



**MANUFACTURING AUTOMATION TEAM**

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**PROJECTS**



## BOX PLANTS

**DAPACOR**

*Brgy. A. O. Floreindo, Panabo City,  
Davao del Norte*

### REHABILITATION OF CORRUGATOR



#### WIRING FOR CORRUGATOR 2 UPPER AND LOWER STACKER AND PYRO DOUBLEBACKER

Digilution installed the wiring of Pyro and Corrugator Machines from Machine Panel to Field Devices, and from DC Motors to Main Panel.

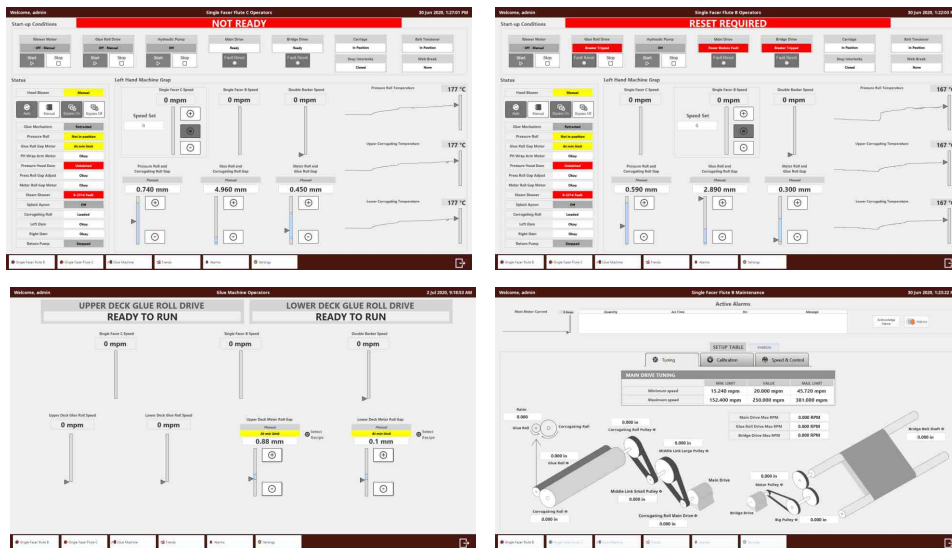
## BOX PLANTS

**DAPACOR**

Brgy. A. O. Floreindo, Panabo City,  
Davao del Norte

### GLUE MACHINE AND SINGLE FACER CONTROL SYSTEM

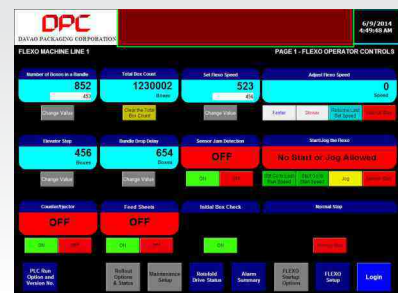
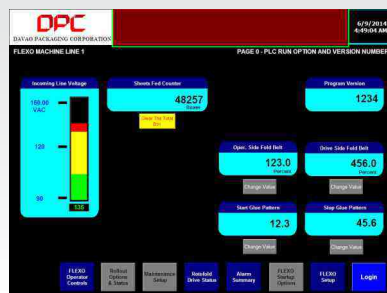
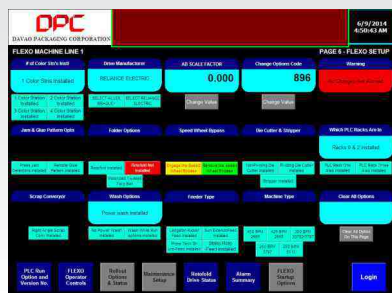
DAPACOR has acquired a corrugator line from another company and needs to rehabilitate it. Digilution created this system with a CompactLogix programmable controller and an Ignition software 8.0.1. Digilution was able to create new screens and write a program similar to how their corrugating line works. Digilution modified DAPACOR's program for Single Facer B & C, while the program for the Glue Machine was created back to square one.



### SINGLE FACER CONTROL SYSTEM

Dapacor's Single Facer machine was starting to give them problems and they needed to replace its control system in order to better support it. Both the controller and HMI were obsolete and did not have any documentation which made it difficult to support. Digilution replaced this system with a ControlLogix programmable controller and a PanelView Plus 1500. Digilution was able to create new screens and write a new program using just the electrical drawings as a guide.

This machine was critical to the plant since it produced the material to be used by the other machines in the plant. If this machine did not run then the whole plant was shut down. Digilution was able to install the new system over a weekend shutdown, and the plant was back in full production on Monday with no problems.



## POWER PLANTS

**EDC (Energy Development Corporation)**  
**Mindanao**

Brgy. Ilomavis, Kidapawan City,  
North Cotabato



### M1 & M2 DATALOGGER MAINTENANCE

Digilution yearly services the system update and maintenance of M1 and M2 Dataloggers. The objective of the PLC (Programmable Logic Controller) Datalogger (CLX-1 and CLX-2) used on this project is to collect raw data from the field devices and turn it into a readable data to the user with the help of a server and the FT Historian Software. Digilution also upgraded their hodge-podge of aging components for M1 and M2's Monitoring and Data Collection System.



