



# **SONIC DRILLING LTD.**

***ADVANCED DRILLING TECHNOLOGY***

## **SITE SPECIFIC HEALTH AND SAFETY MANUAL**

### Introduction

Welcome to Sonic Drilling Ltd. You are now part of a progressive, service oriented company. As part of the SDL team, you will be working for a company that is unique in the Canadian drilling industry.

### About our Company....

SDL was incorporated in 1979 by Ray Roussy. He had worked for Hawker Siddley as part of a design team working on developing a high-frequency vibratory drill rig. Unfortunately, the machine that they developed had frequent and catastrophic failures. When Hawker Siddley abandoned the project, Ray took the knowledge he had gathered, did his own research, and developed a sonic drill that was reliable. Ray holds patents on his improvements to the technology.

The first Sonic Drilling Ltd. drill rig was put into service in 1987. The rig worked on a variety of projects until 1991 when SDL entered the environmental drilling market. From 1991 onward, the sonic drill rig was booked almost 100% of the time. During this time, Ray had built drill heads for other drilling contractors in the US. It wasn't until 1998 when Ray redesigned the sonic drill head that SDL finally got its second sonic drill rig. Sonic Drilling Ltd. remains as the only drilling contractor in Canada with sonic drill rigs.

*Note: Since it is impossible for this manual to cover every possible hazard one might encounter on the job, please use common sense when working.*

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**\*\*this acknowledgement must be submitted to the office administration department at the time of hiring\*\***

## **EMPLOYEE CONFIDENTIALITY AGREEMENT**

Upon commencement of employment with Sonic Drilling Ltd., all new employees will read and review the information and materials in this Health & Safety Plan. Supervisors and employees who need information concerning health and safety policies should also consult and review this manual as a reference tool.

All employees of Sonic Drilling Ltd must read and sign the following Employee Confidentiality Agreement.

Provision of employment contract restricting employee from divulging employer's trade secrets.

Employee agrees that any and all knowledge or information that may be obtained in the course of the employment with respect to the conduct and details of the business and with respect to the secret processes, formulas, machinery, etc. used by the employer in manufacturing its products will be forever held inviolate and be concealed from any competitor and all other persons and that he or she will not engage as employer, employee, principal, agent, or otherwise, directly or indirectly, at any time in a similar business, and that he or she will not impart the knowledge acquired to anybody and that should he or she at any time leave the employ of the employer he or she agrees not to enter into the employ or service or otherwise act in aid of the business of any rival company or concern or individual engaged in the same or in similar lines of business. If he or she does so in violation the employer shall be entitled to an injunction by any competent court of equity enjoining and restraining him [her] and each and every other person concerned from continuance of employment, services or other acts in aid of the business of the rival company or concern. Nothing shall prevent him [her], upon the termination of the employment, in engaging in any occupation in which the processes, formulas, and other secrets of the employer will not be directly or indirectly involved.

Employee's Name (print) : \_\_\_\_\_

YOUR NEW EMPLOYEE NUMBER IS # \_\_\_\_\_

Signed: \_\_\_\_\_

Witness: \_\_\_\_\_ Name (print) : \_\_\_\_\_

Dated: \_\_\_\_\_

**\*\*this agreement must be submitted to the office administration department at the time of hiring\*\***

## EMPLOYEE STANDARDS ACT

Sonic Drilling Ltd is in compliance with the Employment Standards Act.

This Act applies to all employees, other than those excluded by regulation, regardless of the number of hours worked. The purposes of this Act are to ensure that employees in British Columbia receive at least basic standards of compensation and conditions of employment; To promote the fair treatment of employees and employers; to encourage open communication between employers and employees; To provide fair and efficient procedures for resolving disputes over the application and interpretation of this Act; To foster the development of a productive and efficient labour force that can contribute fully to the prosperity of British Columbia; To contribute in assisting employees to meet work and family responsibilities.

## SAFETY POLICY STATEMENT

Sonic Drilling Ltd. is fully committed to meet all social, regulatory, and legal obligations to our employees, our clients and the general public.

The management of Sonic Drilling Ltd. is committed to maintaining a safety and loss control program comprised of:

- ◆ Company rules and policies
- ◆ Safe work procedures
- ◆ Employee training

It is essential that all employees participate in the implementation and maintenance of the safety program. The management of Sonic Drilling Ltd. will not tolerate violations of the safety program and will respond appropriately in the event of non-compliance.

We will make every effort to get the support of our clients in honouring these commitments.

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Ray Roussy , PRESIDENT

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Bill Fitzgerald, GENERAL MANAGER

## EMPLOYEE HEALTH AND SAFETY MANUAL

As we strive to stay current with health and safety legislation, regulation, guidelines and policies for the protection of our workers, the information contained in this manual should be used in conjunction with the information provided in the 2011 **OCCUPATIONAL HEALTH AND SAFETY PROGRAM**.

The following describes the typical contents of this “***EMPLOYEE HEALTH AND SAFETY MANUAL***”:

Further information

Responsibility

Hazard Assessment

Medical Surveillance

Heat Stress

Personal Protective Equipment

Monitoring Procedures for Site Operations

Training

Safety Considerations for Site Operations

Decontaminations Procedures

Disposal Procedures

Equipment Operations

Material Handling

Emergency Response and Accident Notification

Record Keeping

## OBJECTIVES

The purpose of the Health & Safety Plan is to establish the policies, responsibilities and procedures for the prevention of injury and illness and ensure the health and safety of workers/employees involved in all company activities.

## GENERAL STATEMENT OF COMPANY POLICY

- Conduct all operations so the health and safety of all personnel is given the highest priority. No operation shall be pursued at the expense of the safety of individuals performing a task.
- Employees are provided with necessary training and safety instruction, including a copy of the Health and Safety Plan. Only those employees qualified by certified training experience are permitted to operate equipment.
- Employees shall adhere to the requirements of the Health and Safety Plan and other site-specific health and safety plans. Failure to comply will be grounds for disciplinary action or termination of employment.
- Employees are required to actively participate in the Health and Safety, Injury and Illness Prevention Plan. This includes attending safety meetings and adhering to all policies, rules and standards. Active participation in this program will be a substantial part of the employee's Recognition and Goal Setting reviews.
- All equipment will be maintained in safe working condition to prevent accident or injury due to equipment failure or malfunction.

## EMPLOYEE AWARENESS AND PARTICIPATION

- Employee health and safety is essential to the success of the Company.
- Mandatory attendance is expected at regular safety meetings of all employees including management. Attendance and discussion content of meetings will be documented with follow-up actions. These meetings will be open to discuss any health and safety issue, review any incident or near miss during the quarter, and for the employees to bring any unsafe condition to the attention of management.
- The basic policy of "safety first" is stressed at each daily tailgate and quarterly safety meetings.
- The drillers/supervisors will be responsible for ensuring that all employees on their work site
- Accident and near miss reports will be generated to review and discuss at safety meetings.

## GENERAL MANAGEMENT

The role of the General Manager is to provide the materials, equipment, opportunities, and trained personnel in order to complete projects safely and efficiently. This is accomplished through:

- Knowledge of and compliance with applicable regulations
- Knowledge of all materials used and their safe handling
- Familiarity with all pieces of equipment used and their safe operation
- Insuring that employees are properly trained
- Insuring that employees have appropriate safety supplies and equipment
- Performing periodic site safety inspections
- Holding monthly company safety meetings
- Performing annual company safety audits

## OPERATIONS MANAGEMENT

This level of leadership has total control over specific projects. He/she is primarily an administrator when not participating in the field activities. They report directly to upper management. The driller/supervisor may fill this position on some projects.

The operations management is responsible for but not limited to the following:

- Implementing and enforcing Health and Safety, Injury and Illness Prevention Plan
- Preparing and organizing all project work
- Selecting crew personnel and briefing them on specific assignments
- Defining the scope of work
- Coordinating with the driller/supervisor, health and safety officer and all other parties involved to complete the work plan
- Ensuring that health and safety training and equipment requirements have been met
- Obtaining permission from the proper authority to enter and start work
- Coordinating with the owner and/or engineer



### DRILLER/SUPERVISOR

The driller/supervisor is responsible for field operations and the safety of workers under his/her control. Operations management may fill this position on some projects.

The driller/supervisor is responsible for, but not limited to, the following:

- Supervising field operations
- Enforcing site control
- Coordinating work activities
- Enforcing health and safety standards and procedures
- Working directly with the Site Health and Safety Officer
- Daily inspection of drill rig and completion of necessary inspection forms
- Daily pre-job hazard review and completion of necessary forms

### DRILLER ASSISTANT

The Driller's Assistant works on-site with the Driller and is responsible to the Driller. The Driller's Assistant's responsibilities include:

- Knowledge of and compliance with company safety policies.
- Knowledge of and compliance with directly applicable regulations.
- Insure that they have training in the operation of the equipment
- Daily inspection of the support vehicle and completion of the necessary inspection forms.
- Job site safety
- Making recommendations to improve safety and efficiency.

### MECHANIC

The Mechanic is responsible to the Manager. The Mechanic typically works in the shop but may be required to perform on-site repairs. Both in the shop and on-site, the Mechanic's responsibilities include:

- Knowledge of and compliance with company safety policies.
- Knowledge of and compliance with directly applicable regulations.
- Insure that they have training in the operation of the equipment.
- Observe preventative maintenance schedules.
- Make scheduled inspections and correct deficiencies.
- Correct deficiencies noted by equipment operators.
- Make recommendations to improve safety and efficiency.

## RULES

All employees of Sonic Drilling Ltd. are representatives on the company. Their actions and appearance influence how the company is perceived, both by clients and by the public. Each employee has the right and the responsibility to report unsafe working conditions. In addition, all employees have the right to refuse work because of unsafe working conditions.

## APPEARANCE

Sonic Drilling Ltd. requires an employee to wear special clothing; it is without charge to the employee. Uniforms will be maintained and clean uniforms worn by employees at the expense of Sonic Drilling Ltd. Clothing are the property of Canadian Linen Uniform and must be returned when employee leaves the company.

- All employees must present themselves in a tidy manner, not just for appearance but for safety as well
- Ripped clothing or coveralls is not permitted because it is a safety hazard around rotating machinery
- Coveralls should be changed and washed periodically to minimize cross contamination between work sites
- Rainwear and rubber boots should be steam cleaned frequently to minimize cross contamination between work sites
- Long facial stubble is not permitted because it interferes with the seal of respirators
- Excessively long hair must be tied back so that it is not a hazard around machinery

Organization is necessary to safely work in the hazardous waste industry. While each site will have specific differences, the basic organizational structure will be used throughout the company. There must always be lines of authority, responsibility, and communications. A liaison with the community must also be established. All employees must be aware of these lines of authority, and perform their function in the organizational structure safely and efficiently.

