



A Rockwell Automation Company

IMC K2 Power Monitoring System

The Client:

International Minerals and Chemical Corp. (Canada) Ltd. is a wholly owned subsidiary of IMC Fertilizers Group Inc. IMC operates two potash mines (K1 & K2) in southern Saskatchewan, Canada. IMC K2 was the second of the two

mines built in the mid 1960's. The combined output of K1 and K2 is 4.2 million tons per year. The mineable ore body has a remaining life of over 50 years.

The Requirement:

There was a desire by IMC to have a system that would allow better monitoring of the power consumption of the mine. The information was needed both for internal power usage control as well as for controlling costs and cross referencing to the Utility billing.

The system would be required to receive input data from Var and Watt transducers located in electrical equipment around the mine. The equipment was to be divided into a number of different user groups. This would allow for historical trending and forecasting of loads for each user group as well as for the overall mine.

The desired system would be required to receive a synchronization pulse from the Utility and then capture and display data for the duration of the Demand window. The system would be required to shed non-essential loads in order to meet the target demand levels.

The system was to use industry standard components including Allen Bradley PLCs and Operator Interfaces. This requirement was essential in order for the system to be able to retrieve much of its data from existing I/O on other PLC systems within the mine.

The Design Solution:

The Power monitoring system consists of an Allen-Bradley PLC 5/15 programmable controller interfacing with the existing dispatch PLC system for data acquisition and real-time analysis. In addition to this, the operator interface is implemented using the Allen-Bradley Advisor PC graphical interface.

The raw analog inputs are multiplied by the voltage and current transformer ratios, to calculate the actual live kW and kVAR values for each monitored load. The live load calculations calculate kVA and power factor (p.f.) from the live kW and kVAR signals.

A user group load distribution is used allowing total kW and kVAR to be calculated for each user group. From this information, kVA and power factor are also calculated for each group. All of this information is available to the operator on screen and on the system status report.

The system stores the instantaneous and cumulative peak kW and kVAR levels, as well as the time and date of occurrence for the whole mine, and for each user group. In addition each of the user group's loads at the time of the system wide peak is stored. The operator is able to monitor the current accumulated demand (for the current interval) on screen.

The system begins counting down a twenty-minute period upon receipt of an interval pulse from the Utility metering system. This is zeroed upon receipt of the next interval pulse

from the Utility system. The time remaining in the interval is displayed to the operator.

The system totalizes kWh and stores the previous month's total for the main 72 kV feeder into the mine site, as well as for each user group. These totals appear on the monthly report.

A simple forecasting algorithm is implemented in an attempt to forecast the system wide demand peak for the period. This forecast peak is used to calculate the maximum load allowed to attain the demand target. The system requests shedding of anonymous loads of sufficient value to insure the mine does not exceed the demand target. These loads then stay disabled until the synchronization pulse arrives from the Utility equipment, upon which the loads may be re-enabled. An alarm is generated whenever a load is shed or re-enabled. An alarm is generated upon overshoot of the demand target. The system takes into account demand free periods such as holidays and off peak hours and allows the target to be exceeded during these periods.

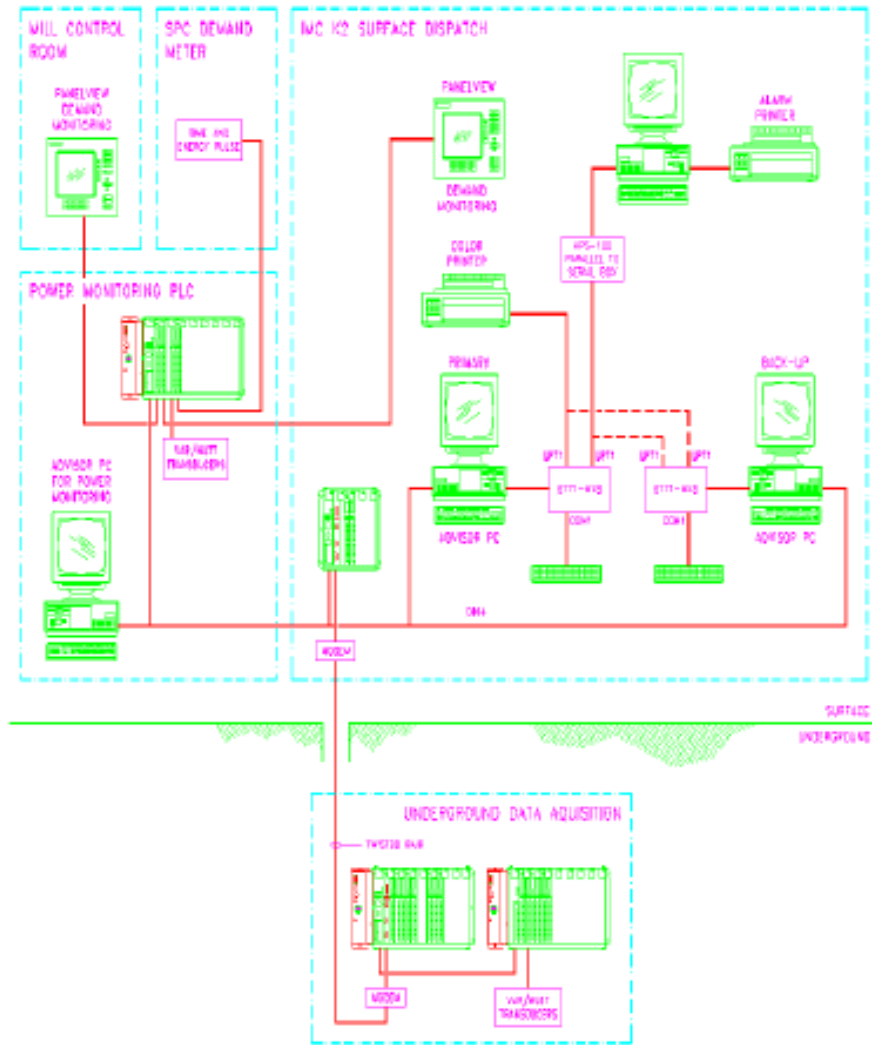
Data logging is performed by the Advisor Data Logger, and provides historical data retrieval for each period's peak demand, for each user group and the main mine 72 kV feeder.

The system has shown that the recorded demand equals the demand reported by the Utility.



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System Specifications:

- Allen Bradley PLC 5/15
- Allen Bradley Advisor PC Operator Interface
- Allen Bradley PanelView Plant Floor Terminal

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

www.hinz.com