

Network Manager News

News and Information for Users of Network Manager™ Worldwide

Volume 1, no. 1

October 2003

Welcome to Network Manager News!

With the introduction of Network Manager, the common release of ABB's RANGER and SPIDER systems, there is also a new "common release" of the newsletter. Network Manager News is intended for all current Network Manager, SPIDER and RANGER customers. Each issue will inform you about what is happening with the product, report on recent projects, and provide a look at general market trends.

One of the main objectives for the newsletter is to support and boost experience exchange between customers. To that end, ABB is encouraging the Network Manager user community to submit topic ideas and articles about your experiences (photos always appreciated). The idea is to make Network Manager News as relevant to your daily work as possible.

SPIDER users familiar with the SPIDER newsletter will notice we have a new look, and a wider audience as well. Some things remain the same, however—the newsletter will still be distributed quarterly via email. To add someone to the distribution list, contact editor Bob Fesmire (bob.fesmire@us.abb.com).

We hope that you will find Network Manager News to be both useful and enjoyable, and we look forward to hearing your feedback.

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Network Manager to Run East China Power Grid

The East China Electric Power Group Corporation (ECEPGC) serves 195 million people in the city of Shanghai and the provinces of Anhui, Jiangsu, Fujian and Zhejiang. One of five state-owned groups that oversee provincial power companies, ECEPGC was selected to pilot test the first open energy market in China. Early in 2003, ECEPGC signed a contract with ABB to provide Network Manager for the SCADA/EMS capability and its SABLE Market Manager to provide the framework for the region's wholesale power market.

When complete, the ECEPGC control center will act as a nerve center for 64 RTU links, hundreds of substations, and ICCP connections to the EMS systems of four adjacent regions. The various applications will be accessed via fifteen Network Manager consoles—with all information displayed in Chinese—and will be run on redundant servers to ensure reliability.



As an early delivery system, ABB will provide the ECEPGC with the necessary components to run the day-ahead market to enable the organization to begin preliminary market tests, evaluate proposed market rules on a pilot-project basis, and to train its staff and market participants in the process and methods of managing the electricity market. ECEPGC's goal is to have a fully operational market within 12 to 18 months from the project's inception. The early delivery system is scheduled to be implemented in April of 2004, with the complete market-ready system slated to go live in mid-2005.

ComEd Implements CADOPS and Network Manager Systems

In August, ABB completed factory acceptance testing on an integrated Network Manager/CADOPS Outage Management System (OMS) solution for Chicago, Illinois based Commonwealth Edison (ComEd). The project marks the first time these leading products have been integrated.

"The current version of our Operator Dispatch System dates from the early eighties," notes ComEd Manager of Strategic Projects, Brian Willemsen. "It could not accommodate functionality such as mobile data collection, and it had very little connectivity with the rest of our systems. We also wanted to streamline our operations more, so it was clear we needed a new solution."

SIDA Class Pays a Visit to ABB



In September, ABB hosted a group of 24 engineers from 22 countries as part of a course arranged by SIDA (Swedish International Development Cooperation Agency). The week at ABB's Västerås location ended a term that included three weeks of classes at the Royal Institute of Technology in Stockholm and one week of visits to electrical installations in Sweden.

In addition to presentations and demonstrations of ABB's systems, the visit provided the students with the opportunity to have informal dialogues with ABB staff. Some of the topics covered during the presentations included: Network Manager Power Applications, Utility Data Warehouse, Asset Management, Data Engineering, Substation Automation and Systems Maintenance. ABB's Lars Trogen organized the event and succeeded in creating an atmosphere of learning and cooperation. Västerås is looking forward to the class of 2004!



John O'Shea, ABB Vice President of Operations, notes, "The ComEd project has given us an opportunity to build a seamless integration. This is a great example of how our customers really drive our product development, and how work on one project benefits the entire user community."

The first phase of the CADOPS system went online for training in June. Now with FAT completed on the CADOPS portion, the project team is looking forward to having the fully integrated production system online early in 2004.

