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The customer newsletter of ABB Network Management

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Last one out, leave the lights to the machines

network

Jens Birgersson
Business Unit Manager Network Management

Dear readers,

Welcome to the third edition of Network 2014, the customer newsletter of ABB's Network Management business,

In this edition, we bring you news of a partnership in Malaysia where our RTUs (remote terminal units) are being used in a major grid expansion project for this rapidly growing economy (page 4). The modular design of our RTUs makes them ideal for expansion projects, where existing infrastructure needs to work alongside new installations. We're also helping to strengthen the grid in Bangladesh (page 5) with substation automation systems and protection and control equipment for PGCB, the country's leading transmission utility. Conforming to international standard IEC61850, these installations will also be compatible with existing infrastructure and enable future modifications to be made as demands on the system change.

It's not just our hardware that helps customers do more with their existing infrastructure. The energy company Black Hills has just contracted Ventyx to deploy its asset management solution (Ventyx Asset Suite) across its T&D operations in the United States. This will introduce a single asset management solution in place of its myriad existing systems. By bringing asset management onto a single platform across the company, the new software will help the company fulfil its promise to provide safe, reliable and affordable energy to its 777,000 customers in seven states.

In R&D news, we highlight a grid automation pilot project we're working on in Germany (page 6). Part of the GridEU initiative, the Demo 1 project will demonstrate the benefits of grid automation technologies in distribution networks. The work will advance our understanding of how renewable power sources can be integrated into networks, without compromising their reliability, a pressing need, particularly in the European grid.

On page 8, you can read about another novel application of MicroSCADA Pro. This versatile technology is now controlling the lights at the port of Vuosaari, Helsinki, in Finland, with finger-tip precision, courtesy of the harbormaster's iPad. And in Swaziland, an upgrade of our Ventyx software for work- and asset management will soon be helping the national electricity utility to improve business management and operational planning.

New for this quarter is an edition of ABB Review, the Group's technical journal, focusing on our portfolio for the mining industries. The mining edition is now available on line. Wireless communications and mine management software both feature in article that show how our technologies can help customers to overcome challenges in the harshest environments. Read about open-pit mines using mobile routers in an extract from the Review on page 11, and the full edition of the magazine at **www.abb.com/review**.
To read more about ABB's offering for network management, including substation automation, communication networks and the Ventyx enterprise software portfolio, visit **http://new.abb.com/network-management.**

Best regards

Jens Birgersson

News

Projects

Technology

ABB delivers RTU solutions in Malaysia with local partnership

Local support, international backing, for remote terminal units and enhanced network management

Malaysia, located in the South China Sea, has boasted one of the best economic records in Asia since it became independent in 1957. Ignited by plentiful natural resources, today the country's economy is expanding into new industries, including scientific research, tourism, international commerce and medical technology.

This newly-industrialized market economy depends on reliable, electrical power, most of which comes from Tenaga Nasional Berhad (TNB). This electrical utility serves around 8.3 million local inhabitants – almost a third of the country's population. The core business of TNB is the generation, transmission, and distribution of electricity across the Malaysian Peninsular – managing the national grid that links its power stations and distribution networks.

By 2013 it was clear that TNB's lack of supervisory control and data acquisition (SCADA) support in its primary distribution substations was stifling expansion and had to be addressed. TNB opened a two-phase tender; one part covering the switchgear, and a later phase for remote terminal unit (RTU) solutions.

TNB is quite specific in its product requirements, requiring that it personally certify every part delivered to ensure that it meets the company's exacting standards. That certification process takes up to eight months, and every device, and every firmware release, has to pass before it can be used on the TNB network. ABB already tests both designs and products before delivery, so customer testing can be seen as a formality.

Customer testing is, however, common practice, as utilities need to know they can rely on the components supplied, and ABB is always pleased to prove that equipment is up to the mark. Our commitment to product life cycle also reduces the testing burden, as an approved device will continue to be available for, effectively, as long as the customer wants it.

Remote Terminal Units, 68 of which ABB has supplied to TNB, provide local aggregation of sensor data, and relay commands from a central SCADA system to substation equipment. But a good RTU can also make local judgments based on sampled data, so the key functionality is interconnectivity and local intelligence. ABB's RTUs are built on a modular platform, allowing functionality to be added for specific installations, and if offers unparalleled connectivity with full support for Ethernet and related interfaces, while still able to talk RS232.