## ASSIGNMENT OF RESPONSIBILITY / INSPECTATIONS

All employees play a role in the implementation and enforcement of this Health and Safety Plan. The Operations Manager has overall authority for enforcement on health and safety issues and the responsibility to direct key personnel to ensure that annual health and safety inspections are conducted and all health and safety matters are addressed as soon as possible. These inspections are geared to identify existing and/or potential health and safety hazards. Any discrepancies found are resolved as soon as possible.

During inspections employees are encouraged to inform their supervisors of any health and safety discrepancies or any conditions they feel are unsafe.

## INSPECTIONS—RECORD KEEPING

After each inspection a report is documented stating which discrepancies were noted and/or corrective actions measures to be taken. If a situation cannot be resolved within one week, a statement will follow the inspection report stating why the delay and the estimated time it will take to resolve the situation. A copy of the report will be kept on file in the Inspections folder for a minimum of three years.

Please see section **10.0 "INSPECTIONS"** in the **OCCUPATIONAL HEALTH AND SAFETY PROGRAM** for further details and information on Workplace Inspections.

## TRAINING

The proper training of employees is the key to the implementation of an effective safety program. Areas of training include: first aid, health and safety, materials handling, vehicle operation, drivers licensing, equipment operation, hazard identification, and communication.

### Employee Safety Tickets

Employee's training tickets are the responsibility of the employee. Employees must keep record of when they are due for renewal. Sonic Drilling Ltd requires a copy of all employee safety tickets and drivers licence.

SDL will pay for all fees and tuition for necessary training, except for driver's license. Employees get paid for their time in training, excluding travel time. Field personnel (Driller, Driller's Assistant) get paid for training at their reduced "Shop" rate.

Employees must have the following training:

- Safe operation of each piece of equipment that they are required to operate in the course of their job, including: trucks, drill rigs, cranes, mixers, pumps, tools, etc.
- Level 1 First Aid
- Workplace Hazardous Materials Information System (WHMIS)
- Basic Transportation of Dangerous Goods (TDG)
- Employees working on contaminated sites should have the 40 hour OSHA 'Health and Safety at Hazardous Waste Sites' course. It is required for work on contaminated sites in the USA.

Employees must insure that they possess the proper class of driver's license for the vehicle that they will be operating.

It must be recognized that new employees represent the highest risk on the job because of their lack of experience and/or training. It is the responsibility of the Manager to insure that each employee has the necessary training to perform each task that is required in their job description. The Manager must keep a record of all training that each employee receives.

Most training in the operation of equipment occurs 'on the job'. Employee training should be conducted by a supervisor. Ideally, a new employee should work alongside a more senior employee that holds the same job title, under the observation of a supervisor.

All new employees must be approved as competent for their position by the Manager. The following is the training structure:

- A Driller trains a Driller with close observation by the Manager.
- A Driller trains a Driller's Assistant
- A Driller's Assistant trains a Driller's Assistant with close supervision by a Driller.

Training for the position of Driller's Assistant typically lasts 2 to 5 days. Training for the position of Driller typically lasts 3 to 12 months.

A training log is kept for each new employee, tracking the dates and progress of the employee in training.

## REQUIRED TRAINING

### **DRILLER -**

Level 1 first aid, TE, OSHA, TDG, WHMIS, Class 3 (or 1) driver's license with air brake endorsement, current hearing test

### **DRILLER'S ASSISTANT -**

Level 1 first aid, TE, TDG, WHMIS, Class 3 (or 1) driver's license with air brake endorsement, current hearing test

### **MECHANIC -**

Level 1 first aid, TDG, WHMIS, Class 3 (or 1) driver's license with air brake endorsement, current hearing test

## TDG – TRANSPORTATION OF DANGEROUS GOODS

Compliance is a three step process:

- become familiar with the basic layout and requirements of the TDG act and its regulations.
- use those regulations to determine whether any of the products you bring in or ship out are considered "dangerous goods" according to the detailed regulatory definitions, criteria or schedules
- decide a shipment falls under its regulatory purview; you must comply with the relevant packaging, labelling and paperwork provisions.

## THE TEN COMMANDMENTS – FOR TRANSPORTING DANGEROUS GOODS

- You must know what you are doing before you handle, package, load or transport and dangerous goods
- You must train your employees to conduct their appointed tasks safely and compliance with regulations
- You must know which of your goods are dangerous, and the class, division and packaging group of each
- You must ensure your goods are packaged properly
- Your labels, placards and markings must be clear, visible and prepared in accordance with the law.
- You must have your paperwork in order and kept near to hand
- You must not spill
- Even the most careful shipper or carrier must be prepared for the worst (preparing an emergency response assistance plan
- You must confess all your mistakes promptly and in writing
- You must place the protection of human health and the environment above all else

## COMMUNICATION

Communication within the company can take the form of memoranda, incident reports, employee reviews, or verbal. Lines of communication should follow the basic 'chain of command' within the company. The Driller's Assistant is responsible to the Driller. The Driller is responsible to the Manager. The Manager is responsible to the President.

### Communication Equipment

#### Cellular Telephones-

Each drilling crew is supplied with a cellular telephone. Use of the phone is limited to essential calls: suppliers, repair companies, clients, etc. Communication with other crews or with the office should be made using the two-way radios.

#### The phone is for BUSINESS USE ONLY.

No personal calls are permitted. Employees are encouraged to use pay phones or other 'land lines' for personal calls, or purchase their own cellular phone for their personal use. Employees will not be reimbursed for business related calls made on their personal cellular telephones without prior authorization from the General Manager.

Two-Way Radios-Each drilling crew is supplied with two two-way radios. The radios are to be used for communication with other crew members, with other crews, and with the office.

The use of cellular phones or two-way radios is not permitted while operating mobile equipment or while using tools.

Safety Training- If you don't have all of the training or certification required for your position, SDL will insure that that you get it. If you do not already have training in First Aid, OSHA, TDG, or WHMIS, for example, training session(s) will be scheduled for you. You will be paid at "shop" rates (if applicable) for your time during your course(s).

Additional Training-You are encouraged to take courses outside of work to enhance your job skills. With the approval of the General Manager, SDL will pay the tuition or fees for courses directly relevant to your job. However, you won't be paid wages or salary for the time that you spend in additional training courses.

#### Abstract Required Form

ICBC - National Safety Code requires all employee's to submit a copy of their Driver's Licence annually. Our office will fill out the required forms, please promptly submit to administration when you are asked.

## MSDS

A Material Safety Data Sheet is a technical bulletin that provides specific hazard information, safe handling information, and emergency procedures for a controlled product. Since the MSDS contains detailed health and safety information specific to each controlled product, it should be used as a key source of information for safe work procedures. Each drill rig must have current Material Safety Data Sheets (MSDS) for every hazardous substance that will be encountered during a project. This applies to materials handled in the course of work and contaminants that may be encountered (WCB OHS Reg. 5.16).

It is the responsibility of the Manager to supply the employees with MSDS for hazardous materials that will be encountered while working. It is the employees' responsibility to familiarize themselves with the available MSDS sheets. When a new MSDS sheet is issued, it is the responsibility of the Driller to update MSDS binder.

All of Sonic Drilling's trucks are equip with a MSDS Binder, and must remain in the truck at all times. These Material Safety Data Sheets are supplied to all Sonic Drilling trucks and are kept up to date by the office administration department.

Group	Responsibly
Suppliers	Provide up to date MSDS's (not more than 3years old) for all controlled products they sell or produce
	Provide supplier labels on all containers of controlled products they sell or produce
Employers	Ensure that workers understand information on MSDS. Supplier labels and workplace labels by providing effective worker education.
	Provide training in specific safe work procedures to workers who work with or near controlled products
	Ensure that all containers of controlled products in their workplace have MSDS and WHMIS labels (suppliers labels, workplace labels or other acceptable means of identification as appropriate)
	Ensure that MSDS are readily accessible to workers
Workers	Know and understand the information on labels and MSDS
	Use the information they receive through education and training to handle controlled products safely.
	Inform employers if labels are illegible or missing
WCB Prevention staff in B.C.	Administer WHMIS legislation about WHMIS to employers and workers
	Provide general information about WHMIS to employers and workers
	Ensure compliance with federal and provincial WHMIS legislation

## WCB – WORKERS COMPENSATION BOARD

The Workers' Compensation Board of B.C. is dedicated to promoting workplace health and safety for the workers and employers of this province. We consult with and educate employers and workers and monitor compliance with the Occupational Health and Safety Regulation. In the event of work-related injuries or diseases, the WCB works with the affected parties to provide return-to-work rehabilitation, compensation, health care benefits, and a range of other services.

Under the requirements of the Workers Compensation Act, a worker must report an injury or a disabling occupation disease as soon as possible to the employer. Reports must be filed from the SDL office within 3 days of incident. Your claim may not be considered if this is not done. A worker may not make an agreement with the employer to give up WCB benefits.

If a worker suffers a work related injury or illness, the WCB provides fair compensation that may include medical costs, loss of earnings, physical rehabilitation and pensions. The WCB also works with employers to help injured workers return to work. If a worker is killed on the job, counselling and financial help are made available to the victim's family. The WCB information line can answer your questions about workplace health & safety, worker and employer responsibilities and reporting a workplace accident or incident. Phone 604-276-3100 Lower Mainland or toll-free 1-888-621-7233 (621-SAFE) To report after-hours and weekend accidents and emergencies call 604-273-7711 or toll-free 1-866-922-4357 (WCB-HELP).

We're here to protect the workers and employers of British Columbia. WCB's mandate is to:

- ◆ Prevent workplace injuries, diseases, and fatalities
- ◆ Rehabilitate injured workers and returning them to productive, safe employment
- ◆ Provide fair compensation for workers suffering from an occupational disease or injury
- ◆ Provide sound financial management for a viable workers' compensation system
- ◆ Protect the public interest

## SAFETY PROMOTION

Safety is a primary concern at SDL. You will be expected to work in a safe and responsible manner at all times. Remember, the General Contract that you signed when you joined SDL states that following the Safety Program is condition of employment. Safe work practices benefit everyone.

Safety is the responsibility of all personnel at Sonic Drilling Ltd. Whether it's the creation of safety policies by management or a driller practicing safe work procedures on site, each person has a role to play. Safety awareness must be emphasized to employees. This will encourage them to adopt a "Safety Attitude". This will also convey to employees that management expects the job to done safely.

In order to maintain an effective safety program, safety must be continually promoted and emphasized within the organization. This promotion includes:

- Monthly safety meetings. The meetings will be held to discuss general safety issues and to review safety policies.
- Incident reports, both from Sonic Drilling Ltd. and from other companies.
- Regular safety inspections of job sites by the General Manager, not less than once per month per crew.