Network Manager to Control Electricity Distribution for Stockholm Subway

SL Infrateknik AB, operator of Stockholm's municipal subway system, will soon replace existing outdated systems with Network Manager for centralized control of the electricity distribution to all of the enterprise's rail-bound traffic. At the same time SL Infrateknik will establish an enterprise-wide technical standard for users of the control systems. This move improves flexibility for the organization and makes training personnel much easier and less expensive in the long term.

The control system solution offers optimal operation and disturbance analysis for the entire monitored plant. Analysis of the distribution network supports optimal and smooth operation under normal operating conditions as well as during disturbances. Network Manager provides a consistent and unified GUI that facilitates the workflow that SL Infrateknik needs. The system also integrates with other subsystems outside the electricity supply in order to establish a complete and scalable monitoring environment for all users.

YIT Building Systems, an ABB partner, will deliver an advanced and geographically dispersed fiber optic communication system as well as all station work and material. The communication structure will be scalable, with switches providing both redundancy and high performance channels for data communications.

Close to 100 new RTU560s will be installed in substations, each equipped with PLC functionality to support autonomous control functions. The data communication will utilize the IEC standard 60870-5-104 protocol via distributed as well as centrally located PCU400 communication servers.

"The project for SL Infrateknik is of great importance to us, and we will spend all efforts to secure an excellent project implementation and final hand-over", says Lars Engdahl, Sales Manager at ABB Sweden. "The system is planned for operation during the summer of 2005. Further, ABB hopes the project will form the basis of a continuing long-term cooperation with SL Infrateknik".



Product Update

The first release of Network Manager—being released this month—contains a wide variety of enhancements aimed at improving the user interface, interoperability as well as application performance.

New User Interface

Our new Windows-based GUI is a step up from the previous UNIX-based interface and makes the product easier to use and integrate into the enterprise. Network Manager now also has a Web client for one-line diagrams and alarms.

As an option, Network Manager is available with a Data Engineering Toolkit that utilizes the object-oriented CIM data model. The Toolkit is based on the ESRI ArcEditor GIS platform and includes a variety of data import, export and manipulation tools.

Integration

Network Manager now supports enterprise application integration using adaptors to several popular middleware products. It has also been seamlessly integrated with several other ABB products to deliver a new level of functionality for specific market segments.

For distribution management, we've linked Network Manager to ABB's CADOPS distribution information and outage management system. On the generation side, ABB's gimsplus GenCo Information Manager can now be populated with data directly from Network Manager, greatly improving the timeliness and depth of information available to wholesale power market participants. And for market operators, ABB's SABLE Market Manager is now integrated with Network Manager to provide a complete solution for managing energy markets and the physical systems that underlie them from a unified set of applications.

In addition we've added support for approximately ten new RTU protocols.

Other Enhancements

Many of the applications in Network Manager have undergone improvements since the last releases of SPIDER and RANGER. Some of these include:

- Automatic Generation Control – supports jointly owned units, multi-area AGC, wind generator simulation
- Outage Scheduler – supports grouping of outages into jobs that can be created, deleted, modified, stored and printed in HTML and XML formats
- Service Information System – records and stores operational information. It assists the operators to perform their daily tasks and includes a service diary, work order clearance as well as a message generator.
- Network Analysis – supports seasonal limits in network applications, determines flow gate limit violations, and standardizes time stamp handling

For more information on Network Manager, contact Anders Bjorkman, anders.bjorkman@us.abb.com, +1 408-615-6364, or your current ABB representative.



TransGrid Implements New Integrated SCADA/EMS

Clive Binnie, Project Manager, TransGrid

TransGrid is the State-owned corporation responsible for the management and development of the high voltage electricity transmission system in New South Wales (NSW), Australia. We transmit electricity across NSW through 12,016 kilometers of high voltage transmission lines operating mainly at 330kV but also employing 500kV, 220kV and 132kV. Our high voltage electricity system also comprises 76 substations and power station switchyards.

Our original SCADA system was progressively installed between 1981 and 1986, to provide remote monitoring and control of substations and power stations throughout the State, from three regional control centers and one State control center.

The system had been very reliable, but became difficult to maintain, and we were not able to expand it to connect new RTUs. With the advent of Australia's National Electricity Market, more modern

technology was also required to achieve a reliable data link to the market operator NEMMCO. Under the National Electricity Code, TransGrid must provide SCADA data for the NSW market region, including data from generation and distribution companies. We must also pass on generation controls from the NEMMCO AGC.

