



Team Members: Justo Barrios, Hans Maggio, and Grant Holman

### ABSTRACT

The Berry Street facility, located in Springdale Arkansas, is one of Tyson Foods Inc.'s premiere poultry production facilities. Focusing on Line 1: Further Processing within the plant, this project targets the current process monitoring system. The current system is paper-based, resulting in both incomplete and missing records. In order to standardize and improve this process, our group has computerized line 1's process monitoring. Using a coding platform called Django, we created a web-based tool to collect and archive data. This tool mirrors the paper process, but allows the data to be stored in an organized fashion for later analysis. Increasing yield on Line 1 is the main objective of this project, and based on research, computerizing the process monitoring system should result in increases and therefore cost savings for Tyson. Since the beginning of our project, Tyson has begun to develop an enterprise wide computerized process monitoring system called the Tyson Production System. This new system will incorporate process control as well and will generate cost savings across Tyson's 20+ production facilities. As a secondary objective, we completed a simulation of Line 1 in Arena. This model was completed in order to quickly test any changes to the major processes in the line with statistical backing. Through the completion of these two objectives, we believe we have given tremendous value to Tyson, which will later generate a large amount of cost savings.

### BACKGROUND





### OBJECTIVES

- Increase overall yield on Further Processing Line 1
- Simulate Further Processing Line 1 in order to test potential changes to the line

# **Improving Process Monitoring for Tyson Foods, Berry Street**

Industry Partners: Thomas Bond, Jeremy Hank

### METHODS

• Method 1: Preliminary Analysis

- Our team conducted basic analysis on yield margins to determine potential profit increase
- Method 2: Computerized Process Monitor
  - By utilizing Django, we came up with a new, computerized process monitor for data collection
- Method 3: Further Processing Line Simulation
  - By finding relationships from historical data, we were able to simulate a product run fairly accurately.

Product Code: 022830-0928		3		Date:		10/25/2016		
		Item Descri	ption:	DIW	DK 1/2 IF			
	Process Monito	or	Tai	get	Batch #1	Batch #2	Batch #3	Batch #4
polet	Is WIP Being Rotated Properly?		Yes	No	Yes			
	Marination Temperature		Belo	w 35*	33°			
Ē	Do Marination Ingredients Match Ingredients Located In The Product Spec? Tumbler Tilt (Degrees) Tumbler Running Time (Minutes) Tumbler Speed (RPM)		Yes	No	Yes			
on					40°			
Mat					14 min.			
F					25 RPM			
F	Percent of Marination Pickup?		Standard: 16.20%		15.60%			
153	Meat Press Height							
ater	Meat Press	Yield Loss	Star -6.	dard: 90%	6.7%			
	Twin Grill Height				-			
ant I	Twin Grill Temperature				(			
winGr	Twin Grill Dwell Time							
	Twin Grill Yield Loss		Standard: -2.38%		-			
	Cooker Humidity							-
	Cooker Temperature							
poter	Cooker Dwell Time							
	Product Temperature							
	Cooker Yield Loss		Standard: -28.60%					
roicet	Machine Set	up Properly?	Yes	No	12023			
sett	Slicer / Dicer Yield Loss		Sta -10	ndard: 0.36%				
	Freezer Temperature						-	
ates	Freezer Dwell Time							
Ree	Product Temperature							
	Freezer Yield Loss		Standard: -3.00%					
	Product Giveaway Percentage		Standard: -0.28%		.16			
addine	Pounds Per Hour Throughput		Standard: 5,333		5,000			
	Product Finished Yield Total		Standard:		63 11			-











R	ESULTS	
Back to Product List 038351-0928Entri Description: FC GRL BST FLT 4 TRL	ry # 196	
Standards Marination Temp: Ingredients Match Spec?: Marination Tilt: Marination Time: Marination Speed: Marination Pickup: Meat Press Height: Meat Press Yield Loss: Twin Grill Height: Twin Grill Height: Twin Grill Yield Loss: Cooker Humidity: Cooker Temperature: Product Temperature: Cooker Yield Loss: Machine Setup Property? Slicer/Dicer Yield Loss: Preczer Temperature: Product Temp:	35       Marination Temperature:       • Yes • No         36       Marination Tumbler Tilt:       • Yes • No         36       Marination Tumbles Pile:       • Yes • No         36       Marination Tumbles Pile:       • To         37       Marination Tumbles Pile:       • To         38       Marination Tumbles Pile:       • To         5.38       Meat Press Height:       • To         Save       • Meat Press Yield Loss:       • To         NA       Twin Grill Height:       • • • • • • • • • • • • • • • • • • •	Using Django as a platform, we created a web- based version of the original paper document seen in the Methods section. The web page consists of two columns: the standards on the left and the actuals on the right. This maintains the original functions of the original document, but allows the actuals to be stored neatly in a database as opposed to stacked on a desk.
Product Giveaway Percenta Pounds Per Hour Throughp Product Finished Yield Tot:	Age: N/A Product Giveaway Percentage: ut: N/A Pounds Per Hour Throughput: al: 86.68 Product Finished Yield Total: Save	
S P	<ul> <li><u>Safety</u></li> <li>Zero Recordable Incidents</li> <li><u>People</u></li> <li>Taking care &amp; investing in our Team Men</li> </ul>	In parallel with our project, Tyson began to rethink and redesign their process control and process monitoring as an enterprise. They are in
	Quality       • Producing product to customer specifica       Delivery       • Delivering product on time	the process of creating a system based on Lean Concepts and the five company pillars to the left. To achieve this they have created a visual
C •	<ul> <li>Derivering product on time, every time</li> <li><u>Cost</u></li> <li>Achieving economies of scale</li> </ul>	in the process of creating a computerized process monitoring system, using concepts sparked by the design of our system.

R	ES	ULTS			
Back to Product List 038351-0928Er Description: FC GRL BST FLT 4 TRL	ntry # 196	Ryson			
Standards Marination Temp: Ingredients Match Spect Marination Tilte: Marination Time: Marination Speed: Marination Pickup:	35 ?: N/A 36 14 17	Actuals Marination Temperature: Do Mar. Ingredients match the spec?: Ves  No Marination Tumbler Tilt: Marination Tumble Speed: Standard Marination Pickup: 17 Save	Using Django as a platform, we created a web- based version of the original paper document		
Meat Press Height: Meat Press Yield Loss:	N/A -5.38	Meat Press Height: Meat Press Yield Loss: Save	seen in the Methods section. The web page		
Twin Grill Height: Twin Grill Temperature: Twin Grill Dwell Time: Twin Grill Yield Loss:	N/A : N/A N/A -1.7	Twin Grill Height:       Twin Grill Temperature:       Twin Grill Dwell Time:       Twin Grill Yield Loss:       Save	consists of two columns: the standards on the		
Cooker Humidity: Cooker Temperature: Cooker Dwell time: Product Temperature: Cooker Yield Loss:	N/A N/A N/A -16.51	Cooker Humidity: Cooker Temperature: Cooker Dwell Time: Product Temperature: Cooker Yield Loss: Save	the original functions of the original document,		
Machine Setup Properly Slicer/Dicer Yield Loss:	/? Yes : N/A	Machine Setup Properly?: • Yes • No Slicer/Dicer Yield Loss: Save	but allows the actuals to be stored neatly in a		
Freezer Temperature: Freezer Dwell Time: Freezer Product Temp: Freezer Yield Loss:	N/A N/A N/A -3	Freezer Temperature: Freezer Dwell Time: Freezer Product Temperature: Freezer Videl Loss: Save	database as opposed to stacked on a desk.		
Product Giveaway Perce Pounds Per Hour Throug Product Finished Yield 1	entage: N/A ghput: N/A Total: 86.68	Product Giveaway Percentage: Pounds Per Hour Throughput: Product Finished Yseld Total: Save			
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$\checkmark$			sparked by the design of our system.		

<u>Run</u>	<u>Lbs. / Min</u>	<u>Lbs. / Hr.</u>	<u>Wai</u>
1	100	6,000	
2	105	6,300	
3	110	6,600	
4	120	7,200	
5	130	7,800	
6	140	8,400	
7	150	9,000	
8	160	9,600	
9	170	10,200	
10	165	9,900	
11	164	9,840	
12	163	9,780	
13	162	9,720	
14	161.5	9,690	
15	161	9,660	
16	160.5	9,630	

## VALUE OBTAINED FOR TYSON

- savings.
- their processes.





Using our simulation as a tool, we varied the input lbs. to the front of the line. This helped to identify bottlenecks and presented a different avenue of determining maximum theoretical throughput.

**Theoretical Maximum:** 9,630 lbs. Hr.

Tyson is internally designing a computerized process monitoring system, using concepts sparked by the design of our system. This new system will be enterprise-wide spanning more than 20 facilities and will result in millions of dollars in

Once Tyson has created a robust data source, we have implanted the idea of using simulation to statistically analyze