In addition, the daily job site safety meetings will reinforce to clients that Sonic Drilling Ltd. is serious about safety.

### PUBLIC SAFETY AND SECURITY

Contractors are responsible for the perimeter of the work area to be appropriately fenced to safeguard the public. In addition, warning signs posted on the site fence and gate.

### GENERAL HEALTH & SAFETY PLAN FOR ENVIRONMENTAL DRILLING OPERATIONS

This health and safety plan applies to all personnel working on or near the drilling operation:

Conduct site safety meeting with on-site consultant before setting up
Familiarize drill crew with contaminants which may be encountered and level of protection required
Deploy fire extinguisher at rear of rig in an easily visible location
First Aid kit is located in the cab of the drill rig on the rear wall between the driver and passenger seat

### HEALTH & SAFETY GUIDELINES

General Procedures - The following personal hygiene and work practice guidelines are intended to prevent injuries and adverse health effects. This guideline is the minimum standard procedures for reducing potential risks associated with work projects.

Eating, Drinking, smoking, taking medication, chewing gum or tobacco is prohibited in the immediate vicinity of the work.
Hands and face will be thoroughly washed prior to eating, smoking or putting anything in the mouth.
Personal visitors are not allowed on site
Whenever possible, the employee shall stand upwind of the work (borehole, test pit, ect.)
Always be alert to potential changes in exposure conditions such as strong odours, unusual appearance in cuttings, oily sheen on water, ect.
Establish pre-arranged hand signals or other means of emergency communication when wearing respiratory equipment, when working around noisy equipment or when working at some distance from fellow workers.
Always be alert as to unusual behaviour, dizziness or other symptoms exhibited by yourself or by other workers at the site as this may indicate exposure to harmful substances.
Noise may pose a health and safety hazard, particularly during drilling, test pitting and construction activities. A good rule of thumb is that is you have to shout in order to communicate at a distance of three feet in continuous noise; you should be wearing hearing protection. Likewise, any impact noise from activities such as driving casing on drilling operation which is loud enough to cause discomfort would indicate the use of hearing protection. Hearing protection is available and should be included in your standard field kit, along with hard hats, safety glasses, steel toed boots, ect.
Always use the appropriate level of personal protection, lesser levels of protection can result in preventable exposure: excessive levels of safety equipment can impair efficiency and increase potential for accidents to occur.



### SAFETY EQUIPMENT on VEHICLES

All Sonic Drilling Ltd. vehicles must be equipped with a first aid kit and a fire extinguisher. All personnel on site, including the client, should be aware of the location of all safety equipment. The following lists the class of vehicle and the minimum safety equipment requirements:

DRILL RIGS :	Level 1 FIRST AID KIT	20 lb ABC fire extinguisher	EYE WASH BOTTLE
HEAVY TRUCKS :	BASIC FIRST AID KIT	10 lb ABC fire extinguisher	
OTHER VEHICLES :	PERSONAL FIRST AID KIT	2.5 lb ABC fire extinguisher	

### DRILLING SAFETY.... IT'S EVERYONE'S RESPONSIBILITY

Well drilling is inherently a dangerous occupation. Many recent improvements on drilling rigs have contributed to making drilling safer: including emergency cut-off switches located at the back of the rig, chain and gears that have been replaced by sealed hydraulic motors, hydraulic drill stem breakouts and hydraulic driven wire lines eliminating the need for rope and catheads, just to name a few.

Most accidents still can be attributed to human error. Human error can be further subdivided into: inexperience, carelessness, being tired or substance abuse accidents from these causes can be greatly reduced by taking the obvious preventative measures.

### **The following is a list of DO's and DON'Ts which may help avoid unnecessary accidents:**

- ✓ Do – Everyone, not just the driller, should know how to turn off the rig.
- ✓ Do –Wear gloves, your skin is to delicate to leave unprotected.
- ✓ Do – Keep equipment and tools in good working order and condition.
- ✓ Do – Regular scheduled safety meetings
- ✓ Do – Wear your hard hat, it doesn't take much metal falling to do serious harm
- ✓ Do – Wear your safety belt while driving.
  
- ✗ Don't drill too close to overhead power lines or underground power sources.
- ✗ Don't re-fuel the engine while it is running. Leaking gasoline and a spark can cause a serious explosion.
- ✗ Don't wear loose clothing around a drill rig. Clothing caught in turning machinery will pull the rest of your body into the machine.
- ✗ Don't drill out of control. There is a direct correlation between accidents and drilling to fast.
- ✗ Don't do things that require excessive strength i.e.) breaking pipe joints, moving heavy tools, ect., this is a precursor to getting hurt suddenly or causing long term health problems. Let the tools and the rig do the work.
- ✗ Don't drill while lightning is seen or thunder is heard. Drill masts are excellent lightning rods.
- ✗ Don't use a cathead with a wet rope, it is too unpredictable.

## DRILLING SAFETY GUIDE

We care about your safety not only when you are working on or around a drill rig, but also when you are travelling to and from site, moving the drill rig and tools from location to location on a site, or providing maintenance on a drill rig or drilling tools. This safety guide is for your benefit. Failure to heed the safety procedures contained in this manual could result in serious injury or death.

Every drill crew should have a designated safety supervisor who has the authority to enforce safety on the drilling site/ a rig worker's first responsibilities are to obey the directions of the safety supervisor.

The safety supervisor- Is the drill rig operator. The safety supervisor must:

- Consider the responsibility for the safety and the authority to enforce safety to be a matter of first importance.
- Be the leader in using proper personal protective safety equipment and take appropriate corrective action when proper personal protective safety equipment is not being used.
- Understanding that proper maintenance of tools and equipment and general housekeeping on the drill rig will provide an environment that will promote and enforce safety.
- Before drilling is started with a particular drill, ensure that anyone operates the drill has had adequate training and is thoroughly familiar with the drill rig, its controls, and its capabilities.
- Inspect the drill rig at least daily for structural damage, loose bolts and nuts, proper tension in chain drives, loose or missing guards or protective covers, fluid leaks, damaged hoses, and/or damaged pressure gauges and pressure relief valves.
- Check and test all safety devices, such as emergency shut down switches, at least daily and preferably at the start of a drilling shift. Drilling must not be permitted until all emergency shut down and warning systems are working correctly. Do not allow any emergency device to be passed or removed.
- Check that all gauges, warning lights and control levers are functioning properly and listen for unusual sounds each time an engine is started.
- Ensure that every drill rig worker is informed of safe operating practices on and around the drill rig. Provide every drill rig worker with a copy of the organization's drilling operations safety manual, operations manual and maintenance manual.
- Carefully instruct a new worker in drilling safety and observe the new workers progress towards understanding safe operating practices.
- Assess the mental, emotional and physical capability of each worker to perform the assigned work in a proper and safe manner. Remove any worker from the drill site whose mental and physical capabilities might cause injury to the worker or co-workers.
- Insure that a first aid kit and fire extinguisher which are properly maintained are on each drill rig and each additional vehicle.
- Be well trained in and capable of using first aid kits, fire extinguishers and all other safety devices and equipment, Train crew members.
- Maintain a list of addresses and telephone numbers of emergency assistance units and inform other members of the existence and location of the list.

## FIRE PREVENTION ... The danger of fire cannot be under estimated!

Fire can be the most devastating of accidents that can occur. Employees must be very conscious of fire prevention measures at all times.

The following points must be observed:

- All vehicles must be equipped with a fire extinguisher rated ULC 'ABC'.
- No smoking or open flame where flammable liquids, solvents, or fuels are stored, transported, handled, or used.
- No smoking while operating any equipment.
- No smoking on work sites except in designated areas.
- Equipment powered by internal combustion engines (except diesel powered) must be shut off
- Great care must be taken when welding or cutting so that sparks or slag do not come in contact with any flammable surface or substance. This includes wearing proper Personal Protective Equipment to insure that clothing does not burn.
- Gas cylinders must be secured, with the protective cap in place, when being transported.
- Gas cylinder valves must be turned off when not in use.

## IN THE EVENT OF FIRE OR EXPLOSION:

If the situation is readily controllable with available resources, take immediate action to do so. If not:

- a.) Clear the area of all personnel working in the immediate vicinity.
- b.) Cease operation of all equipment. No cigarettes, cutting torches or other flame or spark sources shall be permitted in the area.
- c.) Immediately notify the designated Site Health and Safety Officer / Coordinator.
- d.) Keep all personnel and the general public away from the hazard.

## FIRE EXTINGUISHERS

Vehicles are equipped with one 20lb fire extinguisher. Fire extinguishers are inspected in an annual basis and tagged accordingly; tags are weather resistant. All employees are to be familiar with the proper use of fire extinguishers.

## OTHER SAFETY CONSIDERATIONS:

- All electrical equipment should be explosion-proof and properly grounded.
- When dealing with heavier-than-air materials, vertical exhausts and spark arrestors should be employed.
- Welding and cutting should be done away from the hole whenever possible. If it must be done at the hole, it should be initiated only after flammable levels have been monitored and spaces inserted or purged.
- Extra care must be exercised when working topographic lows, at the toes of landfills, and when employing windscreens and barriers.
- Do not keep gasoline cans around the hole.
- Remove excessive oil and grease on rig components.
- Have the right kind of fire extinguisher for the job and make sure it's in working condition.

## PHYSICAL HAZARDS ... BE AWARE !!

### TRAFFIC

When drilling on the street there is significant potential for "stuck-by" accident, make certain that you are wearing a high visibility vest or uniform.

### NOISE

Large equipment and engines such as the drill rig generate significant noise during operation which could affect workers in close proximity to the operating equipment.

### HEAT and SUN

Projects done during the summer months can have an affect on workers. Remain well hydrated and wear protective sun blocking agents.

### HEARING CONSERVATION

Because hearing damage is irreversible, it is crucial that measures be taken to preserve the hearing of all personnel. The steps required to implement a hearing conservation program are minor compared to the impact of the damage or loss of one's hearing.

### MEDICAL PROGRAM

OSHA recommends a medical evaluation for employees required to wear a respirator. A medical program is developed for each site based on the specific needs, location and potential exposures of employees at the site. A site medical program should provide the following components :

#### SURVEILLANCE

- Pre-Employment screening
- Periodic medical examinations (and follow-up examinations when appropriate)
- Termination examinations

#### TREATMENT

- Emergency
- Non-Emergency (on a case by case basis)

#### RECORD KEEPING

- Program review

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

The last line of defence in hazard control is Personal Protective Equipment (PPE). PPE is used when engineering or procedural controls cannot completely eliminate a hazard. The purpose of PPE clothing and equipment is to shield or isolate individuals from the chemical, physical and biological hazards that may be encountered at a hazardous waste site.