On the ground in Malaysia, ABB worked with a local partner – PTIS – who carried out erection and commissioning works on site. PTIS knows the local market, and conditions, and was able to provide valuable knowledge about what the customer needed.

Building critical infrastructure often comes down to a matter of trust. Equipment can be tested, service levels can be agreed, but ultimately an ABB customer is placing their trust in ABB to deliver reliable equipment every time. Over the next few years, TNB will be automating more of its substations, and with the trust established, ABB looks forward to bidding to supply them.

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TNB serves around 8.3 million people - almost one third of Malaysia's population

Strengthening the grid in Bangladesh

Four new substations and the expansion of six others to enhance transmission capacity and boost power supplies

The Power Grid Company of Bangladesh Limited (PGCB), the country's leading transmission utility, has contracted ABB to provide four new turnkey substations and help to expand six others, to help meet the growing demand for electricity.

The four new 132/33kV substations will be built at Rangamati, Khagrachori, Bianbazar and Sunamganj. These new projects and the six existing substations that will undergo expansion are part of Bangladesh's ongoing Power Systems Expansion and Efficiency Improvement Program, which is upgrading the country's generation, transmission and distribution systems. The objective is to increase capacity, improve efficiency, enhance power reliability and reduce environmental impact as demand for reliable power increases.

It is estimated that 450,000 households will receive new power connections through this program, and that carbon emissions will be reduced by almost 2.5 million tons per year.

ABB's project scope includes design, supply, installation and commissioning of the substations. Key ABB product supplies include power transformers, high- and medium-voltage switchgear. The substations will also be equipped with ABB's control and protection equipment, as well as substation automation systems conforming to global IEC 61850 open communication standards.

"We are happy to partner with ABB as we invest in strengthening the country's power infrastructure for the future, and we hope to benefit from the technology leadership that ABB has to offer," said Masum-Al-Beruni Managing Director of PGCB.

ABB has previously executed several projects including a 230kV switchyard, 132/33kV substations and 230/132kV substations and is presently executing a 230kV substation at Bibiyana for PGCB, Bangladesh.

The IEC 61850 standard for communication in substations is one of the most significant developments in substation automation and protection technology for several decades. It fulfills a long-held requirement for a single global standard for interoperability and real-time communication and data exchange between critical substation automation devices.

ABB played a key role in developing the global standard and has achieved a number of world firsts, including the first multi-vendor IEC 61850 installation and the first commercial implementation of IEC 61850-9-2 LE. In the past four years, ABB has supplied hundreds of IEC 61850 systems and thousands of products for new and retrofit installations in over 60 countries to enhance the performance, efficiency and reliability of substation operation.

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Links:

Feature article on the world's first commercial implementation of IEC 61850-9-2 LE

ABB technologies that changed the world: Substations

ABB collaborates on smart-grid distribution automation solution for Germany

ABB with RWE and the Technical University (TU) Dortmund has implemented advanced technology in a research scheme that shows potential for other European grids.

ABB has implemented an advanced grid-automation solution developed as part of the EU-funded Grid4EU project

ABB has implemented an advanced grid-automation solution developed as part of the EU-funded Grid4EU project, which supports the EU's 2020 climate and energy targets and lays the groundwork for the development of tomorrow's electricity grids.

In Demo 1, the grid automation technology is already fully integrated into the existing local network, where it monitors the load conditions in the grid and automatically adapts to changes in demand. It enables existing open ring lines to be switched, establishing direct connections between consumers and generators. This means that local generators can supply power to local consumers, reducing line losses and enhancing the efficiency of the distribution grid. The technology also delivers advanced control functions to enhance the reliability of the network and support the detection of the faults, such as overloads or voltage irregularities, by the regional network control center.

ABB plays a key role in the Grid4EU partnership, which is one of the largest EU-funded smart grid initiatives, participating in three of the six demonstration installations. On the Demo 1 pilot project in Reken, Germany, ABB is collaborating with project leader RWE and TU Dortmund.

