BUCYRUS®

49HR

BLAST HOLE DRILL

OPERATOR'S MANUAL

Manual No.
10484
SN: 141239

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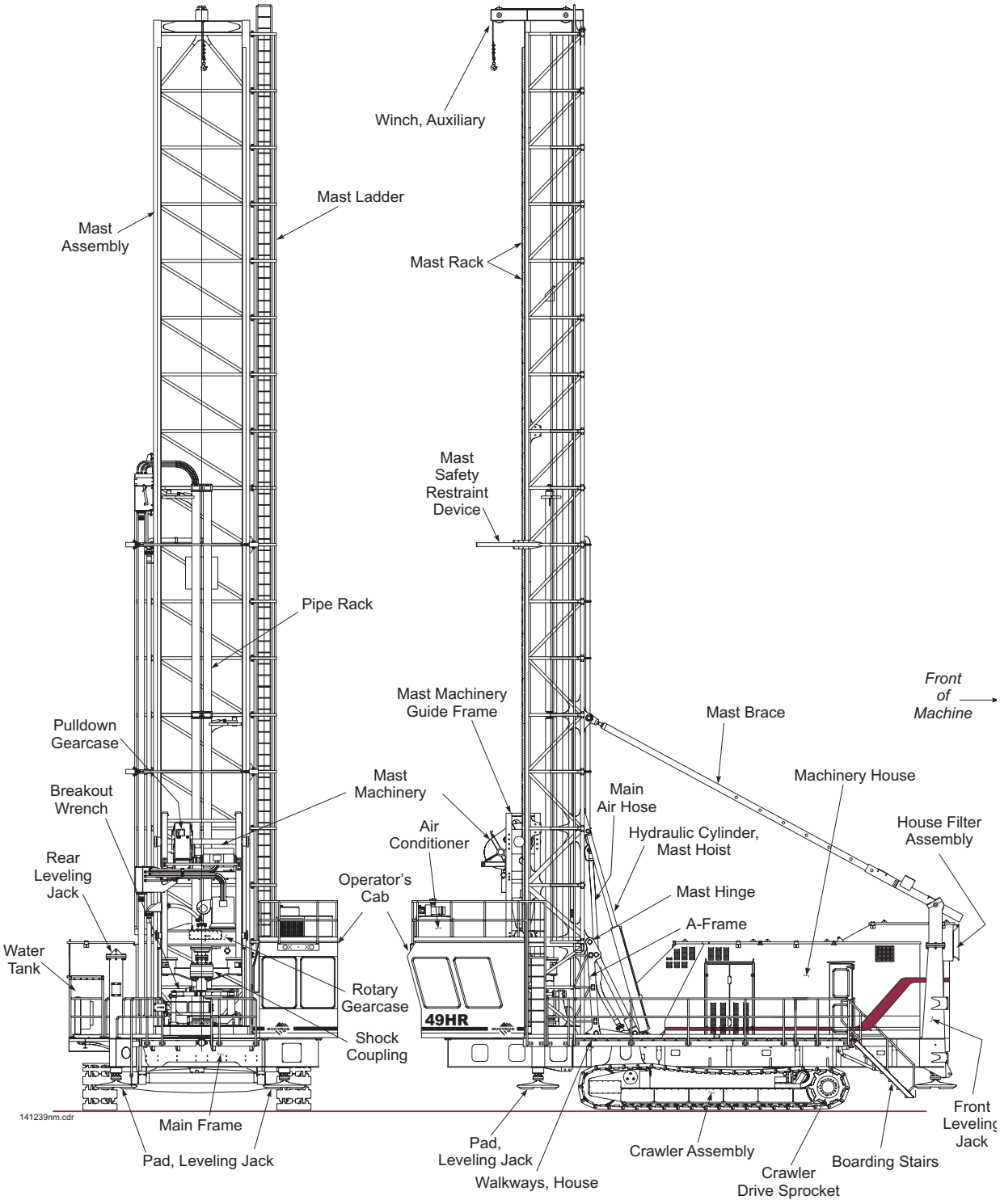
SAFETY PRECAUTIONS

General Precautions:

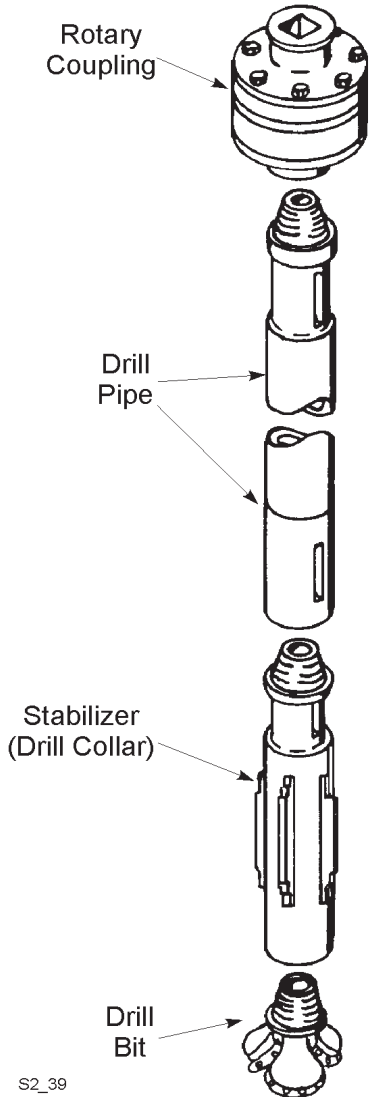
- The employment of qualified maintenance personnel, through a scheduled maintenance program, is the best way to minimize machine downtime and maximize productivity of equipment.
- Keep hands, feet, and clothing away from rotating parts.
- Wear a hard hat, safety shoes and protective lenses at all times.
- Replace any and all safety and warning placards if they are defaced or removed from the machine.
- Think before you act. Carelessness is one luxury the service man cannot afford.
- Excessive or repeated skin contact with sealants or solvents may cause skin irritation. In case of skin contact refer to the Material Safety Data Sheet (MSDS) for that material and the suggested method of cleanup.
- Inspect safety catches (keepers) on all hoist hooks. Do not take a chance, the load could slip off of the hook if they are not functioning properly.
- If a heavy item begins to fall, let it fall, don't try to catch it.
- Keep your work area organized and clean. Wipe up oil or spills of any kind immediately. Keep tools and parts off of the ground. Eliminate the possibility of a fall, slipping or tripping.
- Floors, walkways and stairways must be clean and dry. After fluid draining operations be sure all spillage is cleaned up.
- Electrical cords and wet metal floors make a dangerous combination.
- Regularly inspect for any loose bolts or locking devices and properly secure them.
- Use extreme caution while working near any electrical lines or equipment whether it be high or low voltage. Never attempt electrical repairs unless you are qualified.
- Check limit switches for proper operation.
- After servicing, be sure all tools, parts or servicing equipment are removed from the machine and secured in an appropriate storage area.
- Mechanical Brakes are designed for use as static holding brakes only. Use as a motion (dynamic) brake in emergency situations only.
- Use proper interior and exterior lighting.
- Install and maintain proper grounding and ground fault protection systems.
- Perform functional tests of all safety circuits.
- Allow electrical inspection and maintenance to be performed only by a qualified electrician.
- Use extreme caution when working around drilled holes.