#### MINIMUM REQUIREMENTS WHEN WORKING ON OR AROUND DRILLING EQUIPMENT

Personal protective equipment provides a final barrier between the worker and a potential hazard, which could threaten personal health and safety. All PPE must be in accordance with CSA standards or an approved equivalent and be visually inspected prior to use.

All Sonic Drilling Ltd. Employees working on or around drilling equipment must wear the following PPE:

Individual Protective Equipment – For most geotechnical, mineral and /or groundwater drilling projects, individual protective equipment must include a safety hat, safety shoes, safety glasses and close fitting gloves and clothing. Rings and jewellery must not be worn during a work shift.

- Hardhat that meets ANSI Standard Z89.1-1986 (WCB OHS Reg. 8.11)  
Safety Head Gear. Safety hats must be worn by everyone working or visiting at or near the drilling site. All safety hats must be kept clean and in good repair with the headband and crown straps properly adjusted for the individual drill rig worker or visitor.
- Safety boots that meet CSA Standard CAN/CSA-Z195-M92 (WCB OHS Reg. 8.22)  
Safety boots must be worn by all drilling personnel and all visitors to the drill site that observe drilling operations within close proximity of the drill rig. All safety shoes or boots must meet the CSA standard requirements.
- Gloves. Leather provides protection against most physical characteristics like sharp objects, radiant heat and hot objects. The usual application is for general work. Leather gloves are acceptable unless working on a project in which there is a chance of chemical or contaminant exposure. All drilling personnel must wear gloves for protection against cuts and abrasions that could occur while handling wire rope or cable and from contact sharp edges and burns on drill rods and other drilling or sampling tools. All gloves must be close fitting and not have large cuffs or loose ties that can catch on rotating translating components of the drill rig.

*Note: Since it is impossible for this manual to cover every possible hazard one might encounter on the job, please use common sense when working.*

- Safety Glasses. CSA Standard CAN/CSA-Z94.3-92 WCB OHS Reg. 8.14). All drilling personnel must wear safety glasses when working within 5m of drill table. Safety glasses must have side shields. Contact lenses are generally discouraged at work sites and shall not be worn during any work which would expose the wearer to chemical, gases, vapours, dust or other materials that may harm the eyes or cause irritation. Contact lenses should not be worn when wearing self contained breathing apparatus.
- Hearing protection that meets CSA Standard Z94.2-94 (WCB OHS Reg. 7.14). When working within 5m of drill table
- Coveralls. (WCB OHS Reg. 8.19). Coveralls must fit properly and be free from holes and tears Employees must wear fire resistant coveralls when working at oil refineries, or if required by site regulations (WCB OHS Reg. 8.31) The clothing of the individual drill rig worker is not generally considered protective equipment; however, the workers clothing should be comfortable but must be close fitting, without loose ends, straps, draw strings, belts or otherwise unfastened parts that might catch on some rotating or translating component of the drill rig.
- Reflective vest (WCB OHS Reg. 8.24).
- Respirator. Please use the protective plastic containers that are provided to keep your respirator clean and dry. Each employee has their own respirator, clearly marked with their name. You must be fit tested for your respirator.

#### WORKING IN THE SHOP

Employees working in the shop must wear the following PPE:

- Safety boots that meet CSA Standard Z195.
- Safety glasses (when grinding, drilling, or cutting) that meet CSA Standard Z94.3.
- Hearing protection (when hammering steel or operating loud equipment) that meet CSA Standard Z94.2.
- Gloves...
- Coveralls. Coveralls must fit properly and be free from holes and tears.
- Leather gloves should be worn when welding or cutting.

#### Fall Protection

Fall protection is required when employees are working more than 3m (10ft) from the ground. Employees are not permitted to climb the drill tower without adequate fall protection (WCB OHS Reg. 11.2).

#### Personal Flotation Devices (PFD).

Employees performing work on a dock, pier, wharf, or barge must wear a PFD that meets Canadian Government Specifications Board Standard 65-GP-11, or equivalent.

#### Other

Appropriate face shields and eye protection must be used when welding, cutting, or grinding.

#### CARE OF PPE

Employees are expected to insure that their PPE is safe, clean, and functional. The following is a guide to the care of PPE:

- Hardhat suspension must be replaced every year (check date stamp).
- Hardhats must be replaced every 5 years (check date stamp).
- Respirators should be disinfected periodically and they must be kept in a labelled, sealed container.
- Rubber boots must free of holes.
- Rubber boots should be steam cleaned regularly.
- Rainwear should be free of holes and tears.
- Rainwear should be steam cleaned or pressure washed regularly.

### AIR PURIFYING RESPIRATORS

All employees that work on potentially contaminated sites must be fit-tested for a half-face air-purifying respirator (APR). Each employee must keep his or her respirator in a labelled, sealed container.

Considerations and limitations on the use of air purifying respirators:

- Facial hair must not interfere with the respirator seal against the face. Beards and long stubble are not permitted. Moustaches and closely trimmed goatees are acceptable provided they do not interfere with the respirator seal.
- APR may not be used in environments that are immediately dangerous to life or health.
- APR may not be in oxygen-deficient atmospheres (<18%).
- When working with potential eye irritants, a full-face APR must be used.

The following is a brief guide to respirator cartridge selection:

- HEPA (purple): provide protection against dusts (including silica), mists, welding fumes, asbestos, lead, radon daughters, and radio-nuclides.
- Organic Vapour (black): provide protection against most organic vapours including organic solvents and petroleum products.
- Organic Vapour/Acid Gas (yellow): provide protection against most organic vapours and acid gases such as chlorine, hydrogen chloride, and sulphur dioxide.
- Ammonia (green): provide protection against ammonia and most amines.
- Manufacturer's specifications should be consulted when selecting respirator cartridges.

### CLOTHING GUIDELINES

Dressing for appropriate weather conditions is very important. The following are some guidelines for dressing for extreme cold. It is not just a matter of comfort, but in an emergency situation, it could be a matter of life or death.

Cold weather clothing should consist of a three-layer system.

- The first layer is the base layer. This layer should be long underwear made of polypropylene or thin fleece. This layer transports moisture away from the skin. Polypropylene maintains most of its insulating properties even when it is wet. Some people use silk for the base layer, but silk has poor durability and is hard to care for.
- The second layer is the insulating layer. This layer traps air to keep you warm. It also transports moisture away from your body. This layer is typically fleece. Fleece maintains most of its insulating properties even when wet.
- The third layer is the protection layer. This layer protects you from wind and snow. In outdoor recreation, this layer is often a waterproof breathable material like Gortex. For our purposes, this layer will be the insulated coveralls.

The three-layer system should apply to your hands as well. Wearing a thinner liner glove will provide additional insulation. Also, it will allow you to take off the outer work glove for short periods of time if you need dexterity to do delicate work or handle small parts.

- No cotton! Cotton is extremely poor insulation. It traps moisture and it takes a very long time to dry. Having a wet layer against your skin will conduct heat away from your body very rapidly. Cotton and cotton blends should be avoided for all items of clothing. It is well known among climbers and mountaineers that COTTON = DEATH
- Wool is OK, but manufactured materials like fleece are superior for moisture transport and warmth when wet.

## MAINTENANCE ON AND AROUND THE DRILL RIG

The first requirement for safe field operations is that the safety supervisor understand and fulfil the responsibility for maintenance on and around the drill rig. The safety supervisor must:

- a.) Provide suitable storage locations for all tools, materials and supplies so that these items can be conveniently and safely handled without hitting or falling on a member of the drill crew or a visitor.
- b.) Avoid storing or transporting tools, materials or supplies within or on the mast of the drill rig.
- c.) Stack pipe, drill rods, casing, augers and similar drilling tools in orderly fashion on racks or sills to prevent spreading, rolling or sliding.
- d.) Place penetration or other driving hammers in a safe location on the ground or secure them to prevent movement when not in use.
- e.) Keep work areas, platforms, walkways, scaffolding and other access ways free of materials, debris, obstructions and substances such as ice, grease or oil that could cause a surface to become slick or otherwise hazardous. Keep all controls, linkages, warning and operation lights and lenses free of oil, grease and /or ice.
- f.) Store gasoline only in a non-sparking, red container with a flame arrester in the fill spout and having the word "gasoline" easily visible.

## MAINTENANCE

Faulty and poorly maintained vehicles, equipment and tools can become a hazard on a work site. Good Maintenance will make drilling operations safer. Also, maintenance must be performed safely. The following point are essential to safety:

- a.) Wear safety glasses when performing maintenance on a drill rig or on drilling tools.
- b.) Shut down the drill rig engine to make repairs or adjustments to a drill rig or to lubricate fittings (except repairs or adjustments that can be made with the engine running). Take precautions to prevent accidental starting of an engine during maintenance by removing or tagging the ignition key.
- c.) Block the wheels or lower the levelling jacks or both and set hand brakes before working under a drill rig.
- d.) Release all pressure on the hydraulic systems, the drilling fluid system and the air pressure systems of the drill rig – when possible and appropriate – prior to the performing maintenance. In other words, reduce the drill rig and operating systems to "zero energy state" before performing maintenance. Use extreme caution when opening drain plugs and radiator caps and other pressurized plugs and caps.
- e.) Do not touch an engine or the exhaust system of an engine following it's operation until the engine and exhaust system have had adequate time to cool.
- f.) Never climb the mast (derrick) to do maintenance or make repairs. Lower mast, stop engine and deenergize rig before starting maintenance or repair on the mast.
- g.) Never weld or cut on or near a fuel tank.
- h.) Do not use gasoline or other volatile or flammable liquids as a cleaning agent on or around a drill rig.
- i.) Follow the manufactures recommendations for applying the proper quantity and quality of lubricants, hydraulic oils and/or coolants.
- j.) Replace all caps, filter plugs, protective guards or panels, and high pressure hose clamps and chains or cables that have been removed for maintenance before returning the drill rig to service.