In addition to technical and domain expertise, one of the key contributions by ABB to the project is the remote terminal units (RTU500 series). These autonomous devices help determine and optimize the conditions in medium-voltage networks. They play an essential role by interfacing between physical installations and their associated control, data collection and monitoring systems.

The objective of the project is to demonstrate that autonomous systems using agent functions for surveillance and automated control of medium-voltage networks can become an industrial solution for improving the management of medium-voltage networks.

Reken, with its population of 14,000 and growing volume of renewable generation, was chosen as a model system. This pilot project will provide insights into the performance and management of larger European systems fed by renewable generators. Results are expected in 2016.

ABB already offers a number of products, systems and services for the automation of distribution networks and the implementation of this pilot project is another step in the development of the digital grid. ABB's portfolio of grid automation technologies ensure flexibility while maintaining reliability and and improving overall performance. With its extensive portfolio of power and automation technologies, and significant investment in R&D programs, ABB continues to push the boundaries of what is possible in distribution grid automation.

To learn more about ABB's involvement in smart grid projects and its network management portfolio, follow the links below.

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www.new.abb.com/smartgrids

www.new.abb.com/network-management

In addition to technical expertise, ABB has contributed RTUs to the project. These play an essential role, interfacing between physical installations and their associated control, data collection and monitoring systems.

MicroSCADA Pro takes charge of lighting in Helsinki

Last one out, leave the lights to the machines.

Automated lighting is a basic part of home automation, but when the port of Vuosaari wanted iPad control of 76 lighting towers, each of which is 40 meters tall, they turned to ABB's MicroSCADA Pro for help.

ABB was already in the vicinity, having installed eight substations to power the harbor, and its lights, but controlling them was beyond the original brief. To extend the functionality ABB provided an additional MicroSCADA Pro system, which was easily integrated to manage the zoned lighting system, and save money for the harbor.

The lights themselves were the result of a competition, created by APRT Architects they're designed to minimize light pollution (which wastes power as well as annoying the locals) and to cast a cohesive light across the harbor. But the addition of fractional control means the lights can be on when they're needed, and off when they're not, increasing safety and lowering costs all at the same time.

Initially the system worked by splitting the 76 lighting towers into zones, covering areas of the harbor operated by different companies. Those zones were provided with four degrees of illumination, and linked to fog and light detectors, as well as being controlled with a timer and responding to commands sent by text message.

That worked well, but as the harbor operators grew familiar with the system they realized that additional savings could be made. An intermediate generation added combined zones and greater control, while the final system provides complete control over the harbor lighting from the touch screen of an iPad – enabling a single engineer to vary the lighting from the field.

The iPads connect using Wi-Fi, and replicate the MicroSCADA Pro interface, so an engineer (once authenticated) can select a specific tower or control an entire zone, changing the lighting conditions to suit the work being done.

That means less power is wasted, and fewer staff are needed to manage the harbor lighting, letting MicroSCADA Pro take the workload to the benefit those using the harbor – who get to see what they're doing – and the harbor itself – which saves money thanks to more-efficient lighting – and ABB – who gets to show off another way that MicroSCADA Pro can improve the workplace, no matter how big, or dark, it is.

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The system provides complete control over the harbor lighting from a hand-held tablet.

Swaziland utility brings more reliable power to its citizens with Ventyx Software

Software upgrade to further optimize management of energy assets and workforce

Ventyx, an ABB company, has signed a significant software license agreement with Swaziland Electricity Company (SEC), the government-owned provider of electricity generation, transmission and distribution to the Kingdom of Swaziland. As part of the agreement, SEC will upgrade its Ventyx Ellipse work and asset management platform to the latest release to further optimize the management and visibility of its asset infrastructure and the workforce maintaining it.

Rural electrification continues to be a major priority for Swaziland's Ministry of Natural Resources and Energy, the national energy authority which formed the SEC in 2007 to provide reliable, affordable, safe and sustainable power to its citizens and to help eradicate poverty in Swaziland. The upgrade is part of a major transformation project by SEC to improve power supply, rural electrification and customer service – while minimizing operating costs.

Supported on low-cost technology platforms, the upgraded version of Ventyx Ellipse helps minimize the expense for business process support in key areas of asset and work management, work requests, payroll, rostering, absence management, and employee self-service (ESS). SEC will implement Ellipse Work Planner for advanced maintenance planning to improve asset availability while reducing costs.

