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IT CASE STUDY CHALLENGE 2021



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Wireless Technology Makes Dundee Precious Metals Good as Gold

Dundee Precious Metals (DPM) is a Canadian-based, international mining company engaged in the acquisition, exploration, development and mining, and processing of precious metal properties. One of the company's principal assets is the Chelopech copper and gold mine east of Sofia, Bulgaria; the company also has a gold mine in southern Armenia and a smelter in Namibia. The price of gold and



other metals has fluctuated wildly, and Dundee was looking for a way to offset lower gold prices by making its mining operations more efficient. However, mines are very complex operations, and there are special challenges with communicating and coordinating work underground. Management decided to implement an underground wireless Wi-Fi network that allows electronic devices to exchange data wirelessly at the Chelopech mine to monitor the location of equipment, people, and ore throughout the mine's tunnels and facilities. The company deployed several hundred Cisco Systems Inc. high-speed wireless access points (in waterproof, dustproof, and crush-resistant enclosures), extended-range antennas, communications boxes with industrial switches connected to 90 kilometres of fibre optic lines that snake through the mine, emergency boxes on walls for Linksys Voice over Internet Protocol (VoIP) phones, protected vehicle antennas that can withstand being knocked against a mine ceiling, and custom walkie-talkie software. Dundee was able to get access points that normally have a range of 200 meters to work at a range of 600 to 800 meters in a straight line or 400 to 600 meters around a curve. Another part of the solution was to use Aero Scout Wi-Fi radio frequency identification (RFID) technology to track workers, equipment, and vehicles. About 1,000 Aero Scout Wi-Fi RFID tags are worn by miners or mounted on vehicles and equipment, transmitting data about vehicle rock loads and mechanical status, miner locations, and the status of doors and ventilation fans over the mine's Wi-Fi network. Aero Scout's Mobile View software can display a real-time visual representation of the location of people and items. The software can determine where loads came from, where rock should be sent, and where empty vehicles should go next. Data about any mishap or slowdown, such as a truck that made an unscheduled stop or a miner who is behind schedule, are transmitted to Dundee's surface crew so that appropriate action can be taken. The Mobile View interface is easy to use and provides a variety of reports and rules-based alerts. By using this wireless technology to track the location of equipment and workers underground, Dundee has been able to decrease equipment downtime and use resources more efficiently. Dundee also uses the data from the underground wireless network for its

Dassault Systems' Goveia mine management software and IBM mobile planning software. Before implementing Aero Scout, Dundee kept track of workers by noting who had turned in their cap lamps at the end of their shift. Aero Scout has automated this process, enabling staff in the control room to determine the location of miners quickly. It is also essential for workers driving equipment underground to be able to communicate closely with the mine's control room. In the past, workers used a radio checkpoint system to relay their location. The new wireless system enables control room staff workers actually to see the location of machinery so they can direct traffic more effectively, quickly identify problems, and respond more rapidly to emergencies. Thanks to wireless technology, Dundee has been able to reduce costs and increase productivity while improving the safety of its workers. Communication costs have dropped 20 percent. According to Dundee CEO Rick Howes, the \$10 million project, along with new crushing and conveyor systems, helped lower production costs to \$40 a ton from \$60. In 2013, Chelopech ore production topped two million tons, a 12 percent increase over the previous year.

Question

1. Comment on the steps currently taken by DPM to integrate Wireless Technology into their business processes, and suggest further innovative technological strategies that can be feasibly implemented in order to develop a holistic work environment.

Presentation should include a prototype of the website, mobile app or software, which is developed by your team.

Sources: Clint Boulton, "Mining Sensor Data to Run a Better Gold Mine," Wall Street Journal , February 17, 2015, and "Tags to Riches: Mining Company Tracks Production with Sensors," Wall Street Journal , February 18, 2015, www.dundeeprecious.com, accessed April 29, 2015; Eric Reguly, "Dundee's Real-Time Data Innovations Are as Good as Gold," The Globe and Mail , December 1, 2013; and Howard Solomon, "How a Canadian Mining Company Put a Wi-Fi Network Underground," IT World Canada , December 3, 2013.

Adapted from: Laudon, K. C., & Laudon, J. P. (2018). Management Information Systems: Managing the Digital Firm (15th ed.). Harlow, Essex, England: Pearson Education Limited.