions for day
 - to receive information about workplace conditions

TASK 15.2 INSPECT VENTILATION

- Inspect ventilation
 - ensure area is ventilated before entering work area
 - inspect vent duct for rips and tears
 - identify location of doors, barricades and fans
 - ensure ventilation system is properly installed
 - inspect and maintain sufficient air flow
- identify ventilation flow deficiencies
- take corrective actions as required and according to company standards
- Report deficiencies
 - report deficiencies to appropriate personnel

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 16.1 **RECOGNIZE LOOSE OR ABNORMAL GROUND CONDITIONS**

- Determine ground conditions
 - identify geological structures including faults, slips, jointing, contacts, dykes, fracture system, folding
- Visually inspect for signs including deformation of drill holes, cracks, stress, ground movement, condition of ground support system, floor heaving, tracks shifting, fresh muck on floor
 - refer to history in log-book/ground control
 - listen for rock noises (air blast, snapping or popping)
- Determine guarding and reporting procedures
 - isolate area according to company standards
 - report condition(s) to appropriate personnel
- Take corrective actions
 - assess danger throughout drilling operation (stop drill and inspect conditions regularly)
 - wash and scale loose rock
 - notify supervisor of situation that requires further investigation
 - communicate to local area workers about changing conditions
- Describe methods of ground control monitoring
 - lay out and planning
 - specialized blasting
 - instrumentation (micro-seismic system, tape extensometers, stress metres)
 - de-stressing
 - numerical modeling

TASK 16.2 **RECOGNIZE FAULTY GROUND SUPPORT**

- Describe ground support systems
 - includes bolting, timbering, cementing (shotcrete), backfilling, screening, strapping, cable bolting
- Determine when abnormal conditions are present
 - visually inspect for signs including deformed plates, cracked cement, rock-filled and/or broken screens, cracked timber, dry rot, bulging screen, snapping/shredding bolts, corrosion
 - make inspection by sounding and listening for rock noise(s)
- Take corrective actions
 - scale loose rocks where applicable
 - recondition as needed
 - communicate to local area workers about changing conditions
 - isolate area according to company standards
 - notify supervisor of situation that requires further investigation

TASK 16.3 **WASH ROCK SURFACES**

- Select correct hoses to suit specific application
 - choose appropriate dimensions and length of hoses
- Demonstrate equipment knowledge
 - fasten hoses to prevent leaks under static and dynamic working pressure
 - position hoses correctly
 - ensure hoses are not in contact with any equipment
- Wash rock back and walls
 - ensure proper amount of water has been used
 - wash to minimize dust and expose rock fractures
 - wash rock according to site policies and procedures

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 16.4 SCALE ROCK

- Select scaling bar
 - select proper length of bar for specific task
 - check condition of bar for wear and tear, straightness, sharpness, rubber hand guard
 - do not use worn bar
- Scale loose rock
 - ensure good footing
 - ensure clear space behind for retreat
 - ensure scaled material has a safe bed to fall on
 - anticipate the size and movement of falling ground and stand clear
 - scale from a safe position
 - scale within one's physical limits (do not over reach, keep balance, maintain suitable working posture)
- sound ground for 'drummy' or solid ground conditions
 - scale from good ground to bad
 - take down all loose ground possible
 - watch for unexpected fall from back, face, pillar or wall
 - drop bar if control is lost
 - ensure other workers are positioned in a safe location
 - ensure lighting is adequate
 - ensure work place is scaled at all times
- Maintain scaling bars
 - keep scaling bars clean and sharp
 - discard any bent or chipped bars

TASK 17.1 INSTALL AND MAINTAIN SYSTEMS AND LINES

- Plan and prepare for installation of lines and systems
 - select appropriate type of equipment according to job type and specifications (i.e. specific to drill setup)
- Install lines and systems
 - isolate and lock out, de-energize and tag existing lines and systems
 - install hanging devices to secure to existing ground support mechanisms according to site standards
 - adding supporting mechanisms where appropriate
 - de-isolate existing lines and systems
- Conduct housekeeping activities
 - tear down, move and store tools and equipment in designated/approved areas
 - remove debris
 - recycle materials

TASK 20.1 PLAN FOR STAGING

- Determine type of staging
 - select proper type of staging for specified application (wooden, steel, mechanical, pre-constructed)
 - measure area for required materials