"The move to a newer version of Ventyx Ellipse follows 18 years of successfully using the platform to plan, measure, monitor and improve the performance of our power assets," said Melusi Malinga, Chief Information Officer, SEC. "By upgrading to the latest version, we can continue to use one single, easy-to-use platform for all enterprise resource management functions – offering us significant productivity and cost efficiency gains."

Head of ABB's Network Management business unit Jens Birgersson said, "Ventyx shares SEC's mission to deliver a reliable and safe power supply in a profitable and environmentally safe way. Implementing a proven work and asset management solution like Ellipse will help them achieve this mission amid the challenges of managing extensive operational networks, assets and workforces while expanding the rural distribution network to provide a better quality of life to more of its citizens."

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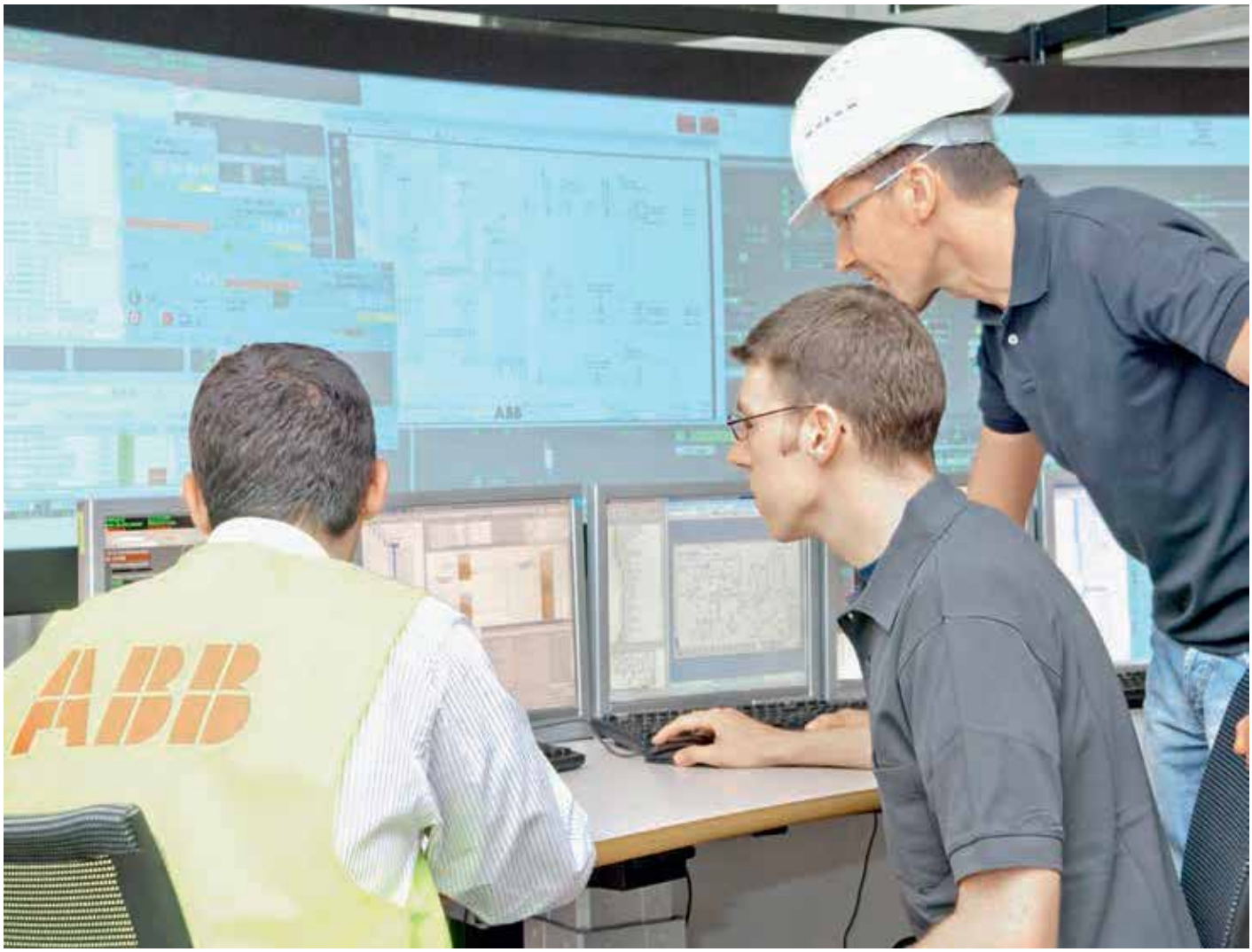
ABB Review, mining, available now

Third edition of ABB Review for 2014 highlights ABB's mining portfolio



This quarter's edition of the Review has a special focus on ABB's mining portfolio, including technologies from our Ventyx and wireless communication portfolios.

