



# Groundbreaking technology in the Valley of Gold



Forage Mercier crew at Val D'Or.

## Cadillac fault

During the early part of the 20th century, major discoveries in precious metals were made in the Abitibi-Témiscamingue region of Québec. These included copper-gold at Rouyn-Noranda in 1922 and gold at Val D'Or in 1925. Subsequently, many mines were developed in ore bodies discovered near these communities, all of them located along what is known as the Cadillac fault, part of the upthrust that created the Canadian Shield billions of years ago. However, exploration drilling conditions have always been difficult, testing contractors and equipment to the limit. The introduction by Atlas Copco of its BT rods, with a rated depth capacity of 2 600 m, has produced a marked improvement in results.

## Major investment

The Cadillac fault is a major structural feature of the geology of the area, covering a stretch of ground approximately 400 km-long and 5 km-wide. It is a break in the earth's crust that extends from Timmins in the west to Val D'Or in the east, formed when the Canadian Shield broke over 3 billion years ago. During the upthrust, magma, or molten rock, rose and solidified within the fracture. The magma carried with it precious metals such as gold and silver, as well as copper and zinc.

Because of its economic importance, some 80% of all the investments in Québec's mineral exploration and ore deposit development are currently made in the Abitibi-Témiscamingue and Nord-du-Québec regions, directly along the fault. Since the first discovery of gold in the 1920s, the ability to

explore at any significant depth along the Cadillac fault has been tested again and again, but with limited success.

## Uncommon ground

While core drilling technology has advanced steadily since the 19th century, there are still several basic, limiting factors that will determine the depth to which a borehole can be drilled. Drilling to depths of 1 200 m to 1 800 m is common where the ground is mainly hard rock. In Val D'Or and other regions along the Fault, geological challenges demand not only superior product technology and performance, but also superior contractor competence. Drilling contractors have to put their skills and experience to the test on every hole. Jean-Claude Gendron, Vice-President of Operations for Forage Mercier Inc., a



company specializing in surface exploration diamond drilling in Val D'Or, has been doing mineral exploration along the Cadillac fault for over 43 years.

He is involved in gold exploration for a Val D'Or-based client where the prospect straddles the fault, and has presented his team with unique geological challenges. They are drilling through layers of abrasive ground, sand, mud, and very hard and broken rock in which, to maintain the integrity of each hole, considerable cementing and wedging is required.

The entire procedure involved in positioning a wedge in a drill hole to achieve a required deviation can often take up to two shifts.

This is due primarily to the fact that there is a wait of at least eight hours between grouting to allow for drying. Once the wedge is placed and the deviation of the hole has been achieved, the corebarrel is re-inserted on the drill string and normal drilling resumes. In the event additional deviation is required, another wedge is installed after 60 m and the process is repeated. It is a time-consuming process and can be hard on the drilling rigs and in-the-hole tools.

## Tougher threads

In April, 2008, on the recommendation of his representative from Atlas Copco, Gendron replaced the BO drill rods he had been using with BT rods, which are exclusive to Atlas Copco. He reports that the new rods work very well in the broken ground, where previously the O-threads were experiencing a lot of strain. Gendron says the BT threads are tougher, and allow more torque to be used without danger of damage or galling, all of which is important for the drillers and conditions at the Cadillac fault.

Wearing metal against metal in abrasive cemented and wedged ground is known to be extremely hard on the rod joints and overall rod life expectancy, commonly reducing the life of the rod string by about 20%, meaning replacements can be required every 16 000 m, or 50 000 ft. At one location, the drillers went through some very bad ground and had to cement more than



From the left to the right: Jean-Claude Gendron, Vice-President, Forage Mercier and Christian Bergeron, Sales representative, Atlas Copco.

ten times, plus a couple of wedges. This would have been very hard on the threads prior to the change, but not with BT rods. As a result, the company now spends more time drilling with the string, and less time pulling and replacing rods. Furthermore the Tuff Rod allowed the Forage Mercier team to reach a record depth of 2 378 m, or 7 800 ft, exceeding their expectations not only for depth, but also for overall integrity and life of the rod threads.

## Straighter holes

More than depth, the goal of this project is to drill a straighter hole. The Forage Mercier team is using an upgraded Atlas Copco B15 drilling rig, which, along with the BT rods, has given them excellent results in the field. Because of the stronger threads, operators have noted that the drill string doesn't bend at the joints due to worn threads.

The standard setup is for drilling at 85 to 87 degrees, which is fairly steep. Normally, readjustment would be required frequently because of worn

threads shifting the rods off angle. However, this is no longer the case, so they feel this is really a superior product across the board. Forage Mercier has been relying on Atlas Copco in-the-hole tools, including drill rods and diamond bits, for over 20 years, during which time Gendron and his team have developed a strong relationship with the staff at the Atlas Copco office in Val D'Or.

When Atlas Copco technical personnel visit the job sites they work with the drillers, giving them the information to solve specific problems. Forage Mercier observes that the resolution of the difficulties with the rods at Cadillac fault is typical of the way in which Atlas Copco supports its clients, as part of their own project team.

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