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 20.2 INSPECT AND CONSTRUCT STAGING

- Receive and store materials in staging area
 - includes timbers, planks, stabilizers, framing
 - deliver materials and timber to staging area
 - store materials and timber in preparation for staging
 - inspect components for defects or damage
- Select required tools
 - select appropriate power and hand tools
 - demonstrate hand and power tool knowledge
- Select ladders
 - discard defective ladders
 - replace defective rungs
- Install ladders
 - choose method of installing and securing ladders according to site policies and procedures
- Construct or place staging
 - follow mine prints, layouts and standards for locating, securing, aligning and spacing staging
 - install temporary support posts
 - determine application of ladders, lagging, planks, legs, chains, guard-rails, toe rails, anchors and wings
 - set up warning signs, barriers, fall arrest systems
 - support staging using appropriate chains, muck pile and/or spraggs
 - place and attach ladders and steps to ensure free access

TASK 20.3 INSPECT AND CONSTRUCT MECHANICAL STAGING

- Set up equipment
 - mechanized staging includes platform lift, scissor lift, (may include loader, bucket elevator, fork lifts, boom lift trucks, crane, mechanized raised climber, basket loader)

TASK 20.4 REMOVE AND STORE STAGING

- Dismantle staging
 - tear down staging using designated equipment
- Move and store staging
 - move staging using designated equipment (scoops, service vehicles, trucks, manual means)
 - store staging and equipment in pre-assigned area

TASK 21.1 OPERATE LIFTING EQUIPMENT

- Describe rigging and lifting equipment
 - includes non-mechanized and mechanized lifting equipment
 - may include hooks (with safety latches), slings or chains (specific to lifting), anchor (attached to an existing or temporary beam), hoisting plugs, weight indication devices
 - power-operated devices may have over-wind protection
 - chain blocks include chains and gears (enclosed in a metal case)
 - come-a-long includes a ratchet lever
- Select and use proper rigging/lifting equipment
 - store slinging equipment in designated/approved area
 - inspect equipment for defects

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 21.2 PLAN AND SET UP LIFT

- Obtain authorization to conduct lift
 - establish daily log-book for overhead cranes
- Select lifting equipment
 - use only certified rated rigging equipment
 - match capacity of lifting equipment to load
 - determine attachments to be used such as hooks, chains or slings (wire, rope, nylon)
- Set up lifting equipment
 - ensure stable and level surface
 - secure area using guards (banners, barricades)
 - ensure devices are securely anchored
 - activate all necessary warning devices
- Prepare workplace for lift
 - activate all necessary warning devices

TASK 21.3 RIG AND SECURE LOAD

- Rig load
 - ensure proper rigging training and qualifications
 - attach selected rigging equipment
 - centre and balance load
 - use attachments to maintain balance
 - ensure load is free of all equipment (hoses, cables and other tools)
- Secure load
 - place shims, fillers and spacers to secure load

TASK 21.4 MAKE THE LIFT

- Test lift
 - conduct test lift as per site policies and procedures
- Move, place, and secure load
 - control load: lift load slowly, steadying with tag line, move load in one direction only, ensure clear path for load travel, keep load as close to ground as possible, keep load clear from operating equipment
 - ensure area is clear before lowering load
 - release load
 - use spotter and proper hand signals according to site policies and procedure

TASK 21.5 DISMANTLE AND STORE LIFTING EQUIPMENT

- Remove lifting equipment
 - remove hooks, slings and accessories
 - inspect equipment for defects
- Return workplace to normal condition
 - store slings according to manufacturer's specifications

TASK 22.1 FOLLOW LAND USE PLANS AND PERMIT GUIDELINES

- Identify type of set up
 - includes drill pads, helicopter landing pad, dock for float planes, access routes (bridges), camp structures
- Interpret guidelines
 - identify correct orientation
 - build to correct dimensions
 - use required tools and equipment
 - use required materials
 - meet specifications

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 22.2 CONSTRUCT ACCESS ROUTES