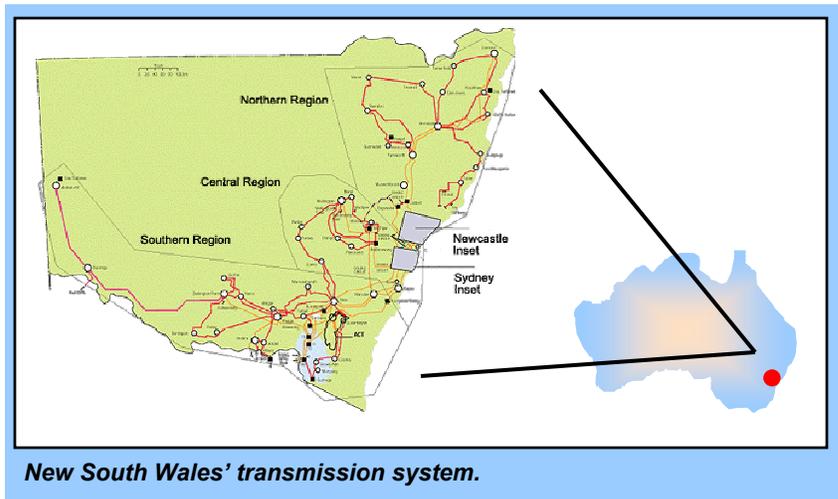
A separate Energy Management System (EMS) was commissioned in the early 1990's. This system runs State Estimation, Contingency Analysis and Operator Power Flow applications.

In October 1998 we signed a contract with ABB to replace the SCADA and EMS with a single integrated SCADA/EMS system that replaced the master equipment and data concentrators in the Control Centers. The existing RTUs were retained, necessitating emulation of the legacy RTU protocol.

The new SCADA/EMS has been in service since May 2002. Cut over of the single-ported RTUs was completed in April 2003. EMS applications are currently being commissioned. While the project did not meet the original challenging delivery target (to be in service before the 2000 Olympic Games in Sydney), the system has proven to be very reliable since going into production, and has achieved a high level of operator acceptance.

The new SCADA/EMS System

The system uses SPIDER release 8.8, an Oracle-based Historical Information System (now called UDW) and RCS 300 Remote Terminal Gateways (based on Vxworks).

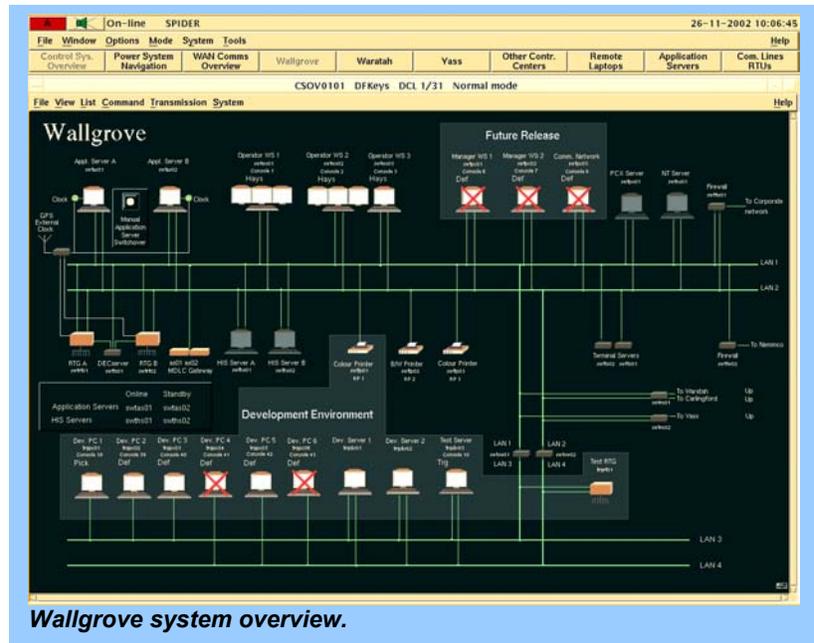


The system consists of three major operating sites: Wallgrove (Sydney), Waratah (Newcastle) and Yass. These sites are connected by WAN links in a delta configuration for redundancy. There are dual Remote Terminal Gateways (RTG) at each site to connect the RTUs in that Region.