ABB Review, the company's corporate technical journal, is currently celebrating one hundred years in print. This quarter's edition focuses on ABB's mining technologies that help to overcome some of the most serious of challenges in the harshest of industrial environments.

The following story, Seamless Comunications, is a summary of an article on Tropos wireless mesh networks, from the current edition of the Review. It shows how wireless communications can enhance the productivity and profitability of mining operations by enabling real-time data to be collected and analyzed at the mine's operations center.

ABB Review is published four times a year in five languages, for a worldwide audience. Special reports are published in English on topics such as ABB's businesses in China, or the application of specific technologies, such as the IEC 61850 standard for substation automation. The story here provides a taste of the articles in the Mining Review. For the full stories, or to download this edition of the journal, please visit **www.abb.com/review**.

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Seamless communication

Wireless communications for open-pit fleet management

Modern open-pit mining is a high-tech undertaking in decidedly hostile environments. Safe and efficient operation requires precise coordination of some of the world's largest and most expensive machines in settings characterized by punishing heat and cold as well as extreme shock and vibration. Managing equipment and tracking data and materials are top priorities for open-pit mining operators, making fleet management a crucial part of their daily job.

Luckily, it doesn't have to be a time-consuming and tedious affair. The ABB Tropos patented private wireless communication networks enhance open-pit mines' productivity and profitability by enabling advanced fleet management, thereby allowing for real-time data to be captured and analyzed at the mine's operations center.

ABB Tropos wireless mesh networks not only solve today's operational challenges in open-pit mines, but also create longterm strategic value for customers. Today's fleet management applications form the foundation for autonomous operation in the future where driverless vehicles in the mine are orchestrated and controlled from a central control room. The highly reliable, scalable, multi-application mesh architecture enables mining customers to move from fleet management to fully autonomous operations with minimal incremental capital investment.

This article is an extract from "Seamless Communications" by Roman Arutyunov. To read the full article, and others in ABB Review's mining edition, visit **www.abb.com/review**.