MACHINE OVERVIEW

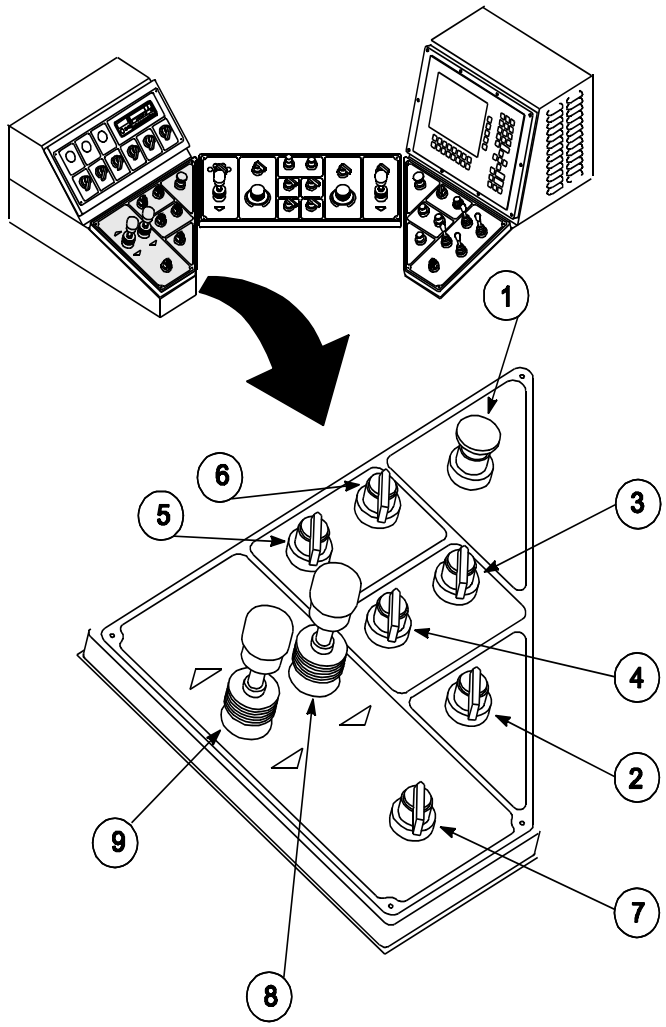
This machine is designed and constructed to provide efficient service under the most severe conditions. It is built to the highest possible standards and will provide trouble free operation if properly maintained.



DRILL TOOL STRING ASSEMBLY



PROPEL CONTROL PANEL



1. Emergency Stop Pushbutton
2. Propel Speed Selector Switch
3. Compressor Stop Pushbutton
4. Compressor Vent/Drill Switch
5. HVAC Mode Selector Switch
6. HVAC Fan Speed Selector Switch
7. Operating Mode Selector Switch
8. Propel RH Crawler Joyswitch
9. Propel LH Crawler Joyswitch

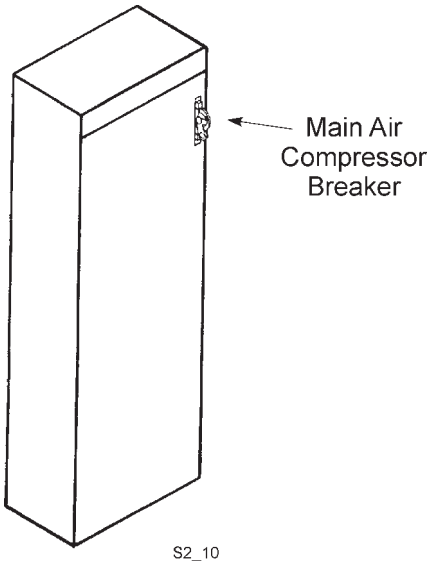
PROPEL CONTROL PANEL - OVERVIEW

EMERGENCY STOP PUSH-BUTTON (Optional)

The emergency stop push-button (1) on the propel control panel is a large red mushroom head push-button switch. Pressing the emergency stop push-button will shut-down the air compressor, hydraulic systems and shut-off all controls. It will also simultaneously provide electrical and immediate mechanical braking. This button should therefore only be used if the operator intends the harshest braking for all motions.

CAUTION: PRESSING THIS BUTTON WHEN ANY DRIVE IS IN MOTION MAY RESULT IN COMPONENT DAMAGE.