The primary server site is Wallgrove, a suburb on the outskirts of Sydney, which is the Central Region and State control center. Here dual-redundant SCADA/EMS servers (Alpha 1200) and dual Historical Information servers (DS20) are connected via dual LANs. The “warm” disaster recovery site is located in Waratah (the Northern Region control center), and contains the same server configuration as Wallgrove. Switchover to operation from Waratah requires a 5-minute SCADA outage.

All three sites have three operator consoles (two 3-VDU consoles and one 1-VDU console). Wallgrove also has two additional 3-VDU consoles for the State Controller.

The system provides SCADA services for a third-party hydro generation scheme, so there are also operator consoles at Kangaroo Valley and Bendeela.



Wallgrove system overview.



Wallgrove includes a Data Engineering System for maintaining the database and displays (IDES/RDE), as well as a Test System (single Alpha 1200 server with a test RTG to which test RTUs can be connected). RTUs can be simulated using the PC-based ASE Test Set, which can emulate both DNP3 and the legacy RTU protocol. Control room consoles use Compaq UNIX workstations while non-control room consoles utilize PCs running Windows NT.

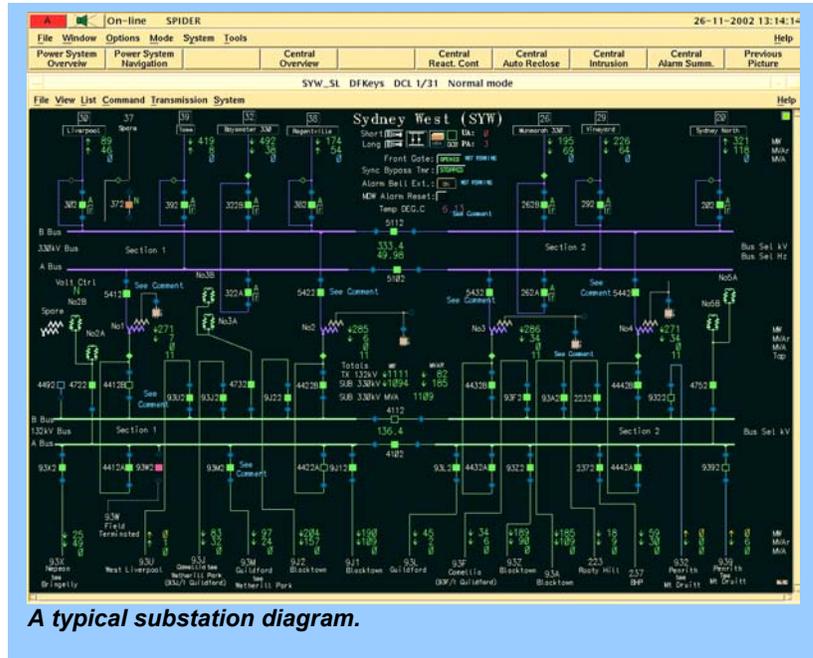
The SCADA uses its own dedicated LAN/WAN for security. This is connected to external systems including NEMMCO and the TransGrid Corporate network through firewalls at Wallgrove and

Waratah (separate duplicated firewalls for each connection).



The integrated SCADA/EMS provides the same broad functionality as the previous SCADA and EMS, but the new system also delivers some additional benefits.

Unlike the previous hierarchical SCADA, all operators can view the full power system. Ability to operate (e.g., open a CB) is subject only to appropriate authorization. There are no inherent capacity limitations, so additional RTUs can be connected as needed, and the system is scalable for future growth beyond current planning levels.



The full-graphics HMI and large-screen wallboard support provide enhanced ability to move between a broad overview of the power system and detailed views of particular sites. Historical SCADA information is more readily accessible, allowing greater use of this valuable corporate resource. The Limit Manager application enables efficient handling of equipment limits that vary according to time of day and season (as is typically the case for the overhead transmission lines).