## POWER PLANTS

**EDC (Energy Development Corporation)**  
**Mindanao**

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North Cotabato

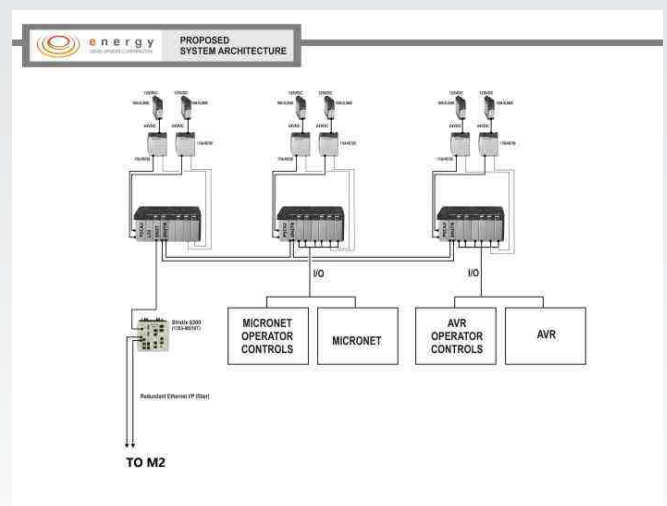
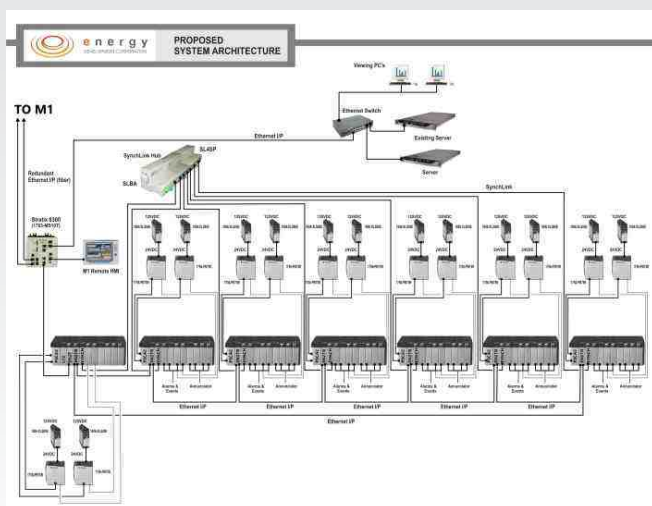
### M1 & M2 DATALOGGER MAINTENANCE

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### I & II DATA LOGGING AND SYSTEM CONTROL

The control systems for the Mindanao I and Mindanao II geothermal power plants consisted of a mixture of independent third party devices that were not that compatible with each other. Some of these devices were already obsolete, and the others were not far behind. EDC needed a new system to replace these, and since they are producing electricity for the Mindanao electric grid, downtime is very limited to the yearly maintenance shutdowns that are allowed by the National Power Corporation. The whole system could not be replaced within the time allotted by these shutdowns.

Digilution designed a system and came up with a phased installation plan that would be implemented over a span of five years. Existing devices would be replaced in pieces during the maintenance shutdowns, and the new system would need to be able to interface with the remaining devices that were still in place. Furthermore, the new system would be enhanced so that the control systems of both plants would be tied together and controlled from one central control room.