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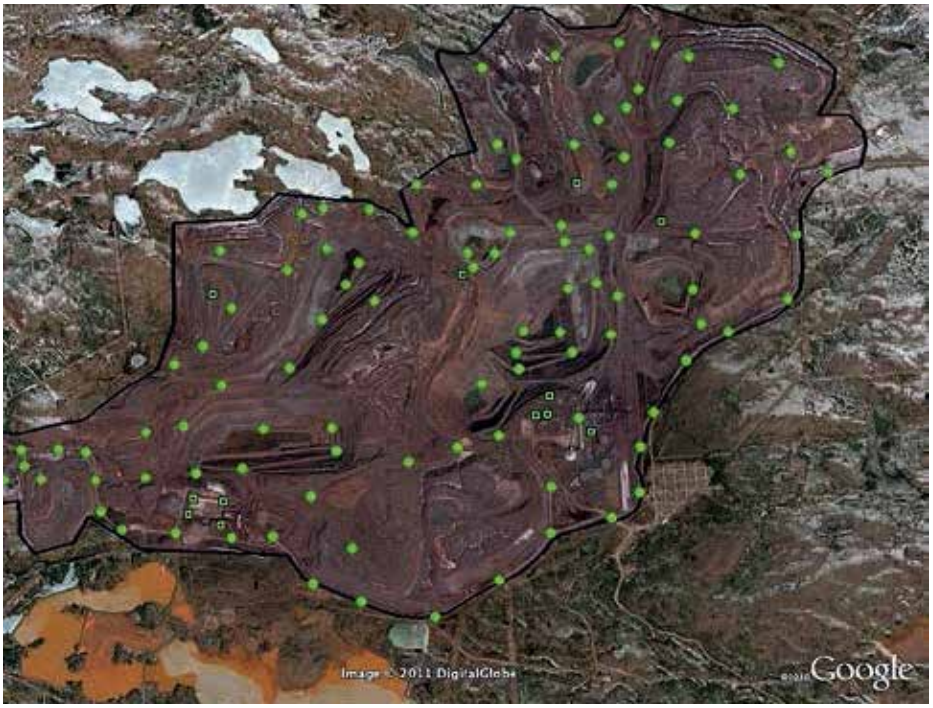
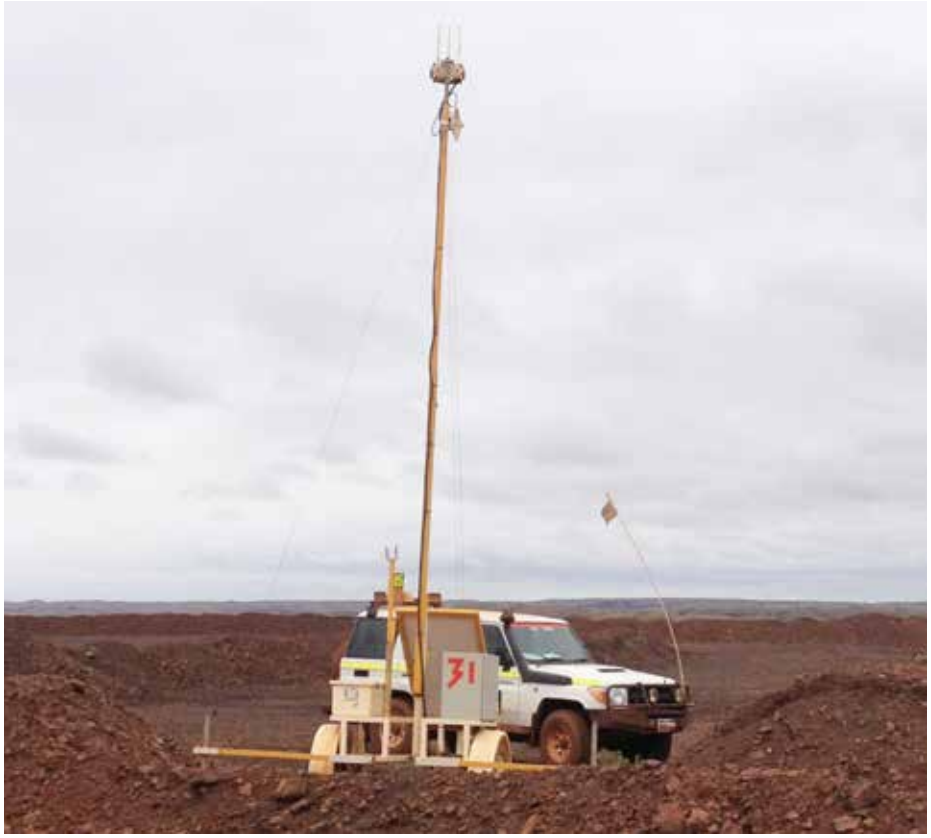