## HAND TOOLS

Since there are almost an infinite number of hand tools that can be used on or around a drill rig and in repair shops, there are an equal number of instructions for proper use. "Use the tools for its intended purpose" is the most important rule. The following suggestions apply to safe use of several hand tools that frequently are used on and around drill rigs:

- a.) When a tool becomes damaged, either repair it before using it again or get rid of it.
- b.) When using a hammer, any kind of hammer for any purpose, wear safety glasses.
- c.) When using any kind of chisel or punch, for any purpose, wear safety glasses.
- d.) Keep all tools cleaned and stored appropriately when not in use.
- e.) Use wrenches, not pliers, on nuts. Use screwdrivers with blades that fit the screw.
- f.) When using a wrench on a tight nut, first use some penetrating oil and then use the largest wrench available that fits the nut. When possible pull on the wrench handle rather than push on it; apply force to the wrench with both hands when possible and with both feet firmly placed. Always assume that you may lose your footing; check the place that you may fall for sharp objects.
- g.) Keep all pipe wrenches clean and in good repair. Use a wire brush frequently to clean the jaws of pipe wrenches. An accumulation of dirt can cause wrenches to slip.
- h.) Never use pipe wrenches in place of a rod-holding devices.
- i.) Replace hook and heel jaws when they become visibly worn
- j.) When breaking tool joints on the ground or on a drilling platform, position your hands so that your fingers will not be smashed between the wrench handle and the ground or the platform if the wrench should slip or the joint suddenly let go.

## GENERAL PROCEDURES

### General Health and Safety Plan for Environmental Drilling Operations

The following personal hygiene and work practice guidelines are intended to prevent injuries and adverse health effects. These guidelines present the minimum standard procedures for reducing potential risks associated with this and other projects and are to be followed by all Sonic Drilling employees.

- Consult site meeting with on-site consultant before setting up.
  - Every working day, a brief safety meeting shall be held before work commences.
  - Review scope of work and schedule. Review higher risk tasks and the related precautions.
- Familiarize drill crew with contaminants which may be encountered and level of protection required.
  - Safety expectations
  - Safety policies and general requirements
  - Site specific Safety Method Statements
  - Protective clothing and equipment
- Deploy fire extinguisher at rear of rig in an easily visible location.
- First aid kit is located in cab of drill truck on the rear wall between the driver and passenger seat.



## SITE

All personnel entering a site must observe minimum Personal Protective Equipment requirements.

All personnel working near a drill rig should be made aware of the exclusion zone.

A clean and organized site not only looks more professional but also is a safer situation. Site organization should include:

- Placing drill pipe on blocks or timbers.
- Returning tools to their proper place. Leaving a tool lying around is not only a tripping hazard but may result in losing or forgetting the tool.
- Picking up garbage as it is created. Bags from well materials should be gathered during the construction of a well rather than at the end.

## CLEARING THE WORK AREA

Prior to drilling, adequately clear and level the site to accommodate the drill rig and supplies and provide a safe working area. Do not begin drilling if tree limbs, unstable ground, or site obstructions cause unsafe tool handling conditions.

## OPERATION RULES

During the operation of company owned, leased, or personal vehicles on Company business, the operator shall:

- Require all occupants to wear seat belts
- Follow safe Cell Phone use guidelines
- Obey all local, state, federal and client traffic laws/rules
- Not operate vehicles in "hazardous" areas or past "do not enter" barricades
- Use extreme caution around congested areas where personnel and or equipment are working
- Not leave engines running if vehicle is unattended
- Lock vehicle unless prohibited by client (while on client's property)
- Assure that transporting samples or other items in vehicle will only be done in a safe manner and in accordance with 49CFR
- Not use personal vehicles to transport regulated materials and hazardous waste. 40 CFR and 49 CFR shall be consulted for the requirements

## START –UP

Instruct all drill rig personnel and visitors to “stand-clear” of the drill rig immediately prior to starting the engine.

- a.) Make sure brakes are set, all gear boxes are in neutral, all hoist levers are disengaged, all hydraulic levers or air controls are in the correct positions, and the cathead rope is not on the cathead before starting a drill rig engine.
- b.) Start all engines according to the manufactures manual.

## PROCEDURES & PRECAUTIONS

Having and following Standard Operating Procedures for critical tasks plays an important role in the Sonic Drilling Ltd. safety program. Employees are expected to know the details of all Standard Operating Procedures that relate to their job duties.

Raising the Drilling Tower - Before raising the drilling tower, the operator must observe the following precautions:

- The surface that the levelling stabilizers will rest on must be reasonably even.
- The surface that the stabilizers will rest on must be able to adequately support the weight of the drill rig. If the surface is soft, timber or boards must be used under the stabilizers in order to spread the weight over a larger area.
- On a sloping surface the stabilizers must be able to extend far enough so that the drill rig is level. Blocking or timbers under the stabilizers may be necessary to meet this condition.
- If possible, the operator should avoid lifting the drill rig completely off of the ground with the stabilizers. It is preferable to have the wheels support some of the weight of the drill rig.
- The drill rig must be level.
- Clearance from overhead obstructions including buildings, bridges, power lines and other overhead utilities must be established. Legal offsets from overhead power lines must be observed and measured prior to raising the tower. Both supervisors and members of the exploration must take special precautions when a drill rig will be used on a site or project within the vicinity of electrical power lines and other utilities. Electricity can shock, burn and cause death.
- Clearance from underground utilities must be established. Although it is the responsibility of the client to locate all underground utilities, the operator has responsibilities to be observant and to look for indicators of possible underground utilities such as storm drains, manhole covers, natural gas meters, ect.
- Locate, note and emphasize overhead and buried utilities on all boring location plans and boring assignment sheets. When overhead electrical power lines exist at or near drilling site consider all wires to be alive and dangerous. Watch for sagging power lines before entering a site. Do not lift power lines to gain entrance. Call the utility and ask them to lift or raise the lines or turn off power. Before raising the drill mast on a site in the vicinity of power lines, walk completely around the drill rig, determine the minimum horizontal distance from any point on the drill rig to the nearest power line when the mast is raised and/or being raised. IF this horizontal distance is less than 100ft , first consult the local utility company and refer to OSHA 1910.180 before commencing. Keep in mind that both hoist lines and overhead power lines can be moved toward each other by the wind. In order to avoid contact with power lines only move the drill rig with the mast down.
- If there are any questions concerning the safety of drilling on sites in the vicinity of overhead powerlines, call the power company. The power company will provide expert advise at the drilling site as a public service and at no cost.
- The pins that secure the tower when it is the raised position must be removed until after the tower is raised.

Once the drill rig is levelled with the stabilizers, the drill head must be moved to or below the pivot point of the tower. Under no circumstances should the operator attempt to raise the tower with the drill head above the pivot point of the tower.

When the operator is confident that the ground surface is supporting the stabilizers (ie. Not sinking into the ground) and when the drill head is at or below the tower pivot point, the operator may raise the tower. As the tower is being raised, operator must scan the entire tower to insure that there is no interference with people, equipment, buildings or utilities. If the operator observes any interference or potential interference between the tower and any object or person, the operator must stop raising the tower and re-evaluate the situation.

Once the tower is raised to its full upright position and the operator is satisfied that tower is safe operating distance from structures and is the legal distance from overhead power lines, the tower securing pins should be put in place.

After the tower is secured with the tower securing pins and all safety conditions have been met, the drill head may be moved up the tower and drilling may proceed.

### Sonic Drill Rig OPERATIONS CHARTS

#### SETTING UP THE DRILL RIG

WHAT TO DO	WHO DOES IT	HOW TO DO IT	COMMENTS
1. Hold a pre-job safety meeting	All personal on site	Complete the Daily Safety Review (DSR)	Insure that all underground and overhead utilities have been checked
2. Perform daily inspection of drill rig	Driller	Follow the daily inspection checklist	
3. Locate the drill rig on the spot designated by the client	Driller Driller's Assistant should guide the driller	Drive the drill rig so that it is located on the spot	The driller should inspect the location for accessibility
4. Lower the stabilizers and level the drill rig	Driller	Adjust the stabilizers so that the rig is level. Use the bubble level as a guide	Insure that all stabilizers are firm ground Blocking may be required
5. Position the Drill Head	Driller	Position the Drill head lower than the pivot point of tower	The Drill head must be lower than the tower pivot point
6. Raise the tower	Driller	Raise the tower	Insure that the limits
7. Secure the tower	Driller's Assistant	Activate or insert the tower securing pin(s)	

#### LOWERING THE DRILL TOWER

WHAT TO DO	WHO DOES IT	HOW TO DO IT	COMMENTS
1. Position the drill head	Driller	Position the drill head so that it is lower than the tower pivot point	
2. Remove the tower securing pins	Driller's Assistant	Remove the tower securing pin(s)	
3. Lower the tower	Driller	Lower the drill tower	The tower must never be lowered with the drill head above the tower pivot point
4. Prepare to move the drill rig	Driller	Raise the stabilizers Position the drill head just behind the cab of the truck	The stabilizers must be fully retraced when travelling on public roads or at speeds greater than 30km/h

The operator must insure that all drill rod, core barrels, casing and drill bits disconnected from the drill head. All drilling guides and collars must be removed from the drilling table. The drill head must be lowered so that it is at or below the drilling tower pivot point. The tower securing pins must be removed.

**CONNECT DRILL PIPE (ROD OR CASING)**

1. Raise the drill head	Driller	Raise the drill head so that it is about 11ft above ground level Angle the drill head so that it is about 20 from vertical	
2. Stand-Up the drill pipe	Driller's Assistant	Lift the female end of the pipe Push the pipe until it is about 10 past vertical	Use proper lifting techniques Insure secure footing
3. Attach drill pipe to drill head	Driller	While rotating the swivel clockwise, lower the drill head so that the threads contact the drill pipe	Insure that the angle of the drill head is the same as the angle of the drill pipe
4. Position the drill pipe in the drill table	Driller	Once the drill pipe is connected by 3 threads, raise the drill head and position it vertically above the drill table. Lower with at least 6in of the pipe into the table	
5. Tighten the drill pipe	Driller	Clamp the pipe with the break-out table jaws Rotate the pipe until tight	

**BREAKING A DRILL PIPE JOINT**

WHAT TO DO	WHO DOES IT	HOW TO DO IT	COMMENTS
1. Position the pipe joint	Driller	Raise or lower the drill pipe until it is in between the two levels of break-out jaws	
2. Clamp the lower pipe	Driller	Clamp the lower pipe with the lower break-out jaws	
3. Clamp the upper pipe	Driller	Clamp the upper pipe with the upper break-out jaws	
4. Break the pipe joint	Driller	Rotate the upper breakout jaws until the pipe joint breaks	Insure that the upper and lower break out jaws are on the upper and lower pipes respectively
5. Position the drill pipe for removal	Driller	Raise the drill head so that the pipe clears the drill table. Angle the drill head at about 20 from vertical and lower the drill head until the pipe is 6in from the ground	Insure that the Assistant is not in the swing out zone.
6. Remove the drill pipe	Driller's Assistant	The Assistant holds the pipe until detached then drops the pipe on a block	Insure that no one is in the drop zone

### COUNTERSINK FOR A WELL PROTECTOR

WHAT TO DO	WHO DOES IT	HOW TO DO IT	COMMENTS
1. Position the countersinking tool	Driller's Assistant	Centre the countersinking tools under the drill table	The Assistant should avoid positioning their head to be under the drill pipe or drill head
2. Attach the countersinking tool	Driller	Lower the drill head until the drill pipe contacts the tools Rotate until tight	Insure that the pipe does not cross-thread
3. Countersink	Driller	Using full rotation. Moderate oscillation and minimal feed pressure, cut into the ground surface	Oscillation may have to be adjusted if cutting though concrete
4. Remove cuttings	Driller's Assistant	Lift the drill head frequently and clear cuttings away	The Assistant should avoid placing their hands under the countersinking tool
5. Inspect	Driller or Driller's Assistant	Dust and cuttings should be cleared away and the outer edge of the hole inspected	The outer edge of the hole should be at least 05in into the surface
6. Remove the countersinking tool	Driller and Driller's Assistant	Same as 'Breaking a Pipe Joint'	

### MATERIAL HANDLING

Accidents while handling materials is the most likely source of injury for Sonic Drilling Ltd. employees. Muscle strains, pinched fingers, and metal slivers can occur during drilling operations.