There is now a full-function disaster recovery system (Waratah), and the system uses mostly standard hardware, so the ability to maintain, expand and upgrade is improved. As well as supporting the legacy RTU protocol, the system supports the industry standard DNP3 protocol. All future RTUs will “speak” DNP3, and the existing heritage RTUs will be replaced over the next 3 years. Similarly, the system supports the industry standard ICCP (TASE.2) protocol for data links to other SCADA systems. This is currently used for communications with NEMMCO, and will be used for links to Distribution Authorities in the future.

The ability to replay incidents on the single-line displays has proven to be a valuable tool for post-event analysis. The new EMS includes a new Short Circuit Analysis application with real-time monitor and study modes. Once EMS implementation is complete, there will be only one system to maintain instead of two at present (and three during the transition!)



Major Outages Bring Reliability Issues Front and Center

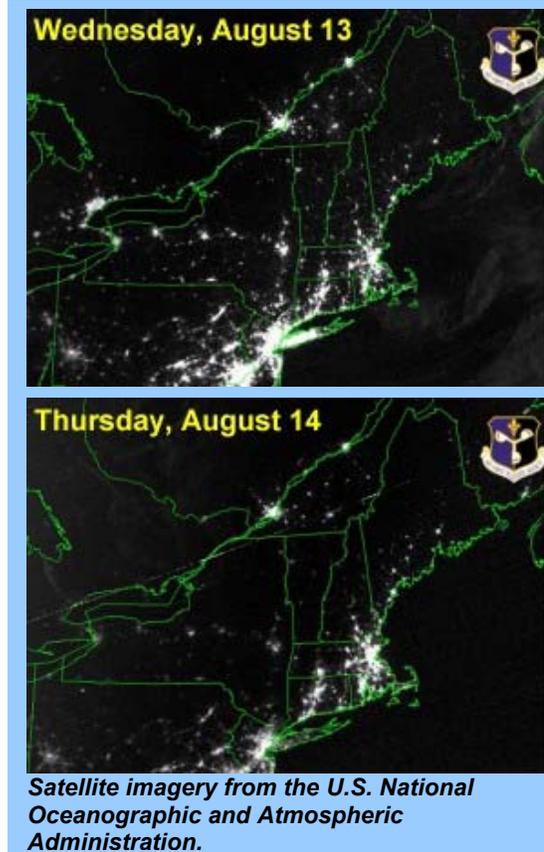
Since the August 14 North American power outage, the U.K., Sweden, Denmark and most recently Italy have all suffered similar disruptions, prompting regulators and industry leaders worldwide to reconsider the reliability of their power systems. Specifically, the NY Time has reported that the state estimator at the MISO was not working and this situation would have impacted the ability to assess the voltage stability margin.

As for the U.S. outage, certain facts have surfaced since the joint U.S.-Canadian task force began its investigation. Perhaps the most compelling is that no single monitoring entity had a comprehensive picture of what was going on leading up to the outage. The Midwest ISO (MISO) and PJM Interconnection both hold “jurisdiction” over utilities in the region, but those organizations did not have any formal information exchange process in place. Similarly, MISO had to rely on phone calls from its member utilities in several instances to find out about downed lines and tripped generation units.

A lack of real-time data, as well as the procedures and technologies to share it, made the grid operators vulnerable to the confluence of events that occurred on August 14. Specifically, the New York Times has reported that the state estimator at the MISO was not working and this situation would have impacted the ability to assess the voltage stability margin. It should be noted, however, that armed even with the best intelligence, MISO still did not have the authority to order its member utilities to take specific actions in the operation of their equipment.

It is clear now that there is room for improvement in grid security. Technologies like intelligent protective devices and load shedding systems, better state estimator programs, wide area monitoring systems (WAMS), and flexible AC transmission systems (FACTS) can all help. The other side of the equation is in knowledge and procedures. Utilities and grid operators should take this opportunity to perform a rigorous re-assessment of their security applications and procedures, benchmark themselves against best practices, and create a roadmap to implement enhancements.

A number of articles have also mentioned that First Energy may have had some computer security issues that could have contributed to the blackout. The U.S. FERC has issued updated *Security Standards for Energy Market Participants*, which is the first step in creating a new regulatory structure for improved computer system reliability. Hopefully it will also mark the beginning of a vigorous debate on how to ensure reliability in the shifting energy marketplace that so many countries are now experiencing.