CONTROLS LOCATED ON LOW VOLTAGE START CABINET

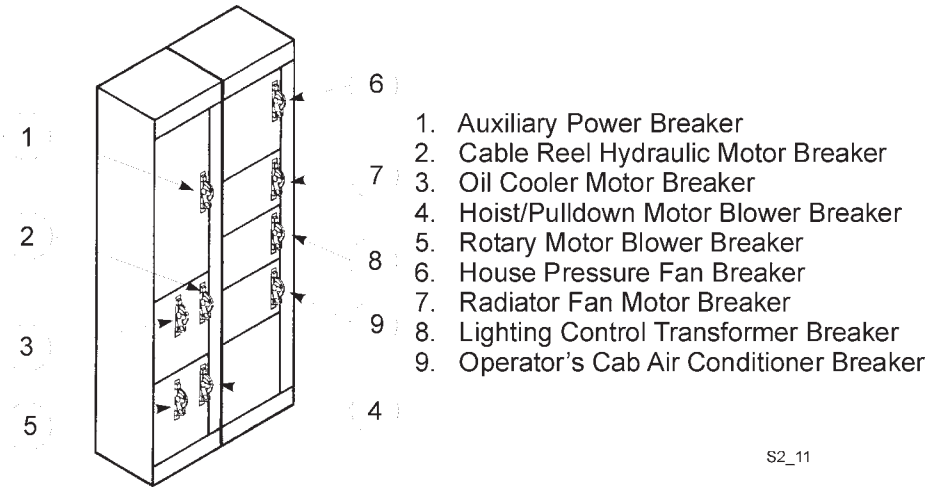


The low voltage start cabinet contains the breaker for the main compressor. Turning the breaker to the ON position will activate the compressor circuits, allowing the compressor to be started.

TYPICAL LOW VOLTAGE START CABINET

CONTROLS LOCATED ON LOW VOLTAGE CABINET

The low voltage cabinet contains most of the breakers for the auxiliary equipment on the drill. Because of the variations of equipment supplied on a particular drill, a list of typical controls which might appear on the cabinet is shown in figure.



TYPICAL LOW VOLTAGE CABINET

OPERATION

Operation of this machine is the same as the operation of any other blast hole drill. But just because the machines operate the same in principle does not mean they operate the same in all respects. For this reason it is important that the operator becomes familiar with the particular machine that is being operated.

The purpose of this section of the operator's manual is to detail the procedures involved in operating many of the major components and preparing to drill a hole. The actual drilling procedure is detailed later within this section.

Become familiar with the controls and learn to operate at reduced speeds. As the machine and drilling cycle become more familiar, increase speeds gradually to the full operating capability of the machine.

The most important reason to operate slowly at first is safety. Operating at full speed means that things happen quickly, perhaps more quickly than expected. This unexpected operation of equipment can very easily lead to an accident.

For the purpose of this manual, we will assume that the drill has been left in the proper condition for operating. If this is not the case, complete the prestart checks and start the machine using the procedures as outlined.

PROPELLING

DEFINITIONS

"Listing" is a machine geometry condition which can occur on vehicles which have a pivotal axle and a fixed axle. It is that condition when the upper works is tilting over onto the pivotal axle, lifting one side of the fixed axle.

"Tipping" is defined as the point of impending overturning. A machine can tip to the rear without listing first. Under all other conditions, the machine will "list" before tipping.

"Maneuvering slope" is the grade on which the machine can be propelled in any direction without listing or tipping.

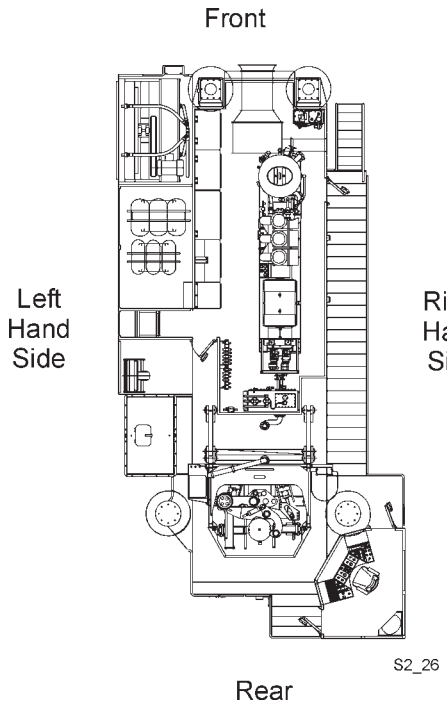
LEVELING

To level the drill, proceed as follows:

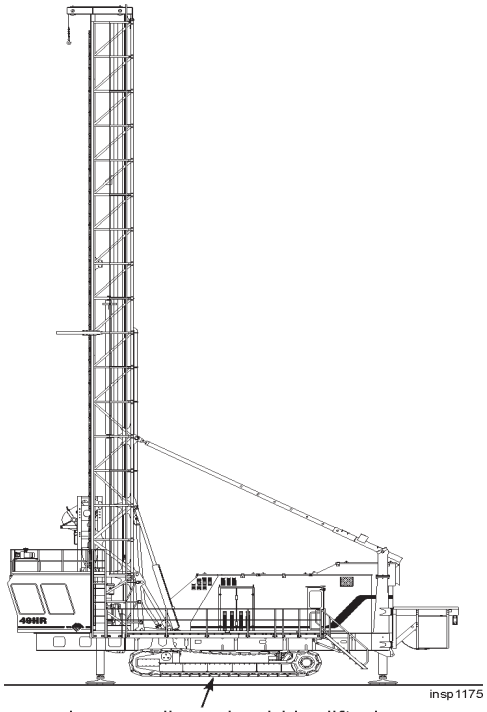
1. Place the machine in the proper location to drill the required hole. Verify that the leveling jack pads will rest on solid footing. Cut or fill or reposition as necessary to achieve solid footing. Maximum angle for jack pad is 17°.

2. The operating mode selector switch must be in the DRILL position and the main air compressor motor must be energized.

NOTE: Normally the machine will be leveled using the automatic leveling switch, Step 3. For manual leveling use Step 4 through 7.



MACHINE ORIENTATION



3. To level the machine automatically verify that the operating mode selector switch is in the drill mode, then turn the automatic leveling switch to the EXTEND position and hold the switch in that position. The Automatic Leveling/ Propel screen will come on automatically on the operator's display terminal. Use the screen to monitor the drill as it is being leveled. The jack cylinders will extend and raise and level the machine. When the machine is raised and leveled, release the switch and it will spring return to the CENTER or OFF position. This procedure can be performed by the operator while he is seated at the main operator's console.

The following special sequence is required for each pipe rack configuration.

1. One pipe rack configuration.

    a. Turn the pipe rack selector switch to the #1 position.

    b. Operate the rack as described under general procedure.

2. Two pipe rack configuration.

    a. If the first pipe rack is to be operated place the selector switch #1 position and operate the rack as described under general procedure.

    b. If the second pipe rack is to be operated place the selector switch in the #4 position and operate the rack as described under general procedure.

NOTE: Take extra care to insure that one pipe rack is out of the way and locked in place before operating the second pipe rack.

3. Three pipe rack configuration.

    a. The first and second pipe racks are part of a carousel and require a special operating sequence. The third pipe rack is a standard swing out rack.

To operate the third pipe rack place the selector switch in the #4 position and operate the rack as described under general procedure.

    b. The carousel configuration of pipe racks one and two requires a special sequence. Position #1 of the selector switch will allow, when the joystick is pulled to the rear, the carousel with pipe racks to be swung out over the guide bushing hole.

One of the pipe racks will be over the hole. Position #2 of the selector switch will allow, when the joystick is pulled to the rear or pushed forward, the carousel to rotate to move the other pipe rack over the hole. Returning the selector switch to position #1 and moving the joystick forward will return the carousel to the stored position.

    c. Because of the sequence of operation pipes must be removed from pipe rack #1 first and then pipe rack #2. When returning the pipes to the racks return pipe to #2 pipe rack, then #1 pipe rack.

NOTE: Take care to insure that one pipe rack is out of the way and locked in place before operating the other pipe rack.

6. Quickly turn the rotary rheostat to the left (counterclockwise) to approximately one-half of full speed. The joint should break at the rotary coupling.

NOTE: IF THE JOINT DOES NOT BREAK IMMEDIATELY, RETURN THE ROTARY RHEOSTAT TO THE ZERO POSITION TO REDUCE THE CHANCE OF DAMAGING THE MOTOR BY STALLING IT.

7. If the joint does not break, it will be necessary to index the slots on the drill pipe so as to allow the rotary drive unit to build up speed before stopping the drill pipe. This is done by rotating the drill pipe in the forward direction until the slots in the pipe are almost aligned with the pawls in the sockets. This allows the drill pipe to rotate almost one-half turn before being stopped by the pawls.

After indexing the pipe to allow the one-half turn rotation, repeat step 6 above to break the joint.

Repeat this procedure as many times as is necessary to break the joint.

8. When the joint breaks, gently raise the rotary/pulldown unit as the joint is unthreading.

9. When the joint completely unscrews, the pipe will drop to the bottom of the pipe rack pocket. The upper gate will automatically close around the drill pipe. When the joint is completely unscrewed, raise the rotary/pulldown unit until it is in a position so as not to be struck by the pipe rack when it is moved. Set the hoist brake.