The following steps can be taken to reduce the risk of injuries when handling drill pipe and other heavy items:

- Do not lift anything that may exceed your abilities. Always get assistance when lifting heavy items.
- Always use safe lifting practices when lifting heavy items.
- Be very conscious of the placement of your hands and fingers are when you are handling drill rod and casing. Make sure that hands and fingers are not placed in vulnerable locations between drill pipe and solid objects.
- Burrs on drill pipe should be flattened with a hammer or removed with a grinder.

The following steps can be taken to reduce the risk of injury when handling hazardous materials:

- Employees must insure that they are familiar with the Material Safety Data Sheets (MSDS) for all materials that they handle in the course of their job, including: solvents, fuels, hydraulic fluids, lubricating oils, cement products, and bentonite products.
- Materials that are vapour harmful, including gasoline and solvents, must be handled in well-ventilated conditions.
- Fuels, such as gasoline and diesel fuel, must never be used as cleaning solvents.

Anyone who enters a hazardous waste site must recognize and understand the potential hazards to health and safety associated with the clean up of that site.

Employees must be conscious of spill response when handling and storing hazardous liquids. Each drill rig should have 1 bag of sorbent material and several sorbent pads available in the event of a spill of any hazardous liquid.

#### Material and Inventory in the yard

Sonic Drilling Ltd. Buy's bits and tooling from Sonic Drill Mfg. Please notify office manager if we are low on any item. Core bits, Casing bits and tooling are kept in the workshop. These are no to be taken unless directed by operations manager. Please leave a note of request if the operations manager is not in.

### INCIDENT ANALYSIS AND FOLLOW-UP

Regardless of the procedural, engineering, and personnel controls implemented, there will always be the possibility of worker injury or equipment failure. In the event of an 'incident', an analysis or investigation must be conducted to minimize the chance that the same situation will occur again.

There are varying degrees of incident seriousness. Minor incidents, referred to as Class II, must be recorded and reported. Serious incidents, referred to as Class I, must be recorded, reported, and investigated. In both situations, an Incident Report must be completed.

### INCIDENT REPORTING

The following Class II situations must be recorded and reported:

- A minor worker injury that requires some first aid but is not a Lost Time Accident.
- A minor mechanical failure or breakdown.
- A workplace hazard that does not pose an immediate threat to worker health and safety, however is a situation that should be corrected or improved.

Work must halt until the situation is recorded and/or corrected.

The following Class I situations must be recorded, reported, and investigated:

- an incident in which there was serious injury.
- a major structural or mechanical failure.
- a workplace hazard that does pose an immediate threat to worker health and safety.

Work must halt until the worker is tended to, or the mechanical failure is repaired, or the hazard is corrected. In all situations, an 'Incident Report' must be completed and the General Manager must be notified. An investigation must ensue within 24 hours.

An incident that is classified as a Lost Time Accident or requires medical treatment must be reported to the Workers' Compensation Board. A WCB Form 7 must be completed and submitted to the WCB within 72 hours of the accident.

### INCIDENT INVESTIGATION

Class II incidents must be investigated. An incident investigation must be conducted by the General Manager and an employee, ideally a witness to the incident. The investigation should encompass the points covered in the Incident Report but contain more detail.

The investigation should clearly identify the following items:

- a) The location, date, and time of the incident.
- b) The personnel involved in the incident.
- c) A description of the incident, based on interviews with all witnesses.
- d) The result of the incident including injury, equipment damage, or other damage.
- e) The cause of the incident. This point must be thorough and detailed. It is essential that all causes be identified so that they can be removed or remedied.
- f) Prevention of recurrence. The causes of the incident must be clearly identified so that procedural and/or engineering changes can be made to reduce the chance that a similar incident will occur again.

### INCIDENT FOLLOW-UP

All situations that require an Incident Report must also be followed-up. The purpose of the follow-up is to assess the effectiveness of the engineering, procedural, or personnel changes and/or corrections.

- ◆ Class I incidents must be followed-up one week and one month after the original incident.
- ◆ Class II incidents must be followed-up two weeks after the original incident.
- ◆ If the incident was the result of a procedure failure, the effectiveness of the procedural changes must be assessed during the follow-up. Further changes may be made to the procedure as a result of the follow-up.
- ◆ If the incident was the result of a mechanical failure, the effectiveness of the mechanical modifications or repairs must be assessed during the follow-up. A close and thorough inspection must be performed to insure that the risk of a similar incident be minimized.
- ◆ If the incident was the result of a problem with an employee, the effectiveness of the corrective measures and/or disciplinary actions must be assessed during the follow-up.

## OVERHEAD AND BURIED UTILITIES

The use of equipment on a work site within the vicinity of electrical power lines and other utilities requires special precautions to be taken by both operators and members of the crews. Electricity can shock, burn and cause death.

1. Before working with equipment at a site, look up to check for overhead obstructions.
2. Overhead and buried utilities should be located, noted and emphasized prior to the start of all jobs.
3. If a sign warning of underground utilities is located on a site boundary, do not assume that underground utilities are located on or near the boundary of property line under the sign, the utilities may be a considerable distance away from the warning sign.
4. Always make sure that the owners of utility lines or the nearest underground utility location service have been contacted before working. Determine jointly with client or utility personnel the precise location of underground utility lines, mark and flag the locations and what specific precautions must be taken to assure safety.
5. When overhead electrical power lines exist at or near a work site or project, consider all wires to be alive and dangerous.
6. Equipment, or any part, does not have the capability of coming within the following minimum clearance from energized overhead lines, or the equipment has been positioned and blocked to assure no part, including cables, can come within the following minimum clearances.

<b>POWER LINES Nominal System kv</b>	<b>MINIMUM Required Clearance</b>
50 or under	10 feet (3.05 m)
69	12 feet (3.66 m)
115,161	15 feet (4.57 m)
230, 285	20 feet (6.10 m)
345	25 feet (7.62 m)
500	35 feet (10.67 m)

7. Watch for sagging power lines before entering a site. Do not lift power lines to gain entrance. Call the utility and ask them to lift or raise the lines or de-energize (turn off) the power.
8. Keep in mind that both hoist lines and overhead power lines can be moved toward each other by wind.
9. If there are any questions whatsoever concerning the safety of working on sites in the vicinity of overhead power lines, call the power company and they will provide expert advice at the work site at no cost.
10. Underground electricity and gas are as dangerous as overhead electricity. Be aware and always suspect the existence of underground utilities such as electrical power, gas petroleum, telephone, sewer and water. Ask for assistance.
11. If there are any questions whatsoever concerning the safety of working on sites in the vicinity of overhead power lines, call the power company. The power company will provide expert advice at the work site as a public service and at no cost.

## ELECTRICITY

1. Only authorized and qualified personnel are allowed to make electrical connections or repair electrical equipment or wiring.
2. Respect loose or exposed wires. All wires must be considered as being alive until it is positively known that they are dead. Do not touch any exposed or dangling wires that you may encounter; report them to your supervisor.
3. Do not use extension cords that are defective. They can cause electric shock or death. Examine them carefully for worn insulation, exposed strands of wire or other defects before using them. Do not drag cords across sharp edges or across aisles where equipment can damage them. Do not create a tripping hazard with extension cords.
4. Never handle energized power cords with wet hands.
5. Never allow extension cords or plug connections to lay in water or other liquid.
6. When repairing, adjusting or otherwise maintaining electrical equipment, all power must be disconnected to prevent the machine or equipment being set in motion by lockout or tagout.

### **Sequence of lockout or tagout system procedure:**

1. Notify all affected employees that a lockout or tagout system is going to be utilized and the reason why. The authorized employee shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the hazards.
2. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open toggle switch, etc.).
3. Lockout and/or tagout the energy isolating devices with assigned individual lock(s) or tag(s).
4. After ensuring that no personnel are exposed and as a check on having disconnected the energy source, operate the push button or other normal operating controls to make certain the equipment will not operate.
5. The equipment is now locked out or tagged out.

### **Restoring machines or equipment to normal production operations:**

1. After the serving and/or maintenance is complete and equipment is ready for normal production operations, check the area around the machines or equipment to ensure that no one is exposed.
2. After all tools have been removed from the machine or equipment, guards have been reinstalled and employees are in the clear, remove all lockout or tagout devices. Operate the energy isolating devices to restore energy to the machine or equipment.

**REACT TO CONTACT WITH ELECTRICITY *If a rig makes contact with electrical wires, it may or may not be insulated from the ground by the tires of the carrier. Under either circumstance the human body, if it simultaneously comes in contact with the drill rig and the ground, will provide a conductor of the electricity to the ground. Death or serious injury can be the result. If a rig or a rig carrier makes contact with overhead or underground electrical lines:***

1. Under most circumstances, the operator and other personnel on the seat of the vehicle should remain seated and not leave the vehicle. Do not move or touch any part, particularly a metallic part, of the vehicle or the rig.
2. If it is determined that the rig should be vacated, then all personnel should jump clear and as far as possible from the rig. Do not step off the vehicle, but rather jump off and do not hang onto the vehicle or any part of the rig when jumping clear.
3. If you are on the ground, stay away from the vehicles and the rig, do not let others get near the vehicle and the rig and seek assistance from local emergency personnel such as the police or fire department.
4. When an individual is injured and in contact with the rig or with power lines, attempt rescue with extreme caution. If a rescue is attempted, use a long, dry, unpainted piece of wood or a long, dry, clean rope. Keep as far away from the victim as possible and do not touch the victim until the victim is completely clear of the rig or electrical lines.
5. When the victim is completely clear of the electrical source and unconscious, and a heartbeat (pulse) cannot be detected, begin cardiopulmonary resuscitation (CPR) immediately.