- Determine access route
 - obtain necessary permits from client or company
 - avoid sensitive areas (swamps, rivers, streams, lakes)
 - avoid recreational and historical/cultural/archaeological sites, plantations, fish, wildlife and their habitats, mature trees and heavily wooded areas whenever possible
 - follow the edge of a swamp, grassy plain or lightly wooded area if possible
 - maintain a buffer zone between cleared areas and lakes, rivers or streams
- Clear trees and brush
 - minimize potential for surface erosion
 - avoid cutting, pushing or dumping debris into water courses
 - fall trees away from standing water, in accordance with permit
 - remove dead limbs, dead standing trees and hang-ups
 - salvage and stack timber away from right-of-way and in scrub brush areas if possible
- Build road/access route
 - use proper bridging techniques
 - extend corduroy two feet on each side of equipment, if applicable
 - travel ways must be free of all obstructions
 - grade roads/access routes
 - apply additional materials as needed (for additional support, to prevent erosion)
- Install signage and barricades
- Ensure completed road/access route is inspected
 - communicate completion of road/access route to supervisor for inspection
 - inspection may include road width, ground, overhead obstructions, proper installation of corduroy, construction of bridges

TASK 22.3 BUILD AND MAINTAIN CAMPS

- Determine type of camp required
 - factors include length of contract, time of year (season) number of people employed, method of transportation (air, water, road), provincial and rural regulations (fire and travel)
 - obtain permits prior to building camps
- Select location of camp site
 - follow specification for camp location in the permit
 - situate camp site on an elevated or well-drained site
 - locate camp sites 50 metres away from the shoreline of a lake or river, if possible
- Build camp
 - follow construction plans and permits
 - ensure that foundations are solid to prevent sagging or twisting
 - build camp structures at least 15 metres apart
 - separate kitchen and sleeping quarters
- Install toilet and waste facilities
 - facilities may include latrines, sumps or lagoons (storage areas for waste or grey water or spill fluids), waste disposal sites
- Maintain camp
 - disinfect contents of pit toilets
 - treat cesspool for cookery sinks with lime daily

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 23.2 DEMONSTRATE HAND DRILL KNOWLEDGE

- Train and become authorized for proper use and operation of all equipment
 - follow safety guidelines (wear protective equipment, shut off appropriate valve, bleed all lines, secure all pipes, follow proper lock out procedures, wash or blow out lines to clear obstructions, install header, check line for leak, ensure 'whip check' is properly installed on air hose, where required)
- Identify types and applications of drill steel and drill rods
 - standard steel, auger steel, threaded steel, thread one end, hex shank other end, threaded both ends, sectional drill rods
 - eliminate damaged or bent steel
 - send rejected steel to surface for recycling
- Visually inspect drill
- Inspect equipment components for damage (spike, outer casing, air gooseneck, leg feed control, hand guard, side rod, exhaust port, throttle control, water hose and valve, inner casing, air leg, chuck, retainer, water tube)
- Set up
 - ensure area has been properly prepared for drilling
 - ensure proper back clearance
 - assemble all necessary tools and supplies
- Conduct pre-operational checks before air and water are hooked up
 - blow out air and water hoses
 - shut off and bleed air before filling lubricator with specified lubricant
 - ensure all controls are in 'off' position
 - hook up and securely tighten hoses
 - ensure spike is placed at or below foot level
 - check air and water goosenecks
 - ensure all control handles move freely
 - ensure there is no rock in chuck of machine
 - check chuck or steel for wear
 - make sure threads on all fittings are clean and tight
 - put rubber hand guard in place over leg air feed control
- check side rods to make sure they are tight
- check leg advance
- ensure spike on leg is present
- ensure all controls are in 'off' position
- ensure chuck is turning when throttle is turned on with leg air feed off
- if water valve is attached to machine, turn valve on to chuck
- Mount drill steel
 - follow proper procedures
 - place steel properly to avoid hazards
- Keep side rods tight
- Dismantle drill
 - shut off air and water at headers
 - bleed water line at drill and slowly loosen hoses
 - disconnect hoses
 - coil hoses neatly
 - store hoses in appropriate place
 - ensure clear travel way
- Maintain drill
 - ensure all goosenecks are tight
 - keep screens on goosenecks clean
 - replace plugged water tube
 - if steel retainer does not work properly, send machine for repairs
 - identify any defects
 - assess severity of defect
 - repair defect according to company standards
 - report defect and repair to appropriate personnel
- Store drilling equipment
 - where it will not be in way of fly rock from blasting
 - where it will not be a hazard to anyone or any machinery passing by
 - if drill is not placed on a rack, stand drill up against wall where it cannot fall or be knocked over
 - if drill is not to be used for a long time, pour oil into chuck to prevent rusting

