Wireless initiation: Enabling new mining methods underground at Musselwhite

In Musselwhite, an underground mine located on the southern shore of Lake Opapimiskan, approximately 480km north of Thunder Bay, Ontario, Canada, 265,000 ounces of gold is produced each year. The mine, owned and operated by Goldcorp Inc (Goldcorp), uses a modified AVOCOA mining method for the majority of its mining in retreats without secondary access. Using this method, each blast is bailed filled and waste is removed from the backfilled stopes (voids) to create a void for the next blast.

As the blast follows the ore body, the increasing depth, strike length and number of lifts contributes to high levels of stope dilution. Some of this dilution is separable during the mucking cycle, but the net effect is a reduction in productivity and profitability.

Steve Piercey, Orica Senior Underground Blasting Specialist and WebGen™ Team Leader at Musselwhite, has been working with WebGen™ wireless through the earth initiation technology to bring the mine operations into the 21st century.

In late 2016, Steve and the Orica team identified an opportunity to use WebGen™ wireless through the earth initiation technology to reduce dilution in the production stopes.

WEBGEN™: WORLD-FIRST TRULY WIRELESS BLASTING SYSTEM

The world-first truly wireless blasting system represents a significant step in the evolution of blast initiation and is one of the most exciting initiation technologies developed in the last 35 years, revolutionising conventional blasting practices. The system provides for groups of in-hole primers to be wirelessly initiated by a firing command that communicates through rock, water and air.

This removes constraints often imposed by the requirement of a physical connection to each primer in a blast and uncouples countless safety and productivity benefits for customers by eliminating the need for down-wires and surface connecting wires.

This step change in blasting technology fundamentally changes the industry approach to blasting and mining.

“Discussing possible wireless applications is an integral part of our planning process”  
BILLY GRACE, CHIEF ENGINEER, MUSSELWHITE

Orica is now producing a wireless primer specifically for surface mining applications that will deliver greater flexibility to the open cut mining sector in coming years. This is a critical first step towards full automation of the drill and blast process across the underground and surface mining sectors, a long-term goal shared by both the mining industry and Orica.

Table 1 Summary of key production metrics at Musselwhite achieved using WebGen™

<table>
<thead>
<tr>
<th>Metric</th>
<th>TRP Case Study Blast Results</th>
<th>TRP Typical Blasts Results</th>
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</thead>
<tbody>
<tr>
<td>Days mucked</td>
<td>33% Reduction</td>
<td>20% reduction</td>
</tr>
<tr>
<td>Avg. TPD</td>
<td>27% Improvement</td>
<td>14% Improvement</td>
</tr>
<tr>
<td>Dilution</td>
<td>93% Reduction</td>
<td>34% Reduction</td>
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For all of the wonderful things we were able to do with electronic blasting, we were still encumbered by wires. Now we have a truly commercial system that is 100 per cent wireless, we are only limited by our imaginations and sound engineering principles.”

Steve Piercey  
Senior Underground Blasting Specialist and WebGen™ Team Leader at Musselwhite.

Steve has over 30 years of industry experience, 22 with Orica, working with mining operations around the world to deliver safe, reliable and efficient outcomes for customers.