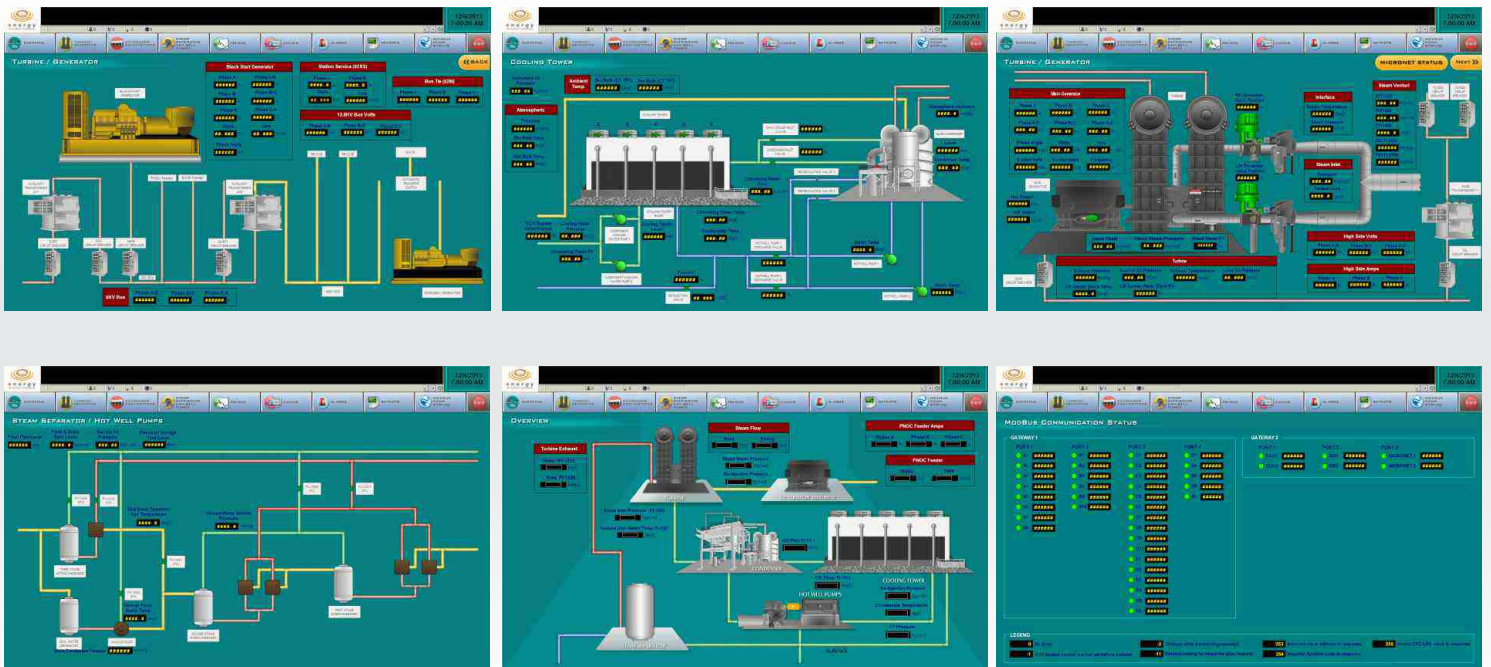


## POWER PLANTS

### EDC (Energy Development Corporation) Mindanao

Brgy. Ilomavis, Kidapawan City,  
North Cotabato

The new system is based on Rockwell's FactoryTalk and ControlLogix platforms. FactoryTalk Historian was used for the data collection system, and FactoryTalk View SE was used for the SCADA system. ControlLogix programmable controllers were used for the control systems, and a couple of PanelView Plus 1500 for the local HMI's. The SCADA system and Historian were installed in a central server, with local operator interface stations connecting to this server as clients. The two plants were connected to each other via a fiber optic connection.



### SEC (Sarangani Energy Corporation)

National Highway, Barangay Kamanga,  
Bayan ng Maasim, 9502 Sarangani

## PLC PREVENTIVE MAINTENANCE AND SCADA SYSTEMS

Digilution serviced the improvement of PLC (Programmable Logic Controller) preventive maintenance and SCADA systems security access privileges. Digilution conducted PLC/HMI (Human Machine Interface) cleaning, PLC SCADA test run and function test, and repaired network problems. Some of their SCADA systems were also enhanced by Digilution.



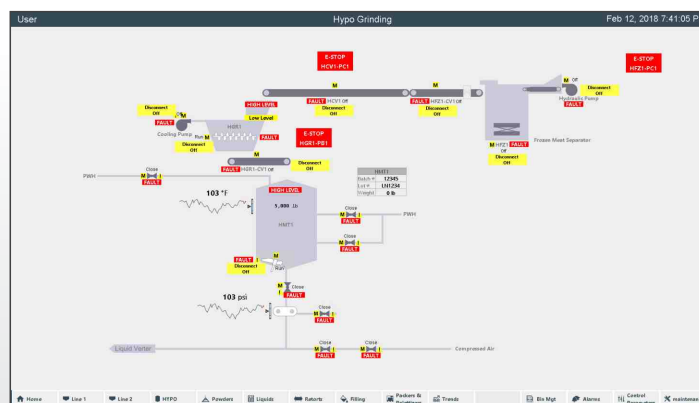
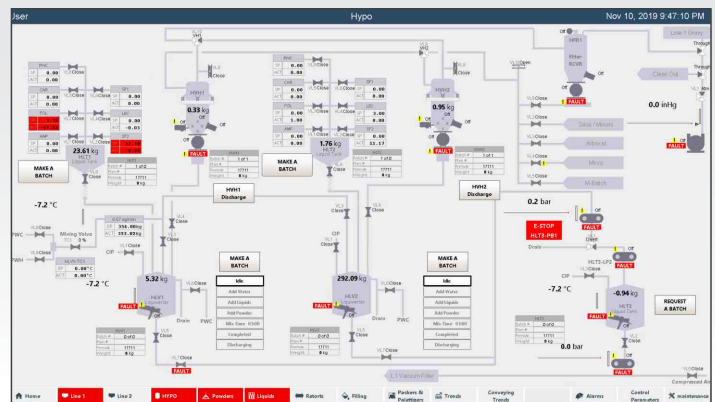
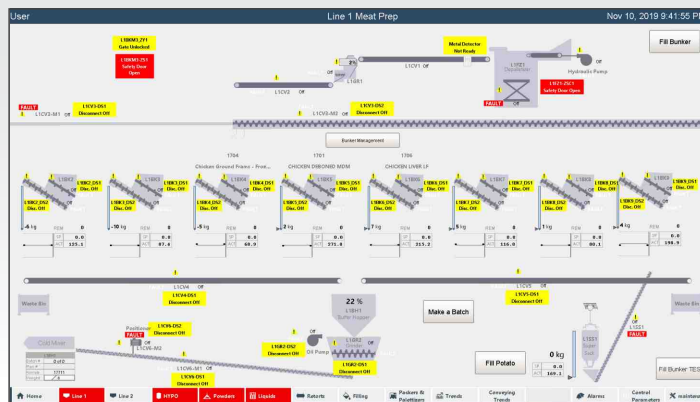
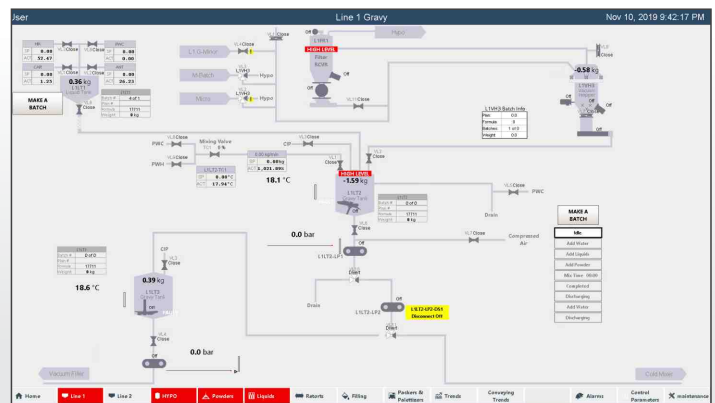
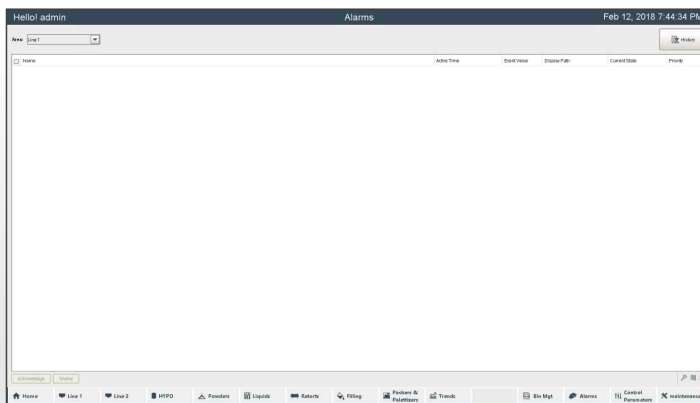
## PET FOOD PLANTS