10. Swing the pipe rack into the stored position.

To remove the stabilizer, proceed as follows;

1. With the stabilizer still clamped in the tool wrenches, attach a lifting bell to the upper end of the stabilizer. Attach the auxiliary winch line to the lifting bell and lift the stabilizer and guide bushing from the hole in the drill deck. Block the assembly in a horizontal position.

2. Remove the auxiliary winch line from the stabilizer. Remove the guide bushing from the stabilizer and replace the auxiliary winch line.

3. Using the auxiliary winch line, remove the stabilizer from the drill. Replace the guide bushing in the hole in the deck.

3. Once the tool string has been removed and the hole reamed, it must now be cleaned out. Reaming the hole loosens cuttings that have become lodged in the side of the hole. These cuttings, and most of the cuttings generated during reaming will fall to the bottom of the hole. This filling of the hole may reduce the actual depth of the hole significantly, so it is necessary to remove these cuttings from the hole. To do this, release the hoist brake and turn the hoist/pulldown rheostat slowly in the pulldown mode.

Leave the air on and the tool string turning at 25-30 RPM. When the bit reaches the point where the cuttings have accumulated on the bottom of the hole, these cuttings will be forced out of the hole. When the cuttings have been cleaned out of the bottom of the hole, the bit will contact the undrilled formation at the bottom of the hole and stop penetrating. Once the flow of cuttings out of the hole stops and the tool string stops penetrating, the hole is clean.

4. After cleaning the hole the tool string may be raised to the top. Turning the hoist/pulldown rheostat control in the HOIST direction and the hoist/pulldown speed selector switch in the HOIST HIGH position will hoist the tool string.

ENDING THE HOLE (MULTIPLE PIPE SECTIONS)

Reaming the hole with multi-section tool strings is the same as reaming with single pipe section strings. The reaming procedure must be done in stages as the pipe sections are removed.

While removing the drill pipe the cuttings dislodged from the sides of the hole and the cuttings generated by reaming will fall to the bottom of the hole. To effectively clean the hole, it would be necessary to reassemble the tool string and lower it to the bottom of the hole. This is not desirable as it is time consuming. One method to eliminate the need to clean the hole is to overdrill the depth and allow cuttings to fill the hole to the desired finishing depth. Experience in this area will show how much to overdrill the hole. A good practice is to overdrill the hole by 1 to 2 feet (0.3 to 0.6 m) over the estimated finished hole depth. This way, if the estimate is wrong, the hole will be 1 to 2 feet (0.3 to 0.6 m) too deep. This can easily be corrected by a few shovels full of cutting thrown into the hole. Underestimating, on the other hand will require that the tool string be reassembled and the hole cleaned.

DRILLING DIFFICULT FORMATIONS

For the purpose of explanation, the drilling procedure given in the DRILLING section of the manual assumes that drilling takes place in consistent, consolidated rock formation. Unfortunately, not all drilling is in this type of formation. This section of the Operator's Manual will detail, in general, some typical drilling difficulties encountered.

time. If the motor is not equipped with heaters, have a qualified electrician install heaters or a suitable substitute. Cover the motor with a waterproof tarp or cover.

8. Close and lock all electrical cabinet doors.

9. Fill the radiator to the top with the proper oil on machines equipped with screw compressors.

10. Manually cycle the auto lube system to verify that all points on the machine are receiving lubricant. Repair the system as necessary to lube all points.

11. Lube all manual lube points.

12. Clean the dust hoppers on the dust control system if required.

13. Close and lock all windows and doors.

LONG TERM STORAGE

Long term storage procedures are necessary any time the machine is to be left for a period exceeding 3 weeks. Long term storage includes all procedures necessary for short term storage, and depending on the situation, some additional precautions.

There are two procedures involved in long term storage of the drill, the choice of which depends upon whether the machine can be attended to while in storage. If the machine can be started and the majority of the machinery operated once a month during the storage period, much less protective work is necessary. If the machine must remain unattended, special precautions are necessary to prevent damage to the machine.

NOTE: If the machine is to be unattended during the storage procedure the procedures necessary to store the machine properly will take considerable time and restoring the machine to production will take even longer. Do not utilize the unattended long term storage procedure unless absolutely necessary.