

## **SigMax Project # SSO6-002**