**ROYAL CANIN**

630 North Derby Lane,  
North Sioux City, SD 57049

### LEVEL 1 AND 2 FACTORY CONTROLS

Royal Canin initially has Line 1 and Line 2 in their production lines in the new wet pet food plant. Digilution was able to create a control sequence and operational procedures for these production lines. Level 1 and Level 2 factory control systems consist of many Programmable Automation Controllers (PACs), an Operator Interface system to provide equipment control, process monitoring, and operator interface.



## PET FOOD PLANTS

### SATURN PETCARE

93 E. Dallas Dr. Terre Haute, IN 47802

### FACTORY CONTROLS

Saturn Petcare needs a Management Execution System (MES) to be implemented to their new pet food plant. Digilution created a system that will be used to utilize the Ignition SCADA platform with specific respect to tracking, tracing, quality, data collection and process enforcement. In addition, the system also made use of third-party MES modules such as the Track & Trace and Barcode Scanner modules.

**OVERVIEW** Friday, 08 May 2020, 1:07 pm

**ORDER SUMMARY**

CUSTOMER ORDER: 988  
 RECIPE: 10007  
 Batch Setpoint: 100.000 lbs  
 Current: 12.000 lbs  
 Finished: 20.000 lbs  
 Batch: 1/100  
 Cans Produced: 1000  
 Production Time: 1:00:00

**RAGOUT**

MIXER 1	HOLDING TANK 1	HOLDING TANK 2	MIXER 2	HOLDING TANK 3	HOLDING TANK 4
Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:
BLENDER 1	BLENDER 2	EMULSION HOPPER	STEAM TUNNEL		
Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:
FILLER 1	FILLER 2	BASKET LOADING	RETORT 1	RETORT 2	RETORT 3
Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:
RETORT 4	RETORT 5	RETORT 6	BASKET UNLOADER	LABEL APPLICATOR	TRAY PACKER
Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:	Order No.: Batch No.: Batch Weight:
PALLETIZER					
Order No.: Batch No.: Batch Weight:					

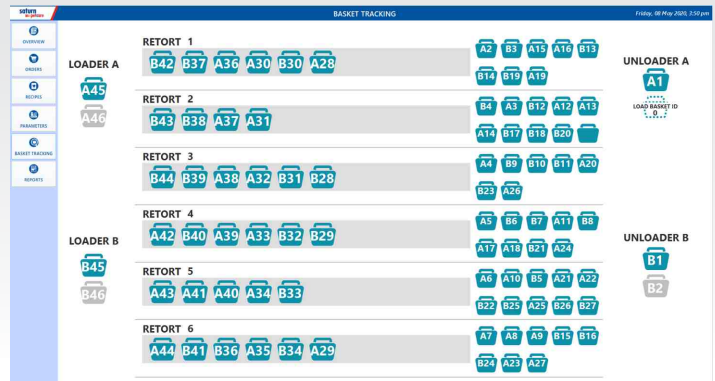
**RECIPES** Friday, 08 May 2020, 1:07 pm

Upload from PLC

ID NO.	RECIPE NAME	QTY.	INGREDIENT	SETPOINT

**PRODUCTION PARAMETERS** Friday, 08 May 2020, 1:07 pm

MIX TANK 1	MIX TANK 2	BLENDER 1	BLENDER 2
Temperature: Mix Time: Standing Time:	Temperature: Mix Time: Standing Time:	Temperature: Mix Time: Standing Time:	Temperature: Mix Time: Standing Time:
RETORT 1	RETORT 2	RETORT 3	RETORT 4
Temperature: Mix Time: Standing Time: Recipe/Family Code:	Temperature: Mix Time: Standing Time: Recipe/Family Code:	Temperature: Mix Time: Standing Time: Recipe/Family Code:	Temperature: Mix Time: Standing Time: Recipe/Family Code:
RETORT 5	RETORT 6		
Temperature: Mix Time: Standing Time: Recipe/Family Code:	Temperature: Mix Time: Standing Time: Recipe/Family Code:		



**ORDERS** Friday, 08 May 2020, 1:07 pm

Process Order	Scheduled Start/End	Target Qty.	Unit of Measure	Date start	Date end	Actual Qty.



