



A Rockwell Automation Company

Shamrock Seeds Ltd. Shamrock Seeds Cleaning Plant

The Client:

Shamrock Seeds Ltd. is a Saskatchewan-owned and operated company which processes peas for export. Peas grown throughout the province are trucked to one of two cleaning plants where they are cleaned and sorted, for export to Southeast Asia. The first cleaning

plant has been operating near Foam Lake SK and a new larger facility was planned for Saskatoon which would include receiving of product, cleaning, and color sorting.

The Requirement:

The cleaning and color sorting equipment in the Saskatoon facility needed to be controlled and monitored so that operator involvement would be minimized. This would allow the operator to supervise the receiving of peas, and check the effectiveness of the cleaning or sorting processes without worrying that another part of the plant was in a fault condition. A fault condition would include a surge hopper running empty or too full, or a motor failure in one of the machines.

The machines in the cleaning section can't always be matched for flow rate. Differences in the grade or size of product being cleaned can change the flow rate of good product through each piece of equipment. Without automated control, the operator must check each part of the process and manually stop and start particular equipment to ensure an acceptable flow is

available to all equipment. The cleaned product is stored in one large bin. When this bin is full, the cleaning process must stop in an orderly manner as some equipment should empty during a shutdown, while some should never run empty.

The color sorting section of the plant works on clean product only. All of the cleaned product is run through color sorting machines which remove any peas that do not fall within the required color range. The good product is transported to a single large bin ready for packing, and the product removed is stored as reject product. If either of the two storage bins fills during the sorting process, the color sorting must stop. Since the color sorting process is much slower than the cleaning, the color sorting runs almost 24 hours when needed. The plant is not manned around the clock, so automatic shutdown is necessary.

The Design Solution:

A PLC is to aid in monitoring and stopping or starting equipment when necessary. A graphic system is to allow monitoring of the entire facility from one location, and allow alarm logging. With a PLC and graphic system, both cleaning and sorting processes can be started from one location and monitored as it starts and stops automatically based on flow rates and bin levels.

An Allen-Bradley SLC 5/03 with two thirteen slot racks and an Intellution FIX graphics package were selected. The bin levels are monitored by Miltronics level probe equipment which include a Modbus communication protocol. A SLC Modbus protocol module is installed to retrieve data from the Miltronics units. By having all data tied directly to the SLC, the FIX terminal becomes a view window into the control

system.

In order to maintain an even flow through the equipment, two VFDs are installed. The first controls the initial feed from a bin. The second controls the flow through the initial cleaning machine which can remove large or small amounts from the product stream.

A modem is installed to allow programming or monitoring of the PLC program from remote locations. A second modem is installed into the graphics terminal to allow a graphics interface from a remote location. The modems follow the idea of not having operators at the facility around the clock and interaction only when desired.



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System Specifications:

- 4 Graphic Screens
- 1 SLC 5/03
- 2 13 Slot Racks
- 225 Digital I/O
- 2 Analog I/O
- 2 VFDs

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