Lean Overview- 2 Case Studies

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There is nothing so useless as doing efficiently that which should not be done at all. ~Peter F. Drucker

WHY CHANGE?

- **The basic economics of business have changed . . .**

Old paradigm	New paradigm
Cost	Price
+ Profit	– Cost
Price	Profit

- **. . . as a result, lean provides new benefits to the company and employees!**

- **To the company**
  - Lower costs
  - Better quality
  - Faster delivery
  - Competitive advantage
  - Better Safety & Environmental performance

- **To employees**
  - Better work environment
  - Ability to improve all aspects of job
  - New skills and increased abilities

DEFINITION OF LEAN MANUFACTURING

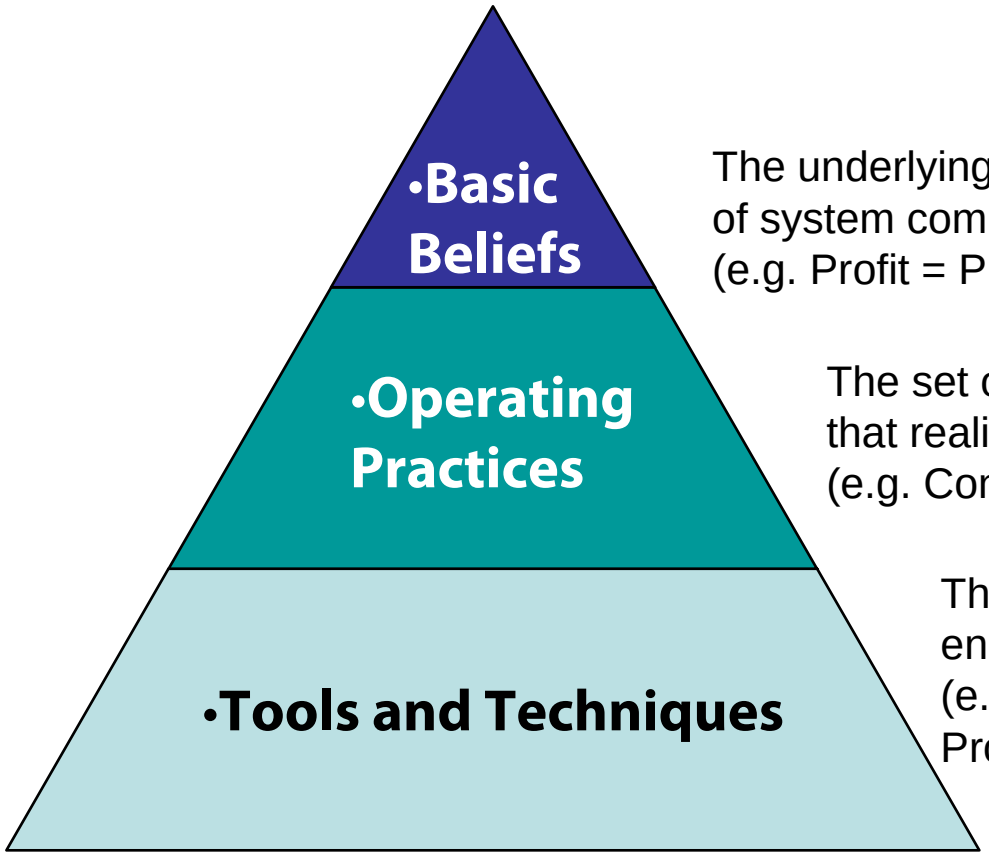
- **Lean is thought to be . . .**
  - A philosophy
  - A mind-set
  - A business system
  - A set of beliefs
  - A bunch of tools, techniques
  - Synonymous with Just-In-Time (JIT)
  - An acronym for more with less

- **Lean is actually . . .**
  - A cohesive, integrated production/business system developed and perfected by Toyota consisting of all the components to the left

- **"The Machine that Changed the World"**
  - MIT researchers coined the term "lean manufacturing" in this 1990 book to describe the Toyota Production System

UNDERSTANDING THE LEVELS OF A LEAN PRODUCTION SYSTEM

A Lean System Changes Status Quo in 3 Important Areas:



The underlying beliefs that govern the interaction of system components and practices
(e.g. Profit = Price - Cost)

The set of standard operating behaviors that realize the system's potential
(e.g. Continuous Waste Elimination)

The mechanisms and methodologies that enable and control the system
(e.g. Value-Stream Mapping,Mistake Proofing)

LEAN PRODUCTION

- **How do I apply lean manufacturing – the operating practices tools and techniques**
  - **Policy deployment**
  - **8 wastes**
  - **Diagnostic value stream mapping**
  - **5S/visual management**
  - **OEE**
  - **Problem solving/error proofing**
  - **Standard operations**
  - **TPM**
  - **Quick changeover**
  - **Line balancing/work pacing**
  - **Continuous flow/pull system**

Compliance + LEAN = CLEAN

Paris Kaizen for Waste Water Loading Reduction

Background/Problem Statement

- Wastewater surcharges were going from $.07 /lb to $.78/ lb for BOD and $0 to $.45/ lb for TSS
- Averaging 3300 lbs of BOD/ day down the drain
- Kaizen Goal – Reduce BOD loading by 50%

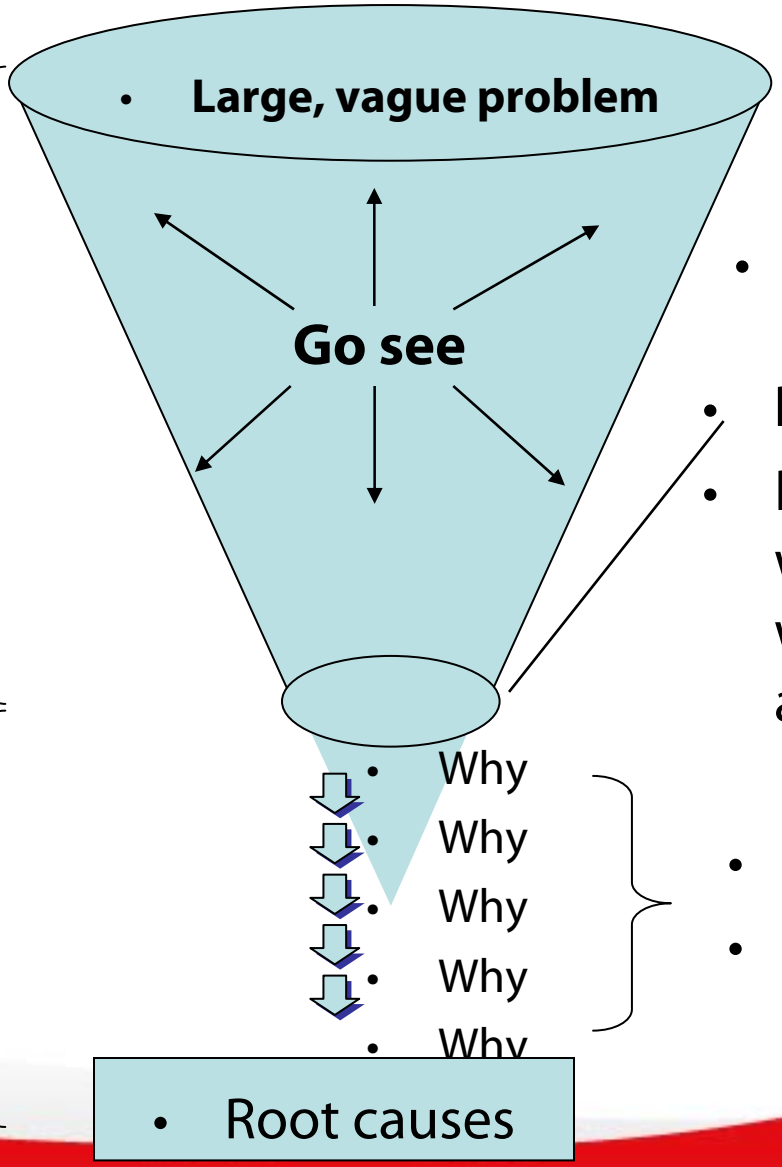
ROOT–CAUSE PROBLEM SOLVING

Problem identification and definition

Problem structuring

- Fishbone diagram
- Brainstorming

Cause prioritization



- **Breakdown**
- **Point of cause**
- Point or location where events occur which result in the abnormal condition
- **5 whys**
- Cause/effect relationships

