



A Rockwell Automation Company

McCain Foods Limited Coaldale French Fry Plant

The Client:

McCain Foods Canada Ltd. is a part of the McCain Foods Group of Companies in Canada. Head office is located in Florenceville, N.B. The Coaldale French Fry Plant is McCain's first fry plant in Alberta and complements 4 other Canadian fry plants. McCain

produces green vegetables, desserts, pizza, juices and beverages, oven meals and other processed and frozen foods but is best known for their French fries. One of every three fries consumed in the world is made by McCain.

The Requirement:

The Coaldale French Fry Plant has the capacity to produce 33,000 pounds per hour (15 metric tons per hour) or 200 million pounds (91 million kilograms) of potatoes annually. The plant produces straight cut French fries and specialty potato products for the western Canadian, US and overseas markets. The plant can also produce batter-coated French fries.

Raw potatoes are brought into the plant in the receiving area where they are washed to remove plant material, dirt and rocks. To make the best possible use of the raw materials the potatoes are next sized. Large potatoes are separated for use on French fry production lines. Smaller potatoes are used in specialty items or French fries not requiring long length. Peeling and scrubbing comes next; high pressure steam loosens the potato skins. Any remaining skin is removed by automated brush peelers. The potatoes then move to the trimming area where gross defects are removed by hand. The final stage before cutting is pre-heating, where the potatoes are slightly softened by heating them in water. This vital step prevents the potatoes from shattering

during the cutting process. The potatoes are sent through a set of knives and are cut into fries of the desired dimension. Defects are removed from the freshly cut fries using a sophisticated electronic system that detects dark spots and triggers a series of knives that slice away the defective spots. The fries are then graded by length before moving to the blanching process where they are dipped in warm water to deactivate enzymes that can cause discoloration. The fries then move through a dryer, where warm air is circulated to quick dry the surface of each fry, before they are deep-fried by the fryer. Pre-cooling and freezing come next followed by length grading and final inspection. The finished fries are ready for packaging and are then placed in cold storage in preparation for shipping.

This entire process is monitored and controlled with a distributed PLC/HMI system. This control system also operates the utility systems for steam generation, refrigeration and waste water treatment as well as facility subsystems including HVAC and lighting.

The Design Solution:

McCain Foods is a strong supporter of Rockwell-Allen-Bradley motor control products, variable speed drives, PLCs and HMI systems. Hinz in Calgary provided electrical design services for the facility that included construction contract co-ordination and site inspection.

Electrical power to the facility is provided by TransAlta Utilities, who constructed a new 25kV line to the site. The Utility provided the 7.5 MVA service transformer that supplies power at 5kV to the plant medium voltage switchgear. The switchgear has feeders for: the following

- 5kV MCC, that services 2500 HP of refrigeration compressors
- twin 2.5 MVA, 480 V unit subs
- a 400 kVA feeder to the waste water treatment system

Two 2.5 MVA silicon oil filled transformers were integrated to custom 480 V unit substations by Babco Electric. These unit subs are located indoors in the center of the plant building to minimize the length of the high current feeders. 18 Allen-Bradley MCCs located in four electrical rooms perform motor control for 560 motors, 120 of which have variable speed drives that were mounted in the MCCs by Allen-Bradley.

The main 5kV transformer and the 480 V unit sub transformer

have high resistance grounded WYE secondaries to limit ground fault currents and the resulting damage potential.

Special project considerations included attention to designs to enhance cleanliness by equipment location to limit traps for debris and allow for easy cleaning, high levels of illumination, and the use of materials compatible with different ambient conditions throughout the plant.

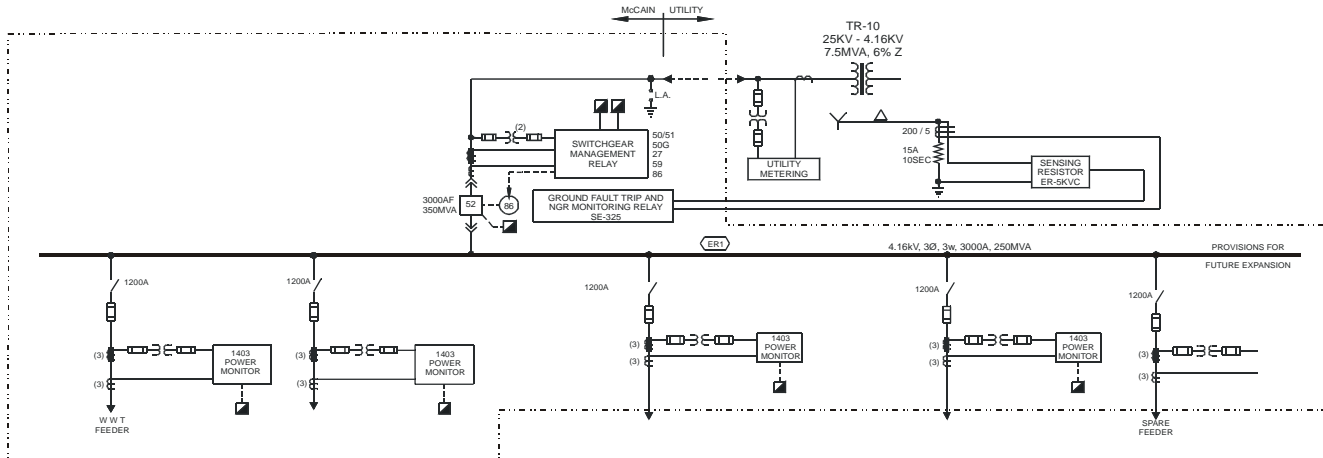
Structured wiring design encompassed a facility LAN with a fiber optic backbone and 178 drops in combination with the wiring for the digital telephone system. The control system uses 51 PLCs and numerous 'smart devices' that are networked with more than 20 data networks.

The design and construction of the plant used a sequential schedule that required multiple electrical work packages to be produced. Over 200 electrical drawings were generated and 7 work packages assembled. Scope included managing the bid process for all major electrical equipment and construction work packages and preparation of requisitions for purchase by the customer. A Hinz Site Manager coordinated the work of the three electrical construction contractors with head office design and procurement activities as well as with the other construction trades on site.



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System Specifications:

- 7.5 MVA main service
- six 4160 V refrigeration compressor motors (2500 HP combined)
- 560 low voltage motors
- 120 Allen Bradley VSDs
- 190 sections of Allen -Bradley MCC
- 51 Allen-Bradley PLCs
- 3150 hardwired I/O
- 17 Digital power meters on RIO and Modbus
- 6 Multilin motor protection relays on Modbus
- 19 scales on RIO, LOMA, ARCNET
- 8 Allen-Bradley PanelView HMIs on Data Highway
- Fiber Ethernet LAN with 178 drops
- 200 electrical drawings

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

www.hinz.com