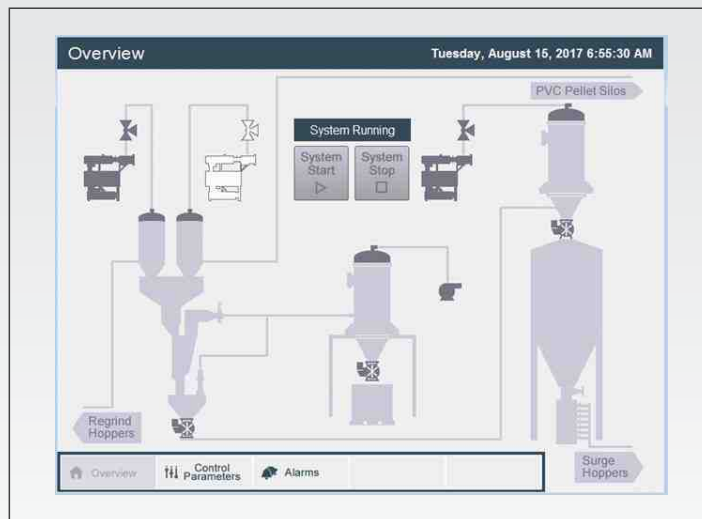
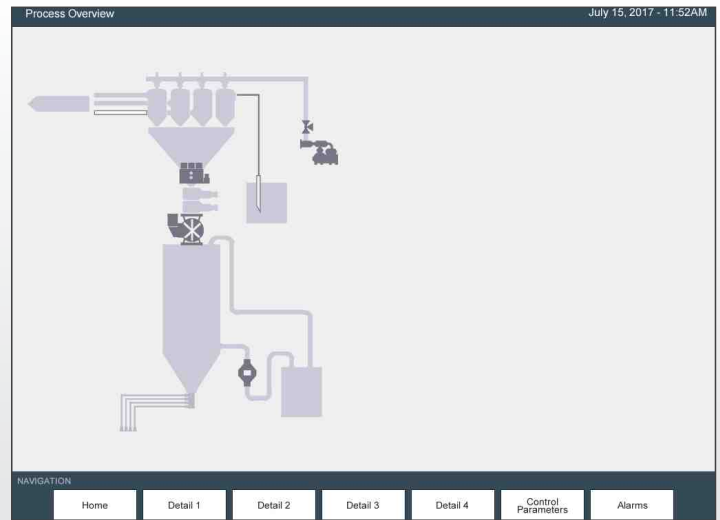
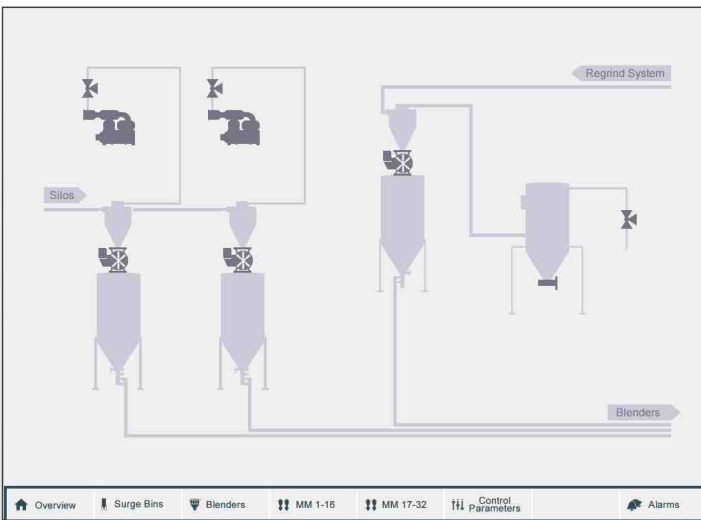
## COMPOUNDING PLANTS

### CHARLOTTE PIPE

Cedar City, Utah & Monroe, North Carolina

### MATERIAL HANDLING SYSTEM

Charlotte Pipe needed a material handling system using vacuum conveying to supply materials to the compounding mixer, and deliver the mixed batch from the mixer to the extrusion lines.



## COMPOUNDING PLANTS

### SILVER-LINE PLASTICS

950 Riverside Drive Asheville,  
NC 28804

### PNEUMATIC CONVEYING AND COMPOUNDING SYSTEM

Silverline needed a compounding system that will cover procedures for operating their mix system. Digilution set up a process control computer that is used to control the actual equipment based on the operator input and strategies preprogrammed in the computer. Digilution created this system with a CompactLogix programmable controller that is used to control silo diverter valves and CaCO3 conveying system and a PanelView Plus 1000.

**Recipes**

- B SIDE PRIME
- C00100 PVC COMPOUND SMALL DIA 165 WAX
- C00120 PVC COMPOUND LARGE DIA
- C00200 PVC COMPOUND CC SKIN
- C00220 PVC COMPOUND CC SKIN
- C00210 PVC SMALL DIAMETER CC FOAM K-416
- Extra Slab
- FOAM@ 3.00 PHR 610&101 .36 & 18.481
- PRIME 6310
- SINGLE BATCH SKINS
- XTRA STAB RECIPE

RECIPE NAME: \_\_\_\_\_

**MINOR INGREDIENTS**

	Minors #1	Minors #2	Minors #3	Minors #4	Minors #5	Minors #6	Hand Add
Ingredient Name	Polyethylene	BHEOLLURE@HONEYWELL	-Select One-	-Select One-	-Select One-	-Select One-	-Select One-
Short Name	PE	R/H					
Setpoint	55.00 lbs.	980.00 lbs.	0.00 lbs.	0.00 lbs.	0.00 lbs.	0.00 lbs.	0.00 lbs.
Tolerance	0.00 lbs.	0.00 lbs.	0.00 lbs.	0.00 lbs.	0.00 lbs.	0.00 lbs.	0.00 lbs.
Discharge Order	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**LIQUID**

	TIO2
Ingredient Name	HONEYWELL 429A
Short Name	
Setpoint	0.00 lbs.
Tolerance	0.00 lbs.
Discharge Temp.	0.00 °C

**BULK INGREDIENTS**

	RESIN	CAC03	STABILIZER
Ingredient Name	HONEYWELL 429A	HONEYWELL 429A	HONEYWELL 429A
Short Name			
Setpoint	0.00 lbs.	0.00 lbs.	0.00 lbs.
Tolerance	0.00 lbs.	0.00 lbs.	0.00 lbs.
Double Batch	0.00 lbs.		