### PROPER LIFTING TECHNIQUES

Proper lifting takes the hazard out of moving heavy objects. Whenever you lift something:

1. Make sure you can lift the load safely, otherwise get help.
2. Use a mechanical lifting device, if available.
3. Inspect route to be traveled, making sure of sufficient clearance.
4. Look for any obstruction or spills.
5. Inspect the object to decide how it should be grasped.
6. Look for sharp edges, slivers, or other things that might cause injury.

### PROPER LIFTING PROCEDURES

1. Keep feet parted - one along side and one behind object for better balance,
2. Keep back straight, vertical, with spine, back muscles, and body in correct alignment,
3. Tuck chin into chest,
4. Bend knees and assume squatting position,
5. Tuck elbows and arms close to body,
6. Keep body weight directly over feet,
7. Start lift with thrust of rear foot,
8. Move slowly and carefully, avoid twisting the body.

### FIRE AND CHEMICAL SAFETY

1. Fire extinguishers in good condition will be on all Company vehicles.
2. All employees shall know the location of the FIRE fighting EXTINGUISHERS and how to use them properly.
3. Do not remove, alter or deface any HAZARD WARNING LABELS.
4. Change your clothing immediately should it become soaked with any flammable liquid or chemical.
5. Never pour FLAMMABLE LIQUIDS down drains or sewers.
6. Store flammable liquids in proper containers in separate area with warning labels.
7. Use metal containers for disposal of rags soaked with flammable liquids.

## AUDIT

An audit is an effective method of monitoring company operations and procedures. An audit insures that all aspects of the company are operating in compliance with company rules and procedures as well as in compliance with laws and regulations. Inadequacies and violations can be identified and corrected.

The Manager must complete a thorough company self-audit yearly. All procedures, rules, and policies must be assessed for safety and effectiveness.

The Manager should perform random inspections or audits of each drill crew. These random audits should be performed approximately every month.

Any inadequacies identified in an audit should be assigned a time frame for correction. The time frame may be immediate or it may be a few months, depending on the nature of the inadequacy.

## MANAGEMENT OF CHANGE

The purposes of company audits are to identify inadequacies in company policies and procedures. The purposes of incident reports are to record and analyze hazardous and potentially hazardous situations. The audit and the incident report serve to recognize inadequacies and correct them. It is then crucial that the corrections be conveyed to company employees.

Sonic Drilling Ltd. is a growing organization. As the company grows, the need for formalization and structure within company policies will likely increase. Employees will be kept informed of changes with the following methods:

- Monthly safety meetings.
- Safety flyers issued with pay cheques.
- Changes to official policies or rules will be issued so that employees can update their own company handbooks.

Safety meetings will allow management and employees to exchange ideas with the common goal of improving the safety and working conditions for all employees.

Safety flyers will serve to notify employees of current health and safety issues, including bulletins issued by clients and competitors.

Changes to official policies and rules will likely be the result of management and employee communication, or the result of an incident. Changes to company policies must first be carefully considered by the Manager and thoroughly discussed with employees. Once approved, official changes will then be issued as replacement pages for the employee manuals.

## CONFIDENTIALITY

Except as otherwise required by federal and provincial laws concerning reporting all information , interviews, reports, statements, memoranda and test results are confidential communications that will not be released.

## PROHIBITIONS

The following conduct is prohibited:

- ◆ Use or possession of alcohol beverages, controlled substances, drugs or drug paraphernalia on company property, while operating company equipment or while otherwise on company business.
- ◆ Entering onto company property, working or reporting to work, operating a company vehicle while under the influence of alcohol or identifiable traces of a controlled substance or drugs in the persons system.
- ◆ Violating any applicable local, provincial or federal law or regulation that relates to alcoholic beverages, drugs or controlled substances while engaging in any activity while on company business.

## DRUG AND ALCOHOL POLICY

Employees must not be under the influence of any mind or perception altering substances while on company time, or while operating any company vehicle or equipment. Forbidden substances include, but are not limited to: alcohol, pain relievers that induce drowsiness, cold medications that induce drowsiness, and any illegal drugs. In the event that any SDL employee becomes impaired at an SDL social function, the employee must arrange transportation home, either with a driver that is not impaired, or by taxi at the expense of SDL. In addition, it is the responsibility of each employee to insure that they, and their coworkers, are healthy and alert and are able to perform their respective jobs. Employees that appear not to be fit for duty, due to illness etc., should not be on site.

## DRUG AND ALCOHOL TESTING

All persons who have been extended an offer of employment by the company are subject to testing. Any person who fails a pre-employment test is not eligible for hire at any time in the future. An employee who is rehired by the company or who is returning from any extended leave is subject to the same pre-employment testing. Employees and other persons may be tested when a reasonable person would have cause to believe that the suspected person may be in violation of the policy through their job performance or behaviour, an incident while on company business, some other relevant and specific indication. In all cases, the company manager will review the facts before deciding to conduct such reasonable suspicion testing. Periodic unannounced testing of employees or other persons may be performed at the discretion of the company. Any employee found to be in breach of the policy is subject to discipline up to and including termination, even for a first offence.

## DISCIPLINARY POLICY

It would be preferable that all employees follow the company safety program so that disciplinary confrontations could be avoided. However, it may be necessary on occasion to gain employee compliance with the company safety program or other regulations through disciplinary measures.

Before disciplinary actions are taken, it is essential that the employee is aware of the company safety rules and of the consequences for non-compliance. Each situation will be different so the severity of the infraction will be determined by the Manager. All disciplinary actions must be documented by the Manager. The following are the guidelines for disciplinary actions:

### Verbal Warning

The Manager and the employee will discuss the problem privately. The Manager will explain what policy has been violated and why the policy is in place. A plan for corrective action will be discussed. The Manager will decide on the number of verbal warnings given before an incident report is completed.

### Written Warning

The Manager will complete an incident report describing the infraction and have the employee sign the report to acknowledge that disciplinary action has been taken. Again, a plan for corrective action will be discussed. A written warning must be followed-up by the Manager.

### Discharge

The employee will be given a letter explaining the reason for discharge.

## CELL PHONE BAN EFFECTIVE OCTOBER 2005

***All employees have been notified in writing about the cell phone ban that now is in effect. While any company vehicle is in motion, employees are not allowed to use a company or personal cellular while driving a company vehicle or a personal vehicle on company time.***

Disciplinary action will be taken if it's found that this company policy is not being followed.

**SUPPORT TRUCK INVENTORY**

A well-prepared crew is an efficient crew. Having all of the necessary equipment, tools, and supplies when you arrive on site is absolutely essential. In addition, returning tools to their proper places helps to keep the work site safe and makes your job easier. All support trucks must have a minimum of the following equipment, tools, and supplies at all times:

<p><u>Safety Supplies</u></p> <ul style="list-style-type: none"> <li>1 box ear plugs</li> <li>10 pairs nitrile coated safety-cuff work gloves</li> <li>1 box nitrile glove liners</li> <li>4 pairs organic vapour respirator cartridges</li> <li>4 pairs respirator cartridge pre-filters</li> <li>6 pairs polyethylene coated Tyvek coveralls</li> <li>2 rolls "CAUTION" tape</li> <li>6 - 3' high traffic markers</li> </ul> <p><u>Drill Tooling (minimum quantities)</u></p> <ul style="list-style-type: none"> <li>7 - 10' drill rods</li> <li>1 - 5' drill rod</li> <li>1 - 3' drill rod</li> <li>5 - 10'X6" casing</li> <li>2 - 5'X6" casing</li> <li>3 - 4.75'X11' core barrels</li> <li>5 - 4.75" core bits (excluding bits on core barrels)</li> <li>2 - 4.75" displacement bits</li> <li>1 - 4.75" open-end displacement bit</li> <li>1 - 4.75" core catcher bit</li> <li>4 - 4.75" core catchers</li> <li>1 - 6" casing bit (excluding bit on lead casing)</li> <li>1 - 6" displacement bit</li> </ul>	<p><u>Well Materials and Supplies (minimum quantities)</u></p> <ul style="list-style-type: none"> <li>2" PVC well materials:</li> <li>20 - 10' PVC solid pipe</li> <li>10 - 10' PVC slotted pipe</li> <li>10 - 5' PVC solid pipe</li> <li>10 - 5' PVC slotted pipe</li> <li>20 threaded end plugs</li> <li>10 slip caps</li> <li>5 slip couplings</li> <li>10 threaded female caps</li> <li>10 threaded male adapters</li> <li>10 J-plugs</li> <li>10 Enviro-caps</li> <li>3 Enviro-cap keys</li> <li>10 flush-mount well protectors</li> <li>3 well protector tools</li> <li>3 stick-up well protectors</li> <li>2 - 205L reconditioned steel drums</li> <li>10 bags bentonite chips</li> <li>5 bags "Post Haste" pre-mix rapid-set concrete</li> <li>silica filter sand, as required</li> <li>bentonite grout, as required</li> <li>drilling polymer, as required</li> </ul>
<p><u>Hand Tools</u></p> <ul style="list-style-type: none"> <li>1 - 36" pipe wrench</li> <li>1 - 8lb sledge hammer</li> <li>1 - 3lb drilling hammer</li> <li>1 fire hydrant wrench</li> <li>1 scoop shovel</li> <li>1 digging shovel</li> <li>1 heavy-duty floor broom</li> <li>1 posthole hand auger</li> <li>1 long digging/prying bar</li> <li>1 short digging/prying bar</li> <li>1 wheelbarrow</li> <li>1 small gardening shovel</li> </ul>	<p><u>Other Equipment</u></p> <ul style="list-style-type: none"> <li>2 - 25' suction hoses, with camlock connectors</li> <li>1 - 10' suction hose, with camlock connectors</li> <li>1 double check valve, with gate valve</li> <li>1 - 15'X1.5" fire hose</li> <li>1 - 25'X1.5" fire hose</li> <li>1 - 50'X1.5" fire hose</li> </ul> <p><u>Other Supplies</u></p> <ul style="list-style-type: none"> <li>1 roll sorbent pad</li> </ul>

## HEAVY TRUCK INVENTORY

A well-prepared employee is an efficient employee. Having all of the necessary equipment, tools, and supplies when you are operating a company truck helps insure that you will arrive at your destination safely and on time. If there are minor problems, you are prepared.

It is also very important to keep your vehicles tidy and organized. This will insure that you always know the locations of your tools, equipment, and safety supplies.