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 23.3 OPERATE STOPER

- Demonstrate hand drill knowledge
 - ensure water valve is turned on before drilling
 - prepare level working area
- Drill rock
 - position stoper properly
 - position yourself according to recommended procedures
- monitor conditions (proper water flow, loosening of ground, loosening of hoses, general condition of drill)
- check scale
- watch for loose rock while collaring
- carry stoper over your hip or shoulder (three-point contact) to move drill

TASK 23.4 OPERATE JACKLEG

- Demonstrate hand drill knowledge
 - tighten nut on leg and ensure end of leg is not plugged with mud
 - ensure bottom of leg is in good condition and secured to prevent slippage
 - check leg advance
 - ensure leg moves freely
 - ensure chuck is turning when throttle is turned on with leg air feed off
 - ensure strong stream of water is flowing from chuck of machine
- Drill rock
 - position jackleg properly
 - use proper anchor
 - check scale
 - watch for loose rock while collaring
 - carry jackleg over your shoulder to move drill

TASK 23.6 DEMONSTRATE DIAMOND DRILL KNOWLEDGE

- Train and become authorized for proper use and operation of drill
 - types of diamond drills include self-propelled, bar-mounted, skid-mounted, rail
 - drills may be powered by air, electricity, or diesel
- Prepare drill site
 - site must be of adequate size to accommodate equipment and free of obstructions and hazards
 - determine need to use cribbing to level drill
 - follow surface site plan to allocate space for ancillary equipment, fuel storage, garbage disposal
 - check underground site for services (air, water, power, ventilation), ground support, ground condition, hazards (missed holes, bootlegs, lifters)
 - extend underground services
- Set up drill
 - position drill as per drill layout
 - crib drill with timbers, as required
 - install underground staging as required
- set up drill on surface following manufacturers specifications (assemble or extend mast, affix associated components such as rod racks, basket, cables, lanyards, fall arrest system, lights, stiff leg, guy wires as required, raise mast/tower to correct inclination, anchor and secure stiff legs and guy wires to appropriate/ designated location (drill shack)
- set up drill underground as per drill layout (front sight and back sight, anchor drill)
- set up water supply system (set up pump and lay out water hoses, bring water supply to drill tub and/or cooler system, connect water swivel to water swivel hose and pressure pump)
- set up water recycling system to collect cuttings and recycle drill fluids (poly drill system, recycling/setting tanks, stuffing box, cyclone, sumps)
- Install safety equipment

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

- includes: fire extinguishers in drill shack and pump shack, seasonal firefighting equipment, emergency response equipment, spill kits, guard rails, communication devices, fall protection, hazardous gas tester, approved first aid kit, adequate lighting for night work
- ensure all safety devices are in place, secure and in good operating condition (spark arrester)
- Conduct pre-operational checks
 - use pre-op checklist and check condition of components (mechanical and rotating components, fluid levels (fuel, oil, hydraulic fluid), hydraulic and fuel fittings, guarding, safety equipment, work environment (lighting, temperature), environmental checks (fluid leaks - hydraulic and fuel, air quality, exhaust leaks)
- Start drill
 - put controls into neutral position
 - follow manufacturer's specifications for start-up
 - turn on power source
 - monitor gauges to ensure equipment is operating properly within manufacturer's parameters (fluid levels, water pressure, system hydraulic pressures)
 - check drill functions on equipment (drill rod threading, drill head rotation, chuck, foot clamp, pump, wireline winch)
 - listen for unusual sounds
 - report deficiencies to supervisor
 - monitor fuel levels during operation
- Shut Down
 - place controls in neutral
 - turn off water going to the hole, power source on panel, air
 - reduce to idle speed
 - conduct post-operational check with checklist (guards, fluid levels)
- Maintain drill
 - inspect bit face for signs of damage and wear (burning, ringing, breakage) change bit if necessary
 - check core barrel assembly and change core barrel, if necessary
 - check gauge of reaming shell
 - replace or adjust components
 - lubricate equipment according to manufacturer's specifications
- Refuel
 - monitor drill fuel levels during operation
- Tear down diamond drill
 - remove safety features
 - lower mast
 - remove mast accessories
 - remove anchors
 - disassemble components (disconnect hoses)
 - prepare and secure loads for moving
 - use approved fuel pumping equipment
 - inspect terrain and remediate site prior to leaving
 - ensure no hazards are left behind
- Environment
 - manage fuel and other hazardous materials
 - use approved fuel pumping equipment
 - inspect terrain and remediate site prior to leaving
 - ensure no hazards are left behind