**CHECK SCALE TOLERANCE**

0.00LBS

**DISCHARGE TEMPERATURE**

Minors	0.00 °C
CaCO3	0.00 °C
Mixer	0.00 °C
Cooler	0.00 °C

**Order Info.**

Select Recipe

Recipe Name

Auto Start Pause

Resume Abort

Actual Batch:

Batch Set Point:

Select Recipe

**Recipes**

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- XTRA STAB RECIPE

OK Cancel

## COMPOUNDING PLANTS

### RHETECH COMPOUNDING

*Whitmore Lake, Michigan*

#### COMPOUND BLEND FACILITY AUTOMATION SYSTEM

This project is a complete retrofit of three existing extrusion lines. Line I consisted of an existing single screw extruder and a new pneumatic conveying system. A PLC 5/20 was used to control feeding material to the extruder using supply hoppers, blend stations, weigh scales, and mixers. Line II consisted of a new twin screw extruder, a new pelletizer system, and a new material handling system. A PLC 5/20 was used to perform all control functions, and for the complex interface to the K-Tron loss-in-weigh system. A CTC operator station was used for the MM I. Line III consisted of an existing single screw extruder and a new material handling system. A PLC 5/11 was used for controlling the material handling equipment.

The three PLCs were connected to two operator interface stations running Wonderware Intouch. These operator stations were used for supervisory functions such as recipe handling, system monitoring and reporting, and historical trending.

### M & W PACKAGING

*Cape Girardeau, Missouri*

#### FILM EXTRUSION MATERIAL HANDLING CONTROL SYSTEM

This project consisted of two material handling control systems for 18 film extrusion lines. These systems controlled the blending from 46 different sources of material feeding 18 extruders. This was managed by a supervisory computer with a 5000-recipe database, and inventory control, recipe handling, and production scheduling capabilities. One system fed 12 extruders, and was controlled by a Siemens 135U interfaced to 8 Hardy scale controllers. The other system (added at a later date) fed 6 extruders, and was controlled by a SLC 5/04 interfaced to 8 Hardy scale controllers. The operator interface consisted of one supervisory station, and two operator stations using Wonderware Intouch. The supervisory station accessed databases that resided in the plant SQL server.



## REMEDIATION PROJECTS KRAFT/OSCAR-MAYER Y2K

These projects involved replacing the non-Y2K-compliant operator interfaces (mostly P-CIM and proprietary) in various plants owned and operated by Kraft or Oscar-Mayer. The RSView software package was used, and the computers were upgraded to newer Pentium IIIs running on the WindowsNT platform. The following is a list of all the systems that we have done:

### **ADAIR FOODS** | *Kirkville, Missouri*

Plantwide Supervisory Monitoring System (interfaced to all the PLCs in the plant)  
SmokeHouse/ChillCells Supervisory System (interfaced to 4 new SLC 5/04s, and  
3 existing PLC 5/15s)

### **COLUMBIA FOODS** | *Columbia, Missouri*

Plantwide Supervisory Monitoring System (interfaced to all the PLCs in the plant) Hotdog Oven  
Controls HMI (2 stations configured as Master/Slave) Hotdog Prep Controls HMI (replaced with  
2 PanelView 900s)

### **COSHOCTON FOODS** | *Coshocton, Ohio*

Plantwide Supervisory Monitoring System (interfaced to all the PLCs in the plant) SmokeHouse  
Supervisory System (interfaced to 7 new SLC 5/04s) Chill Cells Supervisory and Control System  
(interfaced to existing PLC 5/40) Bacon Brine Inject System (replaced with SLC 5/04  
& PanelView 1000) Slicer Monitoring System (data collection/reporting written in VB,  
interfaced to existing SLC 5/04)

### **KRAFT FOODS** | *New Ulm, Minnesota*

Cheese Cookers Supervisory System (interfaced to 6 new SLC 5/05s)

### **LOIS RICH** | *Newberry, South Carolina*

Cookroom Supervisory and Control System (interfaced to 9 existing SLC 5/04s and 11 existing  
SLC 5/03s) Production Data Collection and Utilization Reporting (program with MSAccess  
database)

### **OSCAR-MAYER** | *Davenport, Iowa*

Basement SmokeHouse Supervisory and Control System (interfaced to 4 new SLC 5/04s)  
2nd Floor SmokeHouse Supervisory and Control System (interfaced to 2 new SLC 5/04s)  
3rd Floor SmokeHouse Supervisory and Control System (interfaced to 4 new SLC 5/04s)

### **OSCAR-MAYER** | *Madison, Wisconsin*

SmokeHouse Supervisory and Control System (interfaced to 4 existing SLC 5/04s) Spintech  
Supervisory and Control System (interfaced to existing PLC 5/15)

## CONTROL SYSTEM PROJECTS

### KRAFT CHEESE COOKER CONTROL SYSTEM

Kraft Foods needed a better system to control their cheese cookers. Their old system was based on a combination of mechanical relays and pneumatic controllers; some of the more recent ones used TI components. We designed and developed a control system using a SLC 5/05 and a PanelView 900. This new system had recipe capabilities, and used a more advance PID control scheme. We have successfully installed it in the following locations:

- 11 in New Ulm, Minnesota
- 2 in Springfield, Missouri

### OSCAR-MAYER SMOKE HOUSE CONTROL SYSTEM

Oscar-Mayer Foods needed a better system to control their smoke houses. Their old system used a proprietary controller from the manufacturer of the smoke houses. We designed and developed a control system using a SLC 5/04 and a PanelView 1400e. This new system had recipe capabilities, real-time and historical trending, and more flexibility in cook controls. We have successfully installed it in the following locations:

