Drilling with Xs S system

Preparing the equipment

• Place the casing crown over the end of the casing taking care to align the crown to the squared edge of the casing. Tack weld in three places to hold the crown in position, and then weld around the upper edge of the crown using an electrode approx 3/32" in diameter. Grind the weld down afterwards to minimise interference between the crown and the drilled hole. In cold weather, it is recommended that the components to be welded be preheated. Insert the Driver/Bit into the DTH Hammer in the conventional manner, and if a short starter tube is to be used, attach it to the DTH hammer at this time.

Starter Casing

• The crown and first casing assembly should be cut to match the length of the DTH Hammer (or DTH Hammer and starter tube) minus 8". This should put the top of the casing to approximately 2"- 3" below the top wrench flats. This will allow access to the wrench flats and facilitate the adding and removal of drill tubes as drilling progresses.

Casing length

• Ideally, subsequent casing should match the length of each drill pipe. However many casings are of random lengths, and care should be taken when adding random casings not to cover the top wrench flats of the drill pipe, or be too low for the reach of the diverter. It is desirable to measure each casing and record the length on it so that it is known before adding to the column. Occasionally a casing can be cut to offset these discrepancies.

Assembling the Driver and Crown

• Locate the Diverter into the raised position by raising the control handle. With the winch, raise the driver/bit, the DTH hammer and starter tube assembly and attach it to the thread of the saver sub on the rotation head. Raise the assembly and rotation head high into the drill mast to allow the casing to be positioned. With the winch, lift the starter casing with the crown onto the drill table, and secure. Slowly guide the driver bit into the starter casing and feed it all the way down to the crown. By lifting the driver up and down and turning the driver a few degrees each time, insert the driver through the crown. The driver is in position when the driver protrudes through the crown approximately 3". Turn the driver slowly in the normal drilling direction and the crown will lock onto the driver. To make sure you are locked into the correct position, pull back on the drill string, and this should have for effect to raise the complete assembly. Lower the diverter by operating the up/down lever until the diverter sits on top of the casing.

165 Joseph-Robertson, Sherbrooke, Qc. CANADA J1L 2W7
OFF: 819-569-4207 FAX: 819-563-6883 info@georocfor.ca
www.georocfor.com

Starting to Drill

• Drilling is started by lowering the starter casing with the driver to the ground whilst slowly rotating with the hammer air supply partially on. As the driver bit closes into the DTH hammer, it will start to drill. (Note, it is easier to start a casing hole with an air pressure of less than 200psi) It is imperative that the operator monitors the discharge pipe to ensure a good flow of debris. Once the casing starts penetrating the ground, it is advisable to commence water and/or foam injection. When the casing is level with the drill table, drilling is stopped and the hammer air turned off. The diverter is raised (if using Xs air diverter) to expose the flats on the top of the starter tube which can then be secured in the table with the drill tube wrench. The rotation head can then be unscrewed and travelled to the top of the mast.

Adding Casing

• The length of casing should match the length of the drill pipe. Many casings are of random length, and care should be taken when adding casings not to cover the top wrench flats of the drill pipe. It is desirable to measure each casing and record the length on it so that occasionally a casing can be cut to offset any discrepancies. Drill tubes need to be inserted into the casings whilst in the horizontal position, preferably on the ground. This can be done manually or with a draw cable.

To lift the assembly into the drill mast, it is recommended that a proper double hook and chain be attached to the winch. The drill tube/casing assembly is then raised into the mast, the upper drill tube thread aligned into the saver sub and the two screwed together. The winch with the casing still engaged can then be lowered until the hook sits on the drill table leaving the drill tube hanging from the rotation head. The winch rope can now be loosened, allowing the top loop to run down the casing.

A sling can now be attached to the casing, and then the casing lifted enough to allow the hook to be disengaged. At this point, the drill tube is to be engaged and tightened onto the tube held by the wrench below. The casing is then lowered onto the previously drilled casing, clamped into position and tack welded in three places. The casing joint should then be welded all around using an electrode approx 3/32”in diameter not forgetting to grind the weld down afterwards to minimise interference between the crown and the drilled hole. In cold weather, it is recommended that the components to be welded be preheated.
The sling can now be removed from the casing.

Continuing to Drill

• Lower the Diverter onto the casing with the control handle if using Xs air diverter. Drilling can now recommence by slowly rotating with the hammer air supply on, and water and/or foam injection engaged. As the driver bit closes into the DTH hammer, it will start to drill. With the addition of each casing, only sufficient down thrust should be applied to make the DTH hammer run smoothly. Again, it is important that the operator monitors the discharge pipe to ensure a good flow of debris.
Drilling can continue in this manner until the top of casing is level with the drill table where the whole process starts over again.

Retrieving the driver bit

• When the casing is drilled to the desired depth, it is recommended to thoroughly flush the driver bit with air, water and foam (if available). This will help in the disengagement process. The driver/bit can be disengaged from the casing crown by reversing the rotation. This can be done with the DTH hammer in the lifted position to allow the hammer to go into the by-pass mode, which allows more flushing air and fluids to pass. The driver should then be rotated in reverse approximately 1/8 of a turn and then lifted. If the driver is disengaged, the drill tubes will rise leaving the casing in the hole. If the driver bit does not disengage on the first attempt, rotate it back and for into and out of the locked position with the rotation motor. After the driver/bit is disengaged, pull all the drill tubes out of the casing in the conventional manner, with the hammer air on and slowly rotating in the drilling direction.

Relocating the Driver Bit

• Should it be found necessary to advance the casing further after the driver bit is disengaged, care should be taken to ensure that the hole has been flushed clean to prevent any debris getting in the way of the locking lugs between the driver and crown. After having thoroughly cleaned the hole, the driver can be re-engaged by lowering the driver bit back into the casing until the driver bit sits up against the crown bit. Once this is done, the driller should mark the drill string with chalk and pull the driver bit back 8” to 10”. (all this being done with the air and liquids off) The driver should now be lowered slowly and with a slow rotation in the direction of drilling until he feels/sees the drill tube drop 4” to 6”. The operator can ascertain if the driver/bit is engaged in the crown by lifting the drill string. If the drill string lifts without the casing, then the driver/bit is not engaged in the proper position. If resistance to lifting is felt when pulling back, then the driver and crown are engaged properly.

Drilling below the Casing with the *Square Bit* (TM)

• One advantage of this Xs drill system is being able to return with the specially designed GeoRocFor "Square Bit" (TM) below the crown to drill a larger hole into bedrock compared to a standard bit. This drill bit has two opposing flats and it is designed to pass freely into/through the crown. First, with the air pressure turned off, lower the bit until it reaches the crown. Once this is done, the driller should mark the drill string with chalk and pull the square bit back 8" to 10". The square bit should then be lowered slowly and with a slow rotation in the direction of drilling until he feels/sees the drill tube drop 4" to 6", after which drilling can commence.