Nordic User Group Meeting Goes Medieval

As the attendees of the Nordic User Group sat down to lunch on the opening day, the meeting took on a very different feel when the worst power outage in 20 years hit Sweden and Denmark. Lunch proceeded by candlelight while an estimated five million people were left without electricity. The national grids and utilities began restoring electricity within a few hours and by evening most consumers were back online.



In spite of this, the User Group meeting began with a presentation of Network Manager and the latest development, delivered without the aid of PowerPoint slides by Tommy Carlsson, Manager for Customer Support. Other ABB presentations were devoted to customer values, new products and features that would be presented in more detail at Sydkraft's facilities the next day. The session was ended by a presentation of experiences from the recent system upgrade at Elkraft Systems of Denmark, by Soren Bolberg.

In keeping with the medieval conditions, the attendees enjoyed dinner at the historic Landskrona Castle, built during a time when there was little concern for electricity distribution and light and heat came from the sun and open fires. The evening started with a welcome by the Count of the Landskrona Citadell, and continued with two groups of attendees competing in the traditional high jump and in responding to questions asked by the naughty bishop.

The second day brought a visit to Sydkraft Elnäts to see the new Control Center that operates their 130 kV lines as well as their MV and LV networks. Sydkraft is installing a new Network Manager system. The system is not yet fully functional, but was still fully capable to assist in the analysis of the previous day's outage. Sydkraft put Network Manager to the test, and it showed excellent performance during this relatively limited disturbance. The system received 3,000 events during the first three minutes and 25,000 during the first three hours.

"The system managed to cope with all these events. We were given the support that we need by our control system, and we could operate the power system to satisfaction," said Peter Sigenstam, Sub-project Manager at Sydkraft Elnät.

After this initial presentation, attention turned to the Eldorado project that Sydkraft runs together with ABB. Demonstrations of the functionality were given as well as discussions on the benefits that Sydkraft expects to realize in implementing an integrated distribution management system for its widespread distribution network.

Thanks to Bengt Tore Sondh, Sydkraft's Project Manager and the honorable host for this year's User Group. As we start to assemble topics for next year's event, ABB welcomes an ongoing dialogue with our users and customers.



Events Calendar

Date	Event	Location
Oct 13-15	POWER-GEN Middle East	Abu Dhabi, UAE
Oct 19-22	Network Manager Users Group Meeting	Houston, USA
Oct 20-22	PSC2003 - 18th Int'l Power Systems Conference	Tehran, Iran
Oct 22-23	SCADA Systems for the Energy Sector	London, UK
Nov 11-14	APSCOM2003 - Advances in Power System Control, Operation and Management	Hong Kong, China
Nov 11-13	POWER-GEN Latin America	Sao Paulo, Brazil
Nov 26-27	Network Manager User Group Meeting	Saarbrücken, Germany
Dec 2-3	EBL Nettkonferensen 2003	Oslo, Norway
Dec 8-10	GCC Power 2003	Muscat, Oman
Dec 9-11	POWER-GEN International 2003	Las Vegas, USA
Dec 10-13	PowerCon2003 IASTED International Conference	New York, USA
Dec 16-18	2003 International Middle-East Power Systems Conference	Shebin El-Kom, Egypt
2004		
Jan 14-15	Energi & IT 2004	Gothenburg, Sweden
Jan 20-24	DistribuTECH 2004	Orlando, USA
Mar 10-11	Russia Power	Moscow, Russia
Apr 19-24	Interkama	Dusseldorf, Germany
Apr 27-28	Distribution Europe 2004	Amsterdam, Netherlands
May 25-27	Eliaden 2004	Lillestrom, Norway
May 25-27	POWER-GEN Europe	Barcelona, Spain
Sept	Network Manager User Group Meeting (date and location to be announced)	Norway

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Coming in the Next Issue...

Our next issue of Network Manager News will be published in January 2004, and will include additional coverage of the major outages in Europe and North America, as well as our regular features. To submit articles, contact the editor, Bob Fesmire at bob.fesmire@us.abb.com.