- 9 in Newberry, South Carolina
- 6 in Coshocton, Ohio
- 2 in Madison, Wisconsin
- 4 in Kirksville, Missouri
- 7 in Davenport, Iowa
- 6 in Sherman, Texas

### OSCAR-MAYER COOLER AND CHILL CELL CONTROL SYSTEM

Oscar-Mayer Foods needed a better system to control their cooling units and chill cells. Their old system used mechanical relays. We designed and developed a control system using a SLC 5/04 and a PanelView 900. This new system was configurable to be able to control any number of coolers. The new system had configurable defrost cycles, and used PID control as opposed to the old on-off control scheme. We also enhanced the system to have the capability of controlling chill cells with recipe control. We have successfully installed it in the following locations:

- 1 in Columbia, Missouri (controlling 12 coolers)
- 1 in Coshocton, Ohio (controlling 9 coolers and 14 chill cells; and using a PLC 5/40 and RSView)
- 4 in Davenport, Iowa (controlling a total of 30 coolers and 6 chill cells)
- 1 in Mattoon, Illinois (controlling 10 coolers)
- 1 in Sigourney, Iowa (controlling 2 chill cells)

### AUTOMATIC PRESS CONTROL SYSTEM | CARVER PRESS, INC. *Wabash, Indiana*

Carver Press wanted to automate their line of pellet press machines. These machines were widely used in laboratories. We designed and developed a control system using the Zworld micro-controllers programmed in C. The controller was integrated into the machine as an OEM package. It had recipe capabilities, automatic temperature control, and networking functions. This Auto Pellet line of presses has been sold throughout the United States.

### JAIL HOUSE SECURITY SYSTEM | INNOVATIVE CONTROLS, INC. *Toledo, Ohio*

Innovative Controls is a supplier of Jailhouse Security systems. They approached us because they needed help in developing a control system. They wanted to reduce the cost of the operator interfaces, which were usually more than 10 stations, while maintaining functionality and ease of use and maintenance. We designed and developed an operator interface using MS Visual Basic to eliminate runtime fees. We took advantage of the multitasking properties of WindowsNT and object-oriented methodology to develop a system that was easy to configure from job to job.

## PLASTICS INDUSTRY

### BLOWN FILM EXTRUSION CONTROL SYSTEM

**BATTENFELD GLOUCESTER  
ENGINEERING CO., INC.**

*Gloucester,  
Massachusetts*

This is a control system for a blown film extrusion line. The system consisted of a PLC 5/15 to control the extrusion and traversanip systems. A PanelView 1200 was connected for the operator interface. Special functionality included recipe handling in the PLC and production roll management.

### TESLIN EXTRUSION CONTROL SYSTEM

**PPG INDUSTRIES,  
CHEMICAL DIVISION**

*Barberton, Ohio*

The project is a data collection and control system for a sheet extrusion line. This line is one of only two lines in the world that produce the teslin material. Two PLC 5/15s were used to control the material handling system, extruder, oil extractor, drying oven, and still. The GENESIS Control Series was installed in three IBM industrial computers for operator graphics screens, recipe management, inventory management, and maintenance/troubleshooting screens.

## CHEMICAL & PETROCHEMICAL INDUSTRY

### PIPELINE SITE AUTOMATION SYSTEM

**WILLIAMS PIPE LINE COMPANY**

*Tulsa, Oklahoma*

The project is a system for the control of rack functions in an oil distribution site. The project implementation was based on a GE 90-70 programmable controller system. MegaBasic modules were used for communicating to the various field devices. The MegaBasic module programming was for alarm annunciation to a serial printer, for monitoring and controlling Petrocount meters, and for controlling a JUGO TID terminal used as an operator interface. These programs were designed to be configurable so that the same program would be used for all the 47 rack sites throughout the midwest.

### BATCH PROCESS REACTION CONTROL SYSTEM

**PPG INDUSTRIES,  
CHEMICAL DIVISION**

*Barberton, Ohio*

The project is a control system for a batch process reaction. A PLC 5/15 was used to control the slurry production, the reactor, and the drying and filter kettles. A PanelView 1200 was connected for the operator interface. Special functions include the capability of guiding the operator through each step of the process, and the capability for overriding and skipping steps.

## COMMUNICATIONS

### SATELLITE COMMUNICATIONS SOFTWARE

(NAME WITHHELD)

The project is a Satellite Communications software written in C. The software consisted of three time-driven interrupt modules that log and send message packets, and an interrupt driven communications module. This software was a part of a complex system to monitor and communicate to delivery trucks anywhere in the U.S.

## FOOD INDUSTRY

### R&D FAT PROCESSING CONTROL SYSTEM

OSCAR-MAYER FOODS

Corporation Madison,  
Wisconsin

The project is a control system for an R&D fat processing line. A PLC 5/15 was used to control a grinder, emulsifier, heat exchangers, and cooling exchangers. The RSView software package was installed as the HMI for graphics screens, trending, and reports.

### CHEESE BLENDING CONTROL SYSTEM

KRAFT FOODS

New Ulm, Minnesota

This is a control system for the delivery and mixing of up to 10 ingredients to make the cheese used for Kraft singles and Handi-Snacks cheese sticks. All controls were performed by a SLC 5/04, with two PanelView 1400es as operator interfaces. The old system only allowed one blend at a time since all 12 blenders shared the same ingredient sources. We designed a system with advanced scheduling techniques so that all blends could be started simultaneously if needed.

## LABORATORY SYSTEMS

### SPECIMEN CUP AUTOMATED POURING

BATTELLE LABORATORIES, INC.

Columbus, Ohio

It is mandatory for every military personnel in the U.S. to undergo drug testing on a regular basis, but the process of collecting urine samples for automated testing was too labor-intensive. So, in an effort to simplify the process, the U.S. Department of Defense awarded a contract to Battelle Labs to develop a machine to automate the transfer of urine samples from plastic cups to test tubes. Battelle Labs approached us to design and develop the control system for this machine. The system consists of an Omron PLC to control the conveyors and the test tube barcode printer. A CAVRO robot, programmed in Turbo Pascal, was used to control the transfer. The operator interface was developed in VB, and included archiving and reporting functions. It was also used as a gateway to interface the PLC to the robot controller.

### TEST LAB DATA COLLECTION SYSTEM

ADVANCED DEVELOPMENT CENTER  
COPELAND CORPORATION

Sidney, Ohio

The project is a data collection system for a cooling/heating test facility. The system consisted of six computers in an ethernet network configuration. The uMAC-1050, linked serially to the computers, was used for data collection. The GENESIS Control Series was used for data monitoring and formula calculations. Each node had a separate real-time database and operator graphics screens.



## PRODUCTION DATA WAREHOUSING

### POWER MONITORING SYSTEM

This project offers power monitoring system that primarily generates accurate evaluations of spare electrical capacity. The power monitoring system can provide assessment of data gathered from the monitoring system.

### DATA MONITORING, ARCHIVING, AND REPORTING SYSTEM | DURCON, INC. *Canton, Michigan*

This project involved developing a VB application to serve as a Data Monitoring, Archiving, and Reporting System for a batch weighing process. It consists of collecting process data such as temperatures and weights for each batch and storing them in a database on a network server. The data are obtained via DDE from a Wonderware Intouch application. A Reporting System to view and print process data summaries was also developed and installed in the office PC's. The MS Access engine was used for the database management functions, and Crystal Reports was used for the reporting functions.

### PLANT FLOOR DATA COLLECTION SYSTEM | GREAT NORTHERN NEKOOSA MAILWELL ENVELOPE DIVISION *Cleveland, Ohio*

This project is a real-time production tracking and monitoring system for an envelope manufacturing line. Data was collected via a series of OPT022 single board digital I/O modules. Nematron touch screen terminals were used for collecting operator-entered production information, setting up operation codes, and displaying machine performance. A C program was developed to collect production data automatically from the machines. This data was logged to a network server in dBASE IV tables; all of the database supervisory functions were done in dBASE IV.

## ENTERTAINMENT SYSTEM PROJECTS

### **MEN-IN-BLACK® ALIEN ATTACK®, UNIVERSAL STUDIOS, ORLANDO, FLORIDA, USA**

Men-In-Black® Alien Attack® is an interactive dark ride attraction based on the hit movie, where guests take a ride through an alien infested New York City street and accumulate points by shooting at the space aliens. The attraction consists of four main control systems: Ride Controls, Show Controls, Vehicle Controls, and the Scoring System. We programmed the Show System which controls the special effects, video, audio, and the building facilities, including security. The Show System uses SLC 5/05's and PanelView 600's that are in constant communication with various remote Show Control panels that are distributed throughout the attraction area, and the other control systems of the attraction via wireless and hardwire interfaces.

### **JAWS® | UNIVERSAL STUDIOS** *Osaka, Japan*

Jaws® is a boat ride attraction based on the hit movie, where guests take a ride through a vicious shark infested lagoon. The attraction consists of three main control systems: Ride Controls, Show Controls, and Vehicle Controls. We programmed and helped design the Vehicle Controls which uses SLC 5/05's and PanelView 600's. Each of the vehicles (boats) has its own control system that controls the on-board operator interface, audio, and the two diesel engines that provided power and propulsion to the vehicle. It is also in constant communication with the other control systems of the attraction via a wireless interface.

### **THE MAGIC CARPETS OF ALADDIN & DUMBO® THE FLYING ELEPHANT**

**MAGIC KINGDOM,  
WALT DISNEY WORLD** *Florida, USA*

Under their Global Ride Enhancement effort, Disney refurbished several attractions throughout their theme parks worldwide to elevate the safety of their guests. We designed the refurbished Ride Control Systems for these two similar attractions. Two new synchronized operator control consoles, ride stop stations, motor controllers, and operator communication lights were added to each attraction. Several new control hardware, including variable frequency drives, SLC 5/05 and PanelView 600 were added to the system to adhere to the Global Ride Enhancement guidelines.

## AIRLINE BAGGAGE HANDLING SYSTEM PROJECTS

### SEA-TAC AIRPORT

*Seattle, Washington, USA*

The Port of Seattle has been expanding the Seattle/Tacoma International Airport. Part of that expansion is the addition of a new Central Terminal and Concourse A. We helped design and programmed the controls of the airline baggage handling system expansion for these additions. This system expansion uses ControlLogix processors utilizing ControlNET and RSView operator stations that control baggage handling, automated explosive detection, and airport database interface to facilitate a smooth automated operation.

### BALTIMORE/WASHINGTON INTERNATIONAL AIRPORT

*Baltimore, Maryland, USA*

Under a subcontractor, we designed and programmed a complete baggage handling system for a United Airlines wing. The system uses a SLC 5/05 and PanelView 600 that were integrated to airport database system. Although the project was small by the subcontractor's standards, its timely completion and overall efficiency led to future bigger projects awarded to the subcontractor.

### SOUTHWEST FLORIDA INTERNATIONAL AIRPORT

*Ft. Meyers, Florida, USA*

A new larger terminal was built at the airport to accommodate the increasing usage of its patrons. We helped design the baggage handling system of this new terminal. The system consists of ControlLogix processors utilizing ControlNET, RSView operator stations, motor control consoles, and remote control consoles that control the baggage handling, automatic explosive detection, and interface to the flight database of the various airlines that use the new terminal.