

Real Time data for network management and metering at Bord Gáis Distribution

Bord Gáis Distribution Business Unit, the Irish Natural Gas Distribution Utility, has implemented real-time IT to meet the dual requirements of network pressure monitoring and remote daily metering. Deregulation of the Irish Natural Gas Market has caused changes in requirements for the management of Natural Gas distribution. The distribution utility has deployed Wonderware Historian real-time database with remote data acquisition, alarming, archiving and a multi-user web browser interface. The resulting system has produced significant management improvements and provided cost savings whilst maintaining high levels of customer service and a safe natural gas distribution network for the general public.

Distribution Natural Gas Networks are constantly monitored

Following deregulation, the Natural Gas Distribution business was faced with new business boundaries. These involved step-by-step accountability in the system, and a need to balance the consumption of gas in the system that is allocated to a particular registered gas shipper's customer. In addition to remote metering for revenue billing, Bord Gáis also required a system that would allow

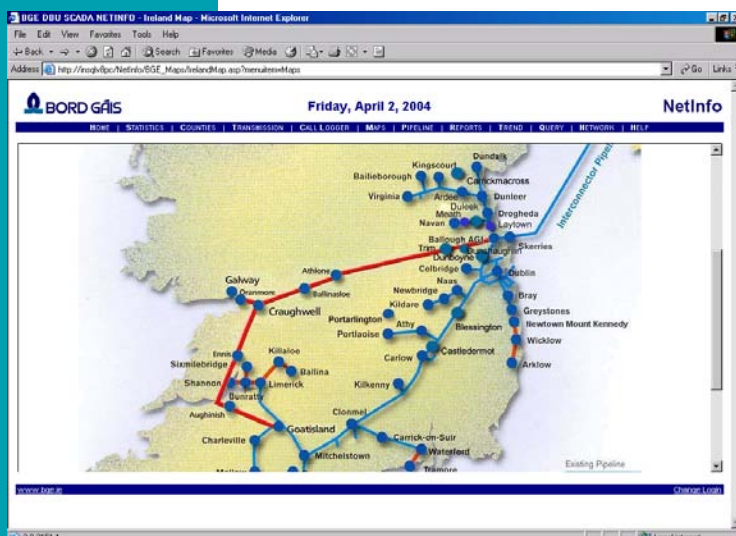
up to and including 4 Bar supply pressure. Consumers are categorised as being Industrial & Commercial (I&C) users or as being Domestic. Large I&C users are remote metered daily, smaller I&C and domestic meters being read monthly and bi-monthly by traditional means.

Pressure and Flow...

The complete system has therefore two facets, Pressure Monitoring of medium and low pressure distribution networks and Daily Metering of large Industrial & Commercial end users.

At the heart of the system is Wonderware Historian real-time database. The functionality required by the application needed features that are available in Wonderware Historian to allow data to that is acquired in real-time but to be automatically placed in the data tables at a later time yet still in correct chronological order.

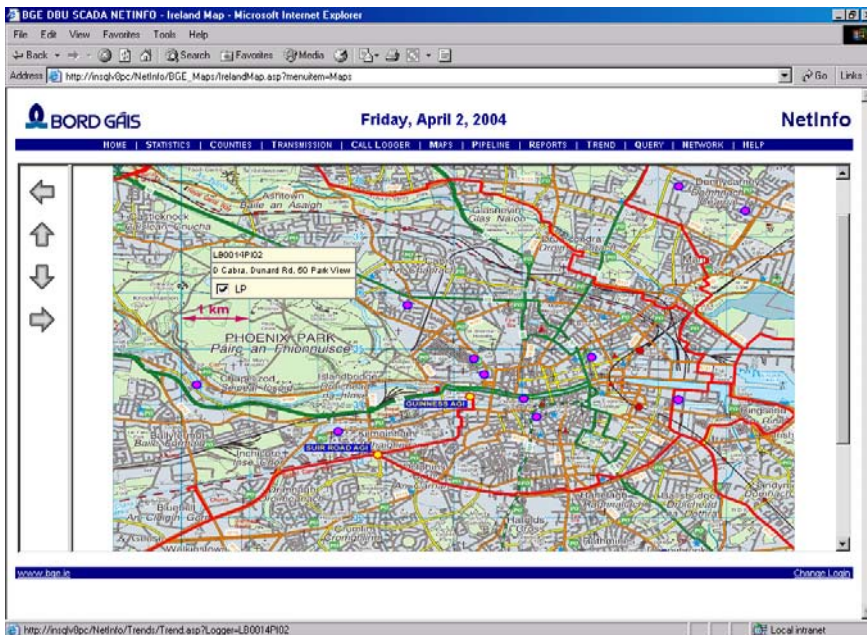
Pressure monitoring involves remote data loggers that are connected by analogue modems over PSTN lines. Cumulative values are read every 6 minutes and received by a logger interface module; this generates CSV files that are date and time stamped. Using the MDAS (Manual Data Acquisition Server) module this information is inserted into the Wonderware Historian data record in the



Bord Gais network

pressure monitoring for operational and safety management.

The Bord Gáis Distribution Business Unit is responsible for all services and installations



Gas network superimposed on a city map - with hot spots

correct chronological order.

Daily Metering uses remote data loggers with onboard intrinsically safe GSM modems. Gas consumption is recorded at hourly intervals to a resolution of one standard cubic metre. The system operates on a daily upload cycle over the GSM mobile network via SMPP protocol to a GSM server. The information is provided to the logger interface module, the resulting CSV files also being handled by the MDAS module to ensure correct chronological data placement in the Wonderware Historian database.