A heavy truck is defined as any vehicle with a G.V.W. of greater than 5000kg. All heavy trucks must have a minimum of the following equipment, tools, and supplies at all times:

<p><u>Safety Equipment</u> (see section 3.5 of the Safety Manual)</p> <ul style="list-style-type: none"> <li>1 set safety reflectors or flares</li> <li>1 - 10lb ABC fire extinguisher (20lb required on drill rigs)</li> <li>1 Basic first aid kit (Level 1 kit required on drill rigs)</li> <li>2 pairs leather gloves</li> <li>4 - 18" traffic cones</li> </ul>	<p><u>Hand Tools</u></p> <ul style="list-style-type: none"> <li>1 set combination wrenches, 1/4" to 1" in 1/16" increments, and/or metric if required</li> <li>socket set(s), 1/4" to 1" in 1/16" increments, and/or metric if required</li> <li>1 - 10" adjustable wrench</li> <li>1 large pair locking pliers (Vise-Grips - 10WR)</li> <li>1 pair needle-nose pliers</li> <li>1 pair side cutters</li> <li>1 airbrake adjustment tool, if required</li> <li>1 multi-tip screwdriver</li> <li>a few assorted slot screwdrivers</li> <li>1 set hex keys, if required</li> <li>1 claw hammer</li> <li>1 electrical crimping/stripping tool</li> <li>1 circuit tester light</li> <li>1 tire pressure gauge</li> </ul>
<p><u>Supplies</u></p> <ul style="list-style-type: none"> <li>1 can WD40 spray lubricant</li> <li>1 can lock de-icer</li> <li>1 can starting fluid (ether)</li> <li>2 minimum of each fuse used in the vehicle</li> <li>2 minimum of each light bulb used in the vehicle (excluding headlights)</li> <li>assorted electrical terminals, connectors, and wire</li> <li>2 driver's log books</li> <li>2 daily vehicle inspection books</li> </ul>	<p><u>Other Equipment</u></p> <ul style="list-style-type: none"> <li>1 complete set of spare keys hidden under the vehicle</li> <li>1 - 20' piece of 3/8" grade 70 chain, with grab hooks</li> <li>1 - 25' coil air hose, with tire chuck (if equipped with airbrakes)</li> <li>1 set heavy-duty jumper cables</li> <li>1 flashlight</li> <li>1 current edition of the Greater Vancouver &amp; Fraser Valley Map Book published by Street Wise</li> </ul>

## DRILL RIG INVENTORY

A well-prepared crew is an efficient crew. Having all of the necessary equipment, tools, and supplies when you arrive on site is absolutely essential. In addition, returning tools to their proper places helps to keep the work site safe and makes your job easier. All drill rigs must have a minimum of the following equipment, tools, and supplies at all times:

<p><u>Safety Equipment</u></p> <ul style="list-style-type: none"> <li>1 set of the WCB Occupational Health and Safety Regulations</li> <li>1 complete set of Material Safety Data Sheets (MSDS)</li> <li>1 spare hard hat</li> <li>1 spare high-visibility vest</li> </ul>	<p><u>Hand Tools</u></p> <ul style="list-style-type: none"> <li>1 hacksaw</li> <li>5 razor knives</li> <li>1 - 12" (or larger) adjustable wrench</li> <li>1 set of combination wrenches, 1" to 1 ½" in 1/16" increments</li> <li>2 - 12" pipe wrenches</li> <li>1 - 30m fibreglass measuring tape</li> <li>1 - 50m fibreglass measuring tape</li> <li>spare measuring tape weights</li> <li>1 grease gun</li> <li>1 wire brush</li> </ul>
<p><u>Drill Tooling</u></p> <ul style="list-style-type: none"> <li>1 - 10" well protector countersinking tool</li> <li>2 - 2'X6" casing</li> <li>1 - 4.5" guide</li> <li>1 - 6 5/8" guide</li> </ul> <p><u>Power Tools</u></p> <ul style="list-style-type: none"> <li>1 - disc grinder, with grinding and cut-off discs</li> <li>1 - ½" drive air impact wrench with 1 - ¾" deep impact socket</li> <li>1 air sander with cut-off wheel (for down-hole well trimming), with extra cut-off wheels</li> </ul> <p><u>Other Equipment</u></p> <ul style="list-style-type: none"> <li>1 stabilizer pad for each stabilizer</li> <li>assorted blocks and timbers</li> </ul>	<p><u>Supplies</u></p> <ul style="list-style-type: none"> <li>1 clip board, with extra Daily Work Records and Timesheets</li> <li>2 <u>full</u> rolls core bag</li> <li>1 tub non-petroleum thread grease, with brush</li> <li>at least 2 sets (male and female) of hydraulic fitting caps of each size up to No. 16</li> <li>assorted hydraulic fittings</li> <li>assorted nuts and bolts</li> <li>assorted hitch pins</li> <li>assorted clevis pins</li> <li>assorted tie straps</li> <li>arc welding mask</li> <li>arc welding rods (#7014)</li> <li>hard-face arc welding rods</li> </ul>

The following is a sample DAILY WORK RECORD it is required to meet the following specifications:

**IMPORTANT notes to consider when filling your daily work record out:**

- a) Please use Black or Blue INK !!! no color pens
- b) Please print clearly and accurately for the office to properly bill out work.
- c) Employee's need to print their initials in full (i.e. M. O. P.) under Driller / Assistant
- d) Make sure that you have your site address completed \*\*\*always include the city !!!
- e) Have the Site Rep. Print there name clearly beside there signature, including their LAST name!
- f) Use separate work records for more than one project, even if it is the SAME site address.
- g) Please specify your material
- h) Note the PVC size used for the install under each hole numbered
- i) Always record your drilling times under 24 Hours
- j) Break down or Repair to rig is not "standby" time. Please write this time under "comments"
- k) If a courier has brought materials to your project please note under 'freight' Make note of the waybill # if possible

**DAILY WORK RECORD**

Client : \_\_\_\_\_ Date: \_\_\_\_\_  
 Site: \_\_\_\_\_ Drill Rig No: \_\_\_\_\_  
 Site Address: \_\_\_\_\_ Driller \_\_\_\_\_  
 Site Representative: \_\_\_\_\_ Assistant \_\_\_\_\_  
 Client Project No.: \_\_\_\_\_ Project No. : \_\_\_\_\_

DRILLING DETAILS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Totals
4" Core / Displace															
6" Core / Displace															
8" Core / Displace															
10" Core / Displace															
12" Core / Displace															
Install															
Difficulty (1-5)															

MATERIALS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Totals
PVC SIZE INSTALLED															
Threaded End Plug															
Pointed End Plug															
Slip Cap															
2" Slotted PVC															
5" Slotted PVC															
10" Slotted PVC															
Sand															
Bentonite (chip/pell)															
Bentonite Grout															
Cement, Type 10															
Concrete															
Cap & Adapter															
J Plug / Enviro Cap															
WellProtector (F/S/C)															
Drum															
Disposable Coverall															
Respirator Cartridge															

Comments: \_\_\_\_\_

Freight (Yes/No) Carrier: \_\_\_\_\_

## VEHICLE OPERATION

Sonic Drilling Ltd. is committed to complying with all federal and provincial regulations governing the safe operation of vehicles. Driver training, vehicle inspection and maintenance, and regulatory compliance combine to form a complete vehicle safety program.

### USE BASIC ROAD SENSE!!

- Wear your seat belt, it is the single most important safety device in most vehicles.
- Keep alert to changes in traffic and road conditions.
- Report any mechanical or operating problem to your supervisor for repair

The manager is required to:

- Keep a photocopy of each employee's driver's license on file.
- Request a Driver's Abstract from BC Motor Vehicle Licensing for each employee annually.
- Insure that employees have the proper driver's license for the vehicle(s) that they are assigned to operate.

Employees are required to:

- Insure that they are properly licensed for the vehicle that they are operating.
- Insure that they are familiar with all of the requirements of the National Safety Code (NSC).
- Complete a daily vehicle Pre-Trip and Post-Trip Inspection for vehicles over 5500kg GVW.
- Keep a Driver's Log while operating a vehicle, of more than 14700kg GVW, more than 160km from the main office.

Employees are NOT permitted to:

- Operate any Sonic Drilling Ltd. vehicle while under the influence of any mind or perception altering substances. Forbidden substances include: alcohol, pain medications that cause drowsiness, cold medications that cause drowsiness, and any illegal drugs.
- Drive for more than 12 hours per day.
- Work for more than 15 hours per day, including driving, unless authorized by the General Manager.
- Use a radar or laser detector when operating a Sonic Drilling Ltd. vehicle.
- Operate a vehicle when they are excessively fatigued. Drivers must recognize that if they drive when they are not alert, they endanger themselves, company equipment, and the general public.

## SERVICE & SUPPORT VEHICLES

We ask that employee's who are driving service and support vehicles please do not drive with your hand sitting on the gear shift; The shifting forks are effected when this is done in habit.

## NATIONAL SAFETY CODE FOR MOTOR CARRIERS

### PURPOSE

The national safety code for motor carriers (NSC)



#### EMPLOYEE ASSISTANCE AND PREVENTION PROGRAMS

An Employee Assistance Program is an employer-sponsored benefit that provides confidential, professional counselling and advisory services for employees and their families. An EAP assists employees by acting as a prevention treatment resource for individuals who are experiencing personal difficulties. The kind of problems that are covered are: Couple and marital relationships, Family matters, Work-related and career issues, Depression, Stress and anxiety, Bereavement, Misuse of alcohol and drugs, Crisis financial and legal. The program is voluntary, confidential, short term counselling, advisory and information service available to employees and their families. A councillor at 1-800 is available 24hr/7days to help and direct him/her to councillors in their area.

Companies enrolled will submit a list of employee names that are covered under the program. The company pays a fee of \$7.29 per person to maintain coverage and \$100 annually.

Testing and Prevention – CAP Program

## SUMMARY

- Follow Instructions. If you don't know, ask!
- Stop and think before you act, perform a pre-work risk assessment
- Immediately report any unsafe conditions.
- Keep all work area's clean and tidy
- Use the right tools and equipment for the job
- Report all incidents promptly
- Attend to First Aid immediately
- Wear appropriate PPE for the job
- Obey the rules, signs and regulations

## **SONIC EMPLOYEE ACKNOWLEDGEMENT OF HEALTH AND SAFETY RULES**

This is to acknowledge that I have received and reviewed a copy of the Sonic Drilling Ltd. "Occupational Health and Safety Program" AND "Employee Health and Safety Manual". I understand these rules and agree to comply with them.

I further understand that failure to comply with these rules may jeopardize my employment or other contractual relationship with Sonic Drilling Ltd.

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Employee Signature

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Date

**\*\*this acknowledgement must be submitted to the office administration department at the time of hiring\*\***