



A Rockwell Automation Company

## IMC Kalium Colonsay Mine PLC-based Peak Load Shaving

### The Client:

IMC Kalium is a multinational fertilizer manufacturing company operating seven potash mines throughout Canada and the United States. The Colonsay Mine is an underground potash mine and mill located near Saskatoon, SK Canada. The mine uses the room and

pillar mining method with continuous mining machines at the face and a conveyor system to move the ore to the shaft. It has a capacity of 1,400,000 tons of muriate per year. Production began in 1969 and has a remaining mine life of 120 years.

### The Requirement:

The client wanted to co-ordinate power usage among it's four potash mine sites in the province. A central site was to control which devices at each mine were to be turned off for a short time when a new 'peak power' usage for the month was in danger of being set. Power usage at industrial sites in Saskatchewan is based on the maximum amount of power used in a 20 minute

moving window in time. There is a base rate specified in the SaskPower contract, then larger amounts of power set a new peak. This project was designed to have the Colonsay mine adjust its power usage as required to minimize the peak demand charges over time.

### The Design Solution:

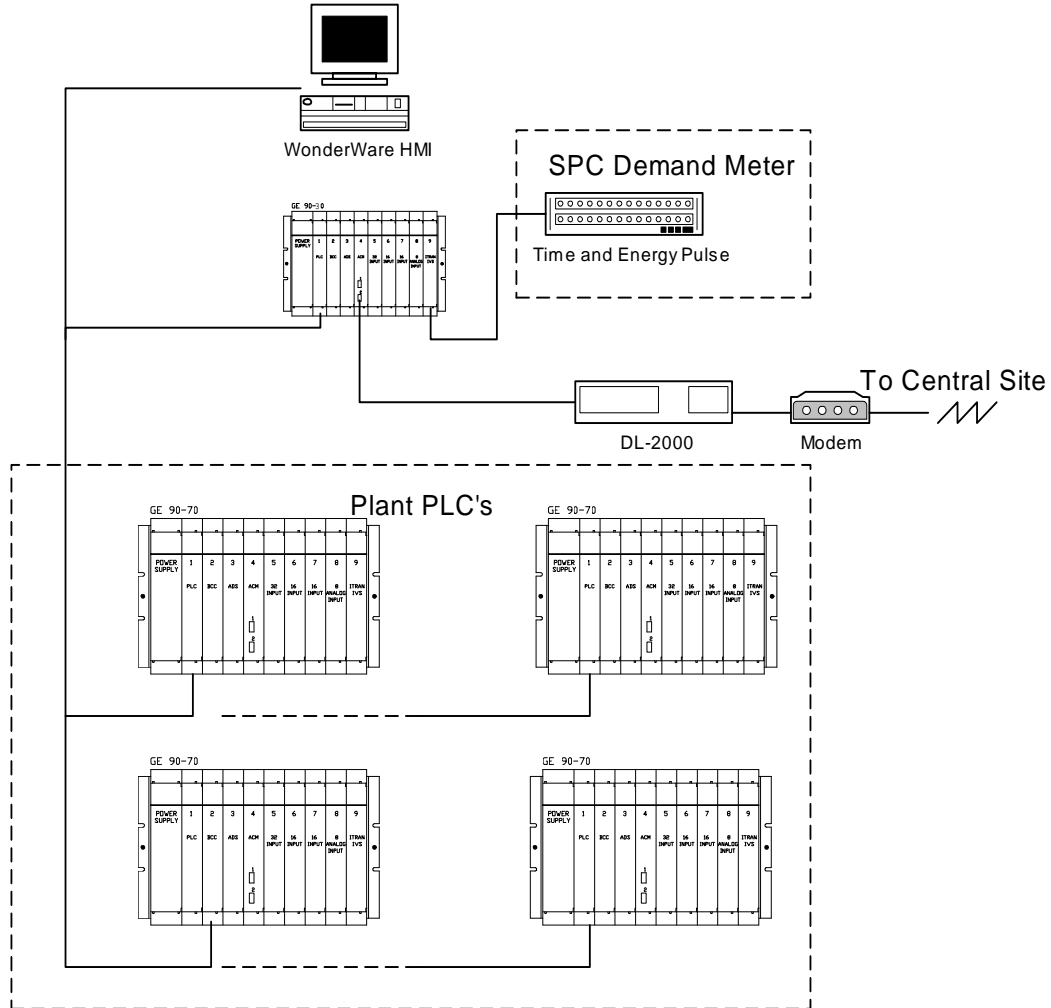
Communication between the sites was designed into a previous project which set up messaging between the different PLCs at each site and gave the central site the power usage status of each site. At the Colonsay mine, a GE 90-30 PLC implemented an algorithm to reduce power usage at the site according to priorities as set by the shift supervisor. The shift supervisor used a dedicated screen running the Wonderware HMI to change these priorities in the 90-30 PLC. When a power adjustment was requested by the central site, the 90-30 PLC sends messages to each local controller on the plant-wide Wide Area Network to turn off the lowest priority devices to approximate the reduction in energy usage requested. After a short period of time, the PLC checks to see if the energy usage has dropped. If it has not dropped sufficiently, the PLC sends messages to turn off the next lowest priority devices. This process continues until all devices that can be

turned off have already been turned off. At that point, a message is returned to the central site that the projected power usage will exceed the target by a set number. The central site can then command other sites to compensate by turning off their electrical loads. There is no feedback to the Colonsay PLC on the running status of much of the underground equipment, so the PLC does not actually know which equipment is running at any given time. This feedback will be added in future projects and will both reduce the amount of time that it takes to reduce the power usage and make the system more accurate. The system is now tuned to turn off one more device than are absolutely required in order to ensure that a new peak power is not set. In the future the feedback will mean the additional device will not be turned off.



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## System Specifications:

- GE 90-30 PLC
- Communication to the central site via corporate WAN and DL2000 DH+ to Modbus translator
- Communication to plant controllers via plant-wide WAN
- Pentium 100 PC with 64 MB Ram, 4 GB Hard drive
- Wonderware HMI 32000 tag system
- 4 screens

For further information or to contact a Hinz office near you, please check our website at:

[www.hinz.com](http://www.hinz.com)