The Wonderware Historian data is manipulated by standard SQL stored procedures coded by NeoDyne, a Wonderware Ireland authorised system integrator. Wonderware's ActiveFactory software reporting tool is used to convert the data into the information that is required by particular users. This information is made available using ActiveFactory software's web publishing tool, access being via the Bord Gáis corporate LAN through standard browsers using the standard Microsoft® security model. The resulting real-time information provides a complete picture of the pressure profile of the entire distribution gas network. The Gas Controllers can direct call-out teams to any location that requires attention, provided with detailed information from the system.

Visualisation and Alarms...

The Distribution Natural Gas Networks are constantly monitored, events and alarms being announced by InTouch HMI SCADA displays directly connected to the Wonderware Historian data and to the pressure monitors.

These monitors also send a priority interrupt signal when low pressure is detected, making the Gas Controllers immediately aware of any potential problem.

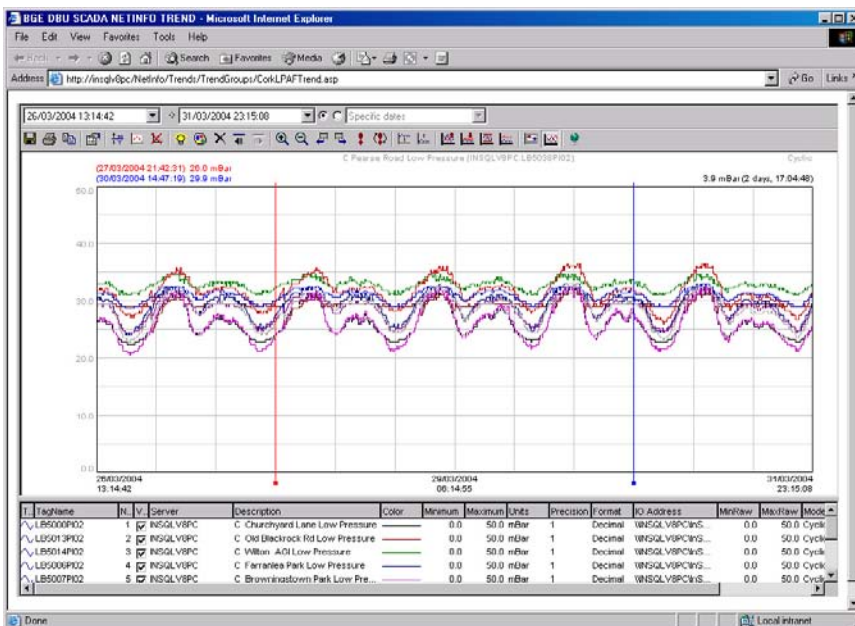
From any point in the system a browser can provide detailed insight into the pressure map of the entire network. This is invaluable in fault detection and for checking remedial work. Principle reasons for gas leakage are construction work leading to "dig-ins" and topographical movements caused ground settling when surface loads change, Bord Gáis has set high standards in its design for and response to such events, the system providing a rich source of diagnostic information.

Gas pressure has to be maintained above a minimum value to be safe in its use in burners, damaged pipes can be one reason for pressure loss, but so can a loss of upstream pressure on the input to the Bord Gáis Distribution Networks from the High Pressure Transmission Network. The Bord Gáis Transmission SCADA system that monitors this system is now linked to the Bord Gáis Distribution SCADA through a 128kbit/sec dedicated line. The data from Transmission SCADA is accessed using OPC Link and is placed in the Wonderware Historian history tables using the IDAS (Industrial SQL Data Acquisition Server) module. IDAS ensures the correct chronological order is maintained for the Wonderware Historian data, even when the data flow is interrupted (the remote SCADA nodes still acquiring data in such an event), IDAS facilitating the "store & forward" action. The acquired data is monitored in real-time and alarm conditions are displayed on the Gas Controller's InTouch HMI displays.

All about the data...

The data in the Wonderware Historian is a critical component of Bord Gáis business, for safety and for metering. The database is duplicated using two servers; changeover being a simple instruction to the web publishing server to point to the new Wonderware Historian server for its data source, users being almost unaware of this changeover. This is done using Microsoft Internet Information Services 5.0.

Wonderware Historian handles archiving of data and provides fast and convenient access to all historised data when this is required. Through this the Board of the company can be assured that their correct running of the distribution system can be witnessed by the detailed archive pressure readings and will



Detailed Trend Displays

always provide confirmation of their due diligence.

Wonderware Historian handles archiving of data and provides fast and convenient access to all historised data when this is required

In addition to being at the heart of the development of the system, Neodyne is the contracted support company. This involves weekly and monthly scheduled tasks and participation in ongoing development and system extension. Through the monthly reports Bord Gáis avoids any risk of “system stagnation”, in that the investment that has been made is visible and is seen as a key tool in providing the high service levels that the company delivers.

Appendix

The project is reviewed monthly by Neodyne and Bord Gáis; this has resulted in progressive development of the information that is extracted from the system. ActiveFactory software web interface has been used extensively by Neodyne to produce reports of the condition of equipment in the many outstations in the Gas Network; this allows maintenance to be planned rather than be reactive. A current task is to utilise Wonderware Information Server to publish InTouch HMI network overview displays to large wall mounted screens for control room overview of the whole system across Ireland.

Wonderware Ireland wishes to thank the following companies for their valued contribution to this success story...

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