TASK 23.7 OPERATE DIAMOND DRILL

- Read and maintain daily drill report/logbook
- take corrective action based on report from previous shift
- make note of hazards, discrepancies at the drill site, abnormalities in the drill hole (drill misalignment, damage bits, broken rods, shell/core barrel/hole deviations)
- Drill bore holes
 - collar hole and set casing
 - lower core barrel assembly
 - commence core drilling operations as specified in layout (hole size, dip, depth)
 - identify adverse conditions while drilling (bit/tube blockage, vibration, bit polishing, loss circulation, worn bit, faulted ground)
 - make adjustments to drilling
 - identify when tube is full or blocked
 - break the core
 - grout hole upon completion or as required

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

- Complete core tube activities
 - remove the inner tube with wire line overshot
 - may use a pumping overshot to retrieve inner tube
 - control extraction of inner tube through controlled release of water to prevent runaway tubes
 - insert empty inner tube
 - add new drive rod
 - pump tube to latch
 - resume drilling
 - move inner tube assembly to core removal area
- Trip drill rods and casing
 - identify reasons for tripping rods (change bit, change core barrel, wedging, remove core due to mismatch, end of hole)
 - pull back and remove rod(s) as required
- pull rods (retract rod[s] to rod joint for breaking, break rod with appropriate tools, remove rod, rack rod[s])
- continue until core barrel is at surface
- lower rods (insert rod[s] to rod joint for making, torque rod[s] with appropriate tools, add additional rod[s])
- Complete testing requirements
 - determine trajectory of the hole
 - pull back and remove rod(s) as required
 - insert survey tool, e.g., electronic or mechanical compass
 - conduct tests
 - take reading
 - remove tool
 - document readings as required
 - resume drilling

TASK 23.8 MAINTAIN DIAMOND DRILL SUPPORT SERVICES

- Manage water supply
 - monitor water flow and pressure
 - inspect hoses regularly (check for leaks, punctures, freezing (permafrost))
 - keep pump running (monitor fluid levels, refuel pump motor)
 - mix in appropriate drill additives as required for hole conditions (casing, caving, loss of circulation, vibration, stabilization, high water pressure, swelling grounds, faulting)
- Maintain inventory
 - maintain supply of consumables (fuel, core boxes, core blocks, rods, additives)
 - inform supervisor of inadequate supply of consumables, if required

TASK 23.9 RECOVER CORE SAMPLE

- Remove core sample from core tube
 - remove latch head assembly
 - place top end of core tube in tray or core box careful not to damage tube
 - remove core from tube
 - ensure all core has been removed from inner tube
- Place core in core box tray
 - start from top left corner of the tray
 - fill each successive groove to the right from top to bottom
 - match core and indicate depth with a marked core block
- ensure core is clean and free of any contaminants
- clean out tube with running water
- visually inspect tube for any defects
- Prepare core box(es) for transportation
 - secure box(es)
 - identify box(es) by marking with the required information inside and outside
 - seal box(es), using approved method (fasten with haywire, tape, rubber bands, screws or nails, fibre filament tape)
 - take core box(es) to designated area

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 23.10 PREPARE AND MAINTAIN ALL IN-HOLE TOOLS

- Identify components of in-hole tools
 - components may include inner tube, inner tube extension, latch head assembly, lifter case assembly
- Prepare in-hole tools
 - attach latch head to inner tube
 - check lifter case assembly and attach to inner tube, if required
- Maintain in-hole tools
 - visually check outside of tube for defects (burrs, bends, flattened threads)
 - inspect inner tube assembly for wear (check threads, look for damage (bulged tube), latch head assembly)
 - grease latch head assembly
- Maintain cutting tools
- Maintain fishing tools

TASK 23.11 GROUT DIAMOND DRILL HOLES

- Select grouting equipment
 - identify equipment needed (pump, pressure rated hoses, plugs, grout type, additives)
- Demonstrate hand and power tool knowledge
 - check power source, fluid levels, pressure rated hoses
 - inspect principal components of pumps and gauges, including guards and controls
- Perform grouting
 - prepare grout mixture (cement, chemicals, water, additives)
 - mix to prescribed ratios
 - install grout plugs when required
 - pump grout mixture into the hole as specified
- Maintain grouting equipment
 - flush grouting system
 - disconnect power sources
 - clean all equipment
 - check controls, lubrication, general conditions of pump, missing tank, hoses and gauges for worn/defective components
 - lubricate grease fittings
- Tear down and store grouting equipment
 - store in designated/ approved area

TASK 23.12 DRILL ON ICE

- Monitor ice conditions
 - monitor thickness over entire route, conditions (open holes, large cracks, inadequate ice, quality of ice (blue vs white ice), freeboard (the difference between the height of the water vs the height of the ice), load capacity of the ice (in relation to weight of equipment, materials and supplies)
- Adapt support services for operating on ice
 - mark off work area with flags or barricades
 - use sills or timbers of appropriate length to distribute weight evenly
 - maintain air flow around the drill to allow heat to escape
 - monitor ice for changing conditions
- make hole for pump suction, using ice auger, in a safe and marked spot
- set up environmental equipment to collect drill cuttings
- follow procedures for installing casing (double casing, slinging)
- grout diamond drill hole and remove casing after drill operations are complete
- Environment
 - limit amounts of stored fuel on hand
 - use extreme caution when fueling
 - dispose of cuttings as required by regulations

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 23.13 DRILL FROM A BARGE

- Monitor marine conditions
 - monitor water depth, obstructions (dead heads, shoals), weather (wind storms, waves)
- Adapt set up process
 - check installations of ancillary equipment and position of drill on barge
 - check water depth for anchoring purposes
 - flag anchor lines
 - ensure warning lights are installed on barge and supply boat
 - install secondary containment boom around barges, e.g., socks
- Adapt support services for operating on barge
 - set up environmental equipment to collect drill cuttings
 - follow procedures for installing casing (double casing)
 - grout diamond drill hole and remove casing after drill operations are complete
- Environment
 - limit amounts of stored fuel on hand
 - use extreme caution when fueling
 - dispose of cuttings as required by regulations

TASK 23.14 TRANSPORT DIAMOND DRILL

- Plan surface move
 - use maps
 - identify hazards, including ground conditions, hydro lines, weather conditions, ice routes
 - land routes - determine need to construct access routes, build bridges and/or install culverts
 - water routes - be aware of hazards (underwater rock or shoals for entire pre-designated route)
 - determine load size
 - determine moving sequence (need to construct route, identify moving order of components and materials, identify equipment needed to make move, identify permits needed to make move, identify permits or licenses required)
- Plan underground move
 - read layout
 - identify hazards and potential hazards along entire route to destination
 - determine moving method
 - determine equipment required
 - moving equipment may include scoop, utility vehicle, motor, forklift, cage
- Move drill and supplies
 - load components and materials
 - select proper tie-downs to secure load
 - co-ordinate with others to ensure timely and efficient move
 - unload at destination

TASK 23.19 PERFORM DIRECTIONAL DRILLING

- Test direction of hole
 - survey the hole
- Correct the deviation
 - install retrievable wedge, steep wedge, steerable tools

REFERENCE/EXAMPLES OF ABILITIES AND KNOWLEDGE

TASK 25.16 MAINTAIN HOSES

- Describe hoses
 - water hose: commonly used to supply drill with water or wash the headings or rock face, usually made of rubber, comes in various sizes, usually 1 inch diameter
 - air hose: used for low/high air pressure applications, e.g. pneumatic tools, usually made of rubberized material
 - special application hoses (propane hoses used on propane tanks)
- Use hoses
 - inspect hoses to ensure they are not damaged
 - turn on air or water slowly to detect any unnoticed damage
 - do not let hose become a tripping hazard
 - protect hoses from falling muck
- Repair hoses
 - air hoses: ensure clear of muck, debris or water before connecting to a piece of equipment, use whip check when attaching air hoses to diamond drills
 - water hoses: be aware of sudden surges of pressure in water hoses caused by air locks
 - use correct fitting for hoses (joiners, ends)
 - use clamps to secure hose to fitting (select correct size, use correct number of clamps for size of hose, punch to ensure connection, be careful not to cut hose)
 - discard damaged propane hoses