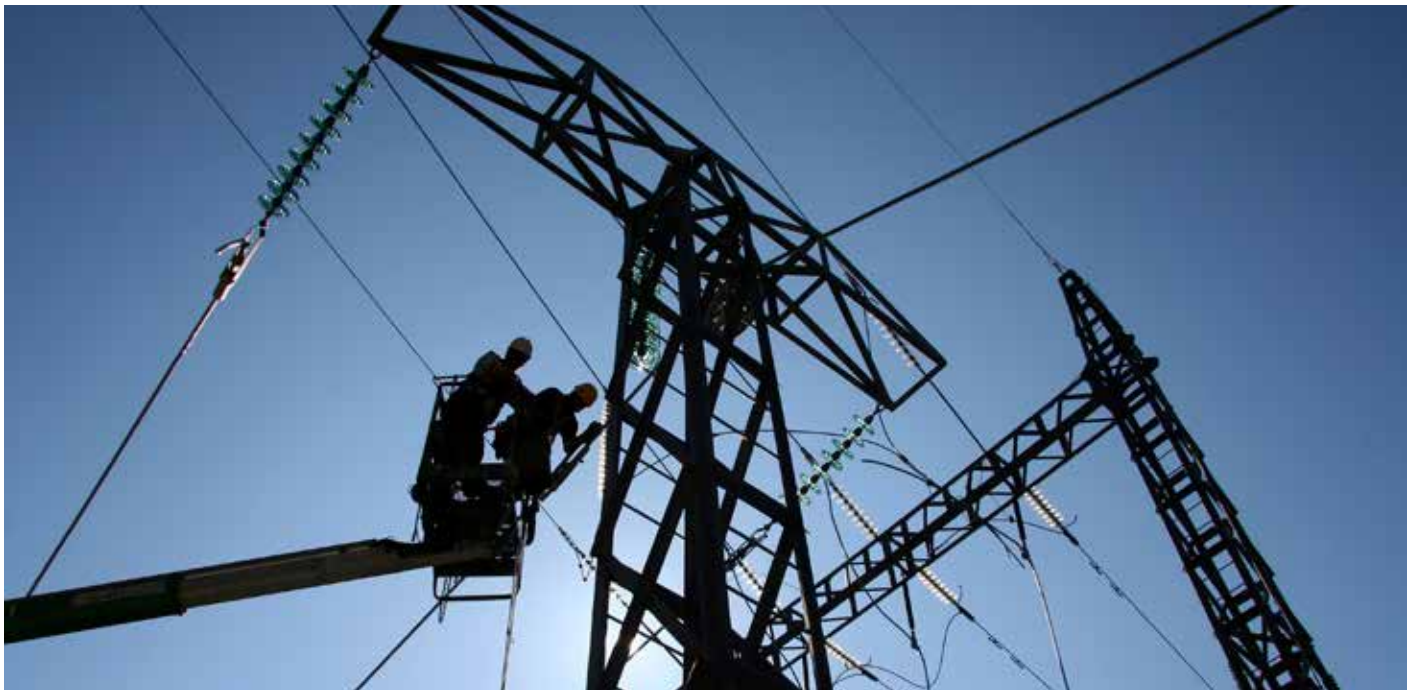
Routers deployed on trailers "discover" each other automatically and provide ubiquitous coverage for the entire pit.



Seamless mobility in the Tropos wireless network is achieved through make-before-break connectivity.

Black Hills selects Ventyx enterprise asset management solution

US energy company will deploy Asset Suite across transmission and distribution operations.



Black Hills operates a vast system of T&D assets

The diversified energy company, Black Hills Corporation, will to deploy Ventyx's leading enterprise asset management (EAM) solution, **Ventyx Asset Suite**, across the utility's transmission and distribution (T&D) operations. Black Hills is replacing its myriad existing systems with Asset Suite to modernize and optimize its T&D operations as part of a broad "Utility of the Future" initiative.

"[We are] upgrading systems and processes across our operations to fulfill our commitment to provide safe, reliable and affordable energy in a manner that protects the environment, improves customer service and adds value for our shareholders," said Ivan Vancas, VP of Operations Services at Black Hills. "Optimizing our sizable T&D operations, which have grown significantly through acquisition in recent years, is vital to our Utility of the Future initiative. We need business partners who share our vision, understand our unique challenges and offer innovative, scalable solutions that can be expanded as we continue to grow. We feel that Ventyx will be a great partner in this endeavor."

Black Hills will roll out Asset Suite in a phased approach across its gas and electric utility operations, serving 777,000 customers in seven states.

Standardizing on a single asset management system will enable Black Hills to optimize asset management processes companywide and leverage economies of scale. Black Hills' goal is to provide a full, clear view of the company's vast T&D asset infrastructure and the workforce maintaining it – thereby helping to reduce downtime, extending the operational life of the assets and minimizing the total cost of ownership.

"As the world's leading provider of enterprise asset management solutions for T&D utilities, Ventyx understands the demands on these companies to manage widely dispersed assets, and often aging infrastructure, amid continually changing safety and environmental regulations – all while working to improve customer satisfaction," said Ventyx EVP Global Sales Daryl Rolley. "Visionary energy companies like Black Hills invest in the technology needed to overcome these challenges today and prepare for the demands of tomorrow."

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Issue
3/2014

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