Problem Solving Guidelines

1. Determine the problem
2. What is the standard
3. What is the discrepancy
4. Brainstorm potential causes
5. Achieve most likely cause
6. Brainstorm countermeasures
7. Achieve course of action

Problem Solving Ground Rules

1. There are no bad ideas

2. No Interrupting. Be Courteous

3. Stay on track

4. Full participation. (TEAMWORK)

5. Have honest and tactful input

6. It’s OK to disagree

7. Make decisions by consensus

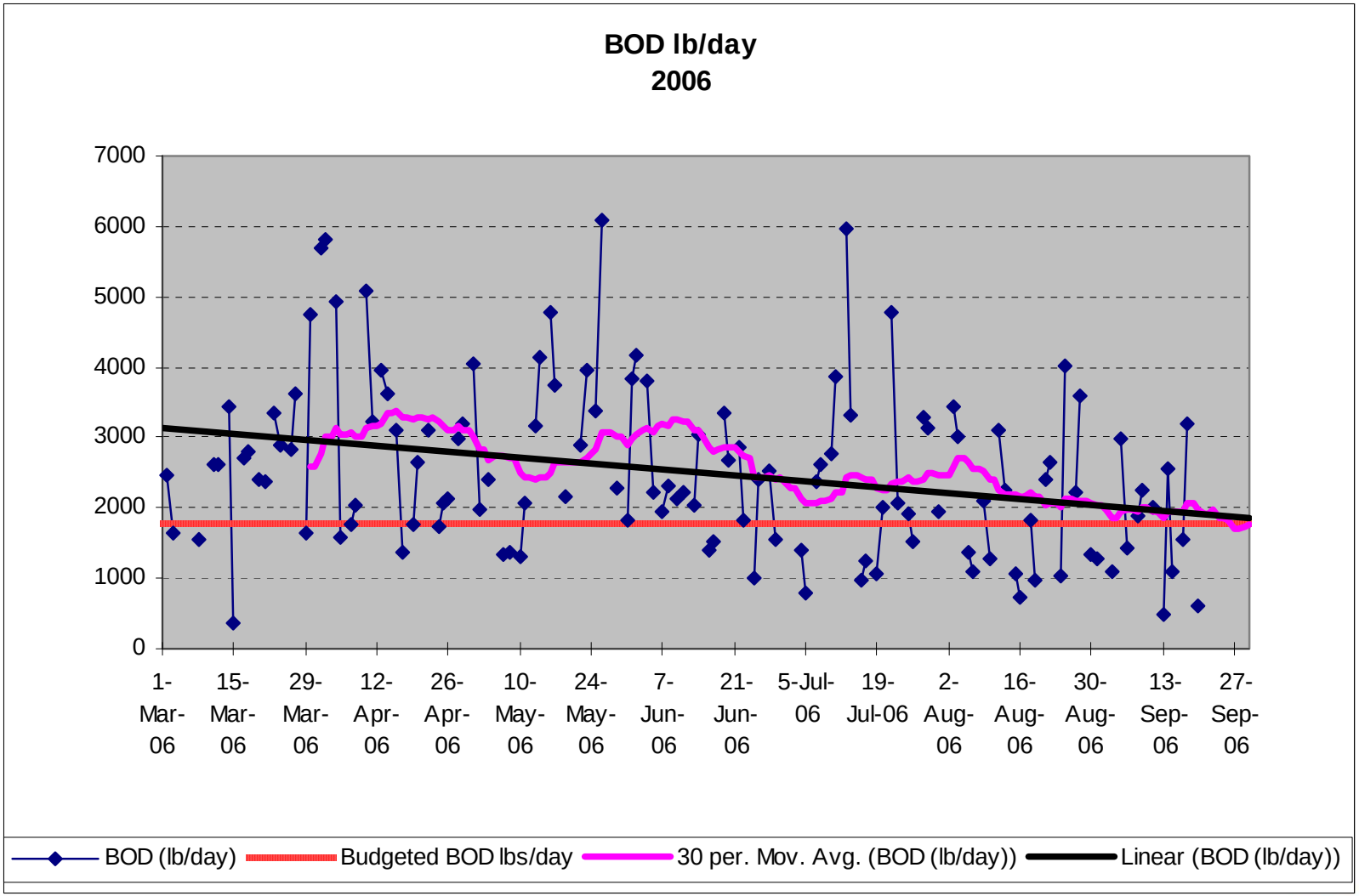
Sequence of Activities (PDCA)

1. Define Problem Statement
2. Gather and Analyze Data
3. Brainstorm Opportunities
4. Quantify and Prioritize
5. Floor Observations & Simulations
6. Problem Solve Issues
7. Resolve Issues
8. Identify “Just Do Its”
9. Develop Standardized OIFs
10. Implement Action Plan

Paris WW

- **Kaizen Team developing alternate methods for managing waste product discharging to the Paris POTW with the following priorities:**
  - ***Reduce: Identifying and minimizing mixer clean-up material. Repairing leaks, etc. Modifying daily equipment cleaning procedures to collect all solid materials***
  - ***Rework: Minimizing process upsets to minimize rework***
  - ***Recycle: Modifying mixer clean-up procedure to solidify liquid materials to send to waste product recycler.***
  - ***Modifying Spiral freezer area cleanups to reduce waste to drains and minimize 6-8 week cyclic load increases***
  - ***Wastewater BOD has shown a 45% reduction in daily average discharge load compared to 8 months ago.***

Paris WW


BOD lb/day
2006
7000
6000
5000
4000
3000
2000
1000
0
1-Mar-06
15-Mar-06
29-Mar-06
12-Apr-06
26-Apr-06
10-May-06
24-May-06
7-Jun-06
21-Jun-06
5-Jul-06
19-Jul-06
2-Aug-06
16-Aug-06
30-Aug-06
13-Sep-06
27-Sep-06
BOD (lb/day)
Budgeted BOD lbs/day
30 per. Mov. Avg. (BOD (lb/day))
Linear (BOD (lb/day))

Team Accomplishment and Future

- **Team accomplished the original goal of 50% reduction in Load**
  - **Avoided Major Capital expenditures and added maintenance costs to accomplish reduction of source pollutants**
  - **Provided improved bargaining power in WW surcharge negotiations**
  - **Reduced environmental impact on community**
  - **Improved cooperation within departments**
- **WW Team's success has charged up other plant teams to reach similar successes**
- **Without management prompting the team has requested that they be allowed to move on to other lines in the plant with a similar goal- reduce or eliminate WW loading from existing processes.**

Popular Paris Sites!!!

Wastewater Surcharge Reduction Kaizen

Goal Reduce Surcharges to <$10,000 a period

Orangeburg SC – March 2008

We are too busy mopping the floor to turn off the faucet. ~Author Unknown

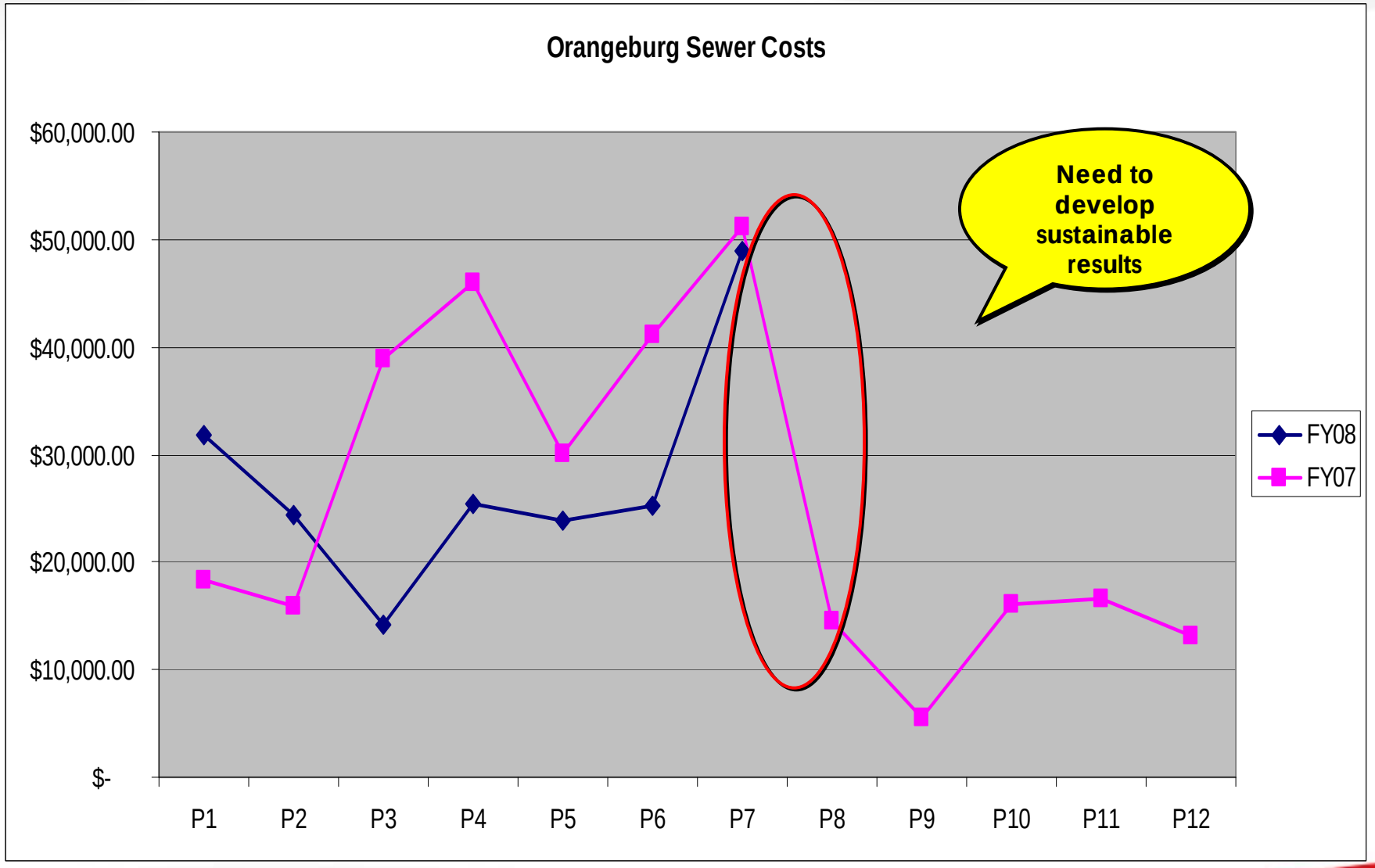
Chris Thomas, Ron Kropiwnicki, David Rivers, Lamont Singleton, Ray Misiewicz

Not Pictured – Ryan Somerville, Joe Garonski

Problem Statement …

- The facility has paid $194,000 so far this year in surcharges.
- $48,990 worth of surcharges in Period 7 alone.
- Total charges last year were $307,418.

Historical Data

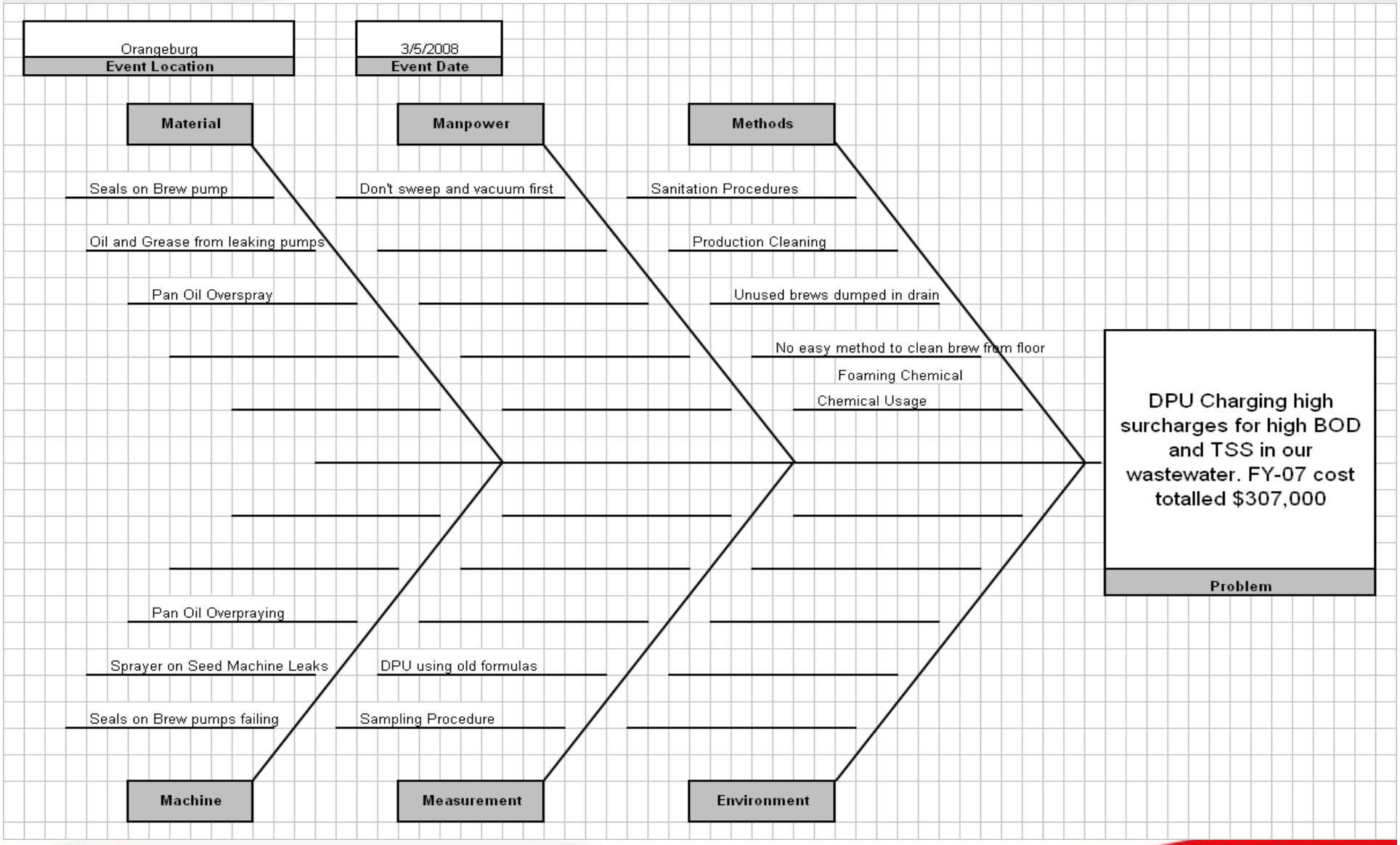


Current State:

DPU – Department of Public Utilities

- DPU tests Orangeburg Wastewater and assigns a cost to treat the water based on the amount of BOD, COD, and TSS measured.
- Water being used to sanitize the floors and machinery picks up debris and ingredients, as well as the chemicals used to clean, and the water goes into the drains.
- Brews leaked into the drain also add to the levels of BOD, COD, and TSS.
- Oil and Seeds from the process can end up in the drains.
- The rate calculation is based on older formulas process water content.

Brainstorming



5-Why Analysis

5-Why Analysis

Plant Location: Orangeburg Date: 3/5/2008

Cause	Why?	Why?	Why?	Why?	Why?
Seals on Brew Pump Failing	Too Much Back Pressure on Pipes	Pipe Diameter is not large enough.	Don't know what size to use.	No method to measure.	
	Pumps are worn out	Pumps too old	Never been upgraded	Too Expensive	
Oil and Grease leaking from oil pumps	Seals fail due to high pressure	Using wrong seals	dot color code is incorrect	seal code changed	
Pan Oil Overspray	Dust covering photo eye	not cleaned often enough	no procedure or process in place	no STW document for pan oil sprayer	
Not Vacuuming dust/brew/flour from floor daily	Not enough resources to vacuum all day	dust/brew/flour builds up continuously	drains not plugged		
Brew dumped directly into drains	Left over at end of run	brew not used in production	process change during shift	doughs cut	
	No procedure to pump brew into modules				
Sprayer on Seed Machine Leaks	Dust covering photo eye	not cleaned often enough	no procedure or process in place	no STW document for pan oil sprayer	
Sampling done while cleaning	no procedure in place for sampling days				
Old Formulas being used to calculate amount of water treated.	DPU has not updated the calculations.	No Liason between Orangeburg and DPU to safely provide the information needed.	DPU not working directly with plant.		

Implementation

Action Item	Responsible	Target Date	Actual Completion Date
Develop method to measure pressure in pipes on Brew Machine to determine what diameter pipe to use.	Ray M.	3/5/2008	3/5/2008, test to monitor
Upgrade Brew System Pumps	Ray M.	9/1/08, Replacing 1 per month	
Determine correct oil pump seal codes and replace.	Ray M.	4/1/08	
Develop STW document/Operator Care for Pan Oil Sprayer	JJ, RK, DR	3/17/2008	
Get coverings and plugs for crittical drainage areas in plant	David R., Lamont S	3/5/2008	3/5/2008
Develop procedure and method to pump unused brew into waste modules	David R., Lamont S	3/5/2008	3/5/2008
Develop STW/Operator Care for Seed Water Sprayer	JJ, RK, DR	3/17/2008	
Develop Sampling Day Procedures to minimize impact to Wastewater	Ron K., David R., Lamont S.	3/5/2008	3/5/2008
Install Grease Trap to collect Grease	Ron K., David R., Ray M.	7/31/2008	
Develop Sanitation OIF for wastewater pit	David R., Lamont S., Jackie H.	3/10/2008	3/5/2008
DPU calculations to be set up for new formulas with higher absorption	Ron Kropiwnicki	4/1/2008	

Short Term

- 1.) No brew or ferment is to be put down the drain at any time. Industrial vacuums and sump pumps will be purchased to vacuum up any leaks or spills into white modules. We will send the spills or leaks to the hog farmers.
- 2.) A pump replacement program will be put in place to secure new pumps in the ferment area.
- 3.) No sesame seeds or other materials like dusting flour are to go down the drain. Scoop them up into a module instead.
- 4.) No oil of any kind can be sent down the drains, this includes Model-K oil, pan oil, trough oil, lubricants used by maintenance.
- 5.) Lock down drains near pan oilers, dough chunkers, seeders.

Currently In Place

Current Progress (Kaizen Impact) …

- Wastewater report shows improvement in all areas.

Just received most recent sampling data, surcharge rate has dropped 51%!

Had it not been for some residual issues on the first day of sampling, rate would have been at historical lows for the plant!

Date	PH	TSS		BOD		COD		Flow	
		mg/l	Lbs/Day	mg/l	Lbs/Day	mg/l	Lbs/Day	Gal	MGD
3/3 - 3/4	9	28885	3126	7000	758	47813	5174	12976	0.01298
3/4 - 3/5	6.6	352	8	788	19	1316	31	2856	0.00286
3/5 - 3/6	7.1	486	10	1121	23	2005	40	2415	0.00242
3/6 - 3/7	7	212	4	710	14	1883	36	2300	0.0023
Average		7484	787	2405	203.1	13254	1324	5137	0.00514

Oil & Grease = 69 mg/l

Quotations for LEAN Manufacturing

- A bad system will beat a good person every time. ~W. Edwards Deming
- Watch the little things; a small leak will sink a great ship. ~Benjamin Franklin
- The world we have created is a product of our thinking; it cannot be changed without changing our thinking. ~Albert Einstein
- The essential question is not, "How busy are you?" but "What are you busy at?" ~Oprah Winfrey
- Don't water your weeds. ~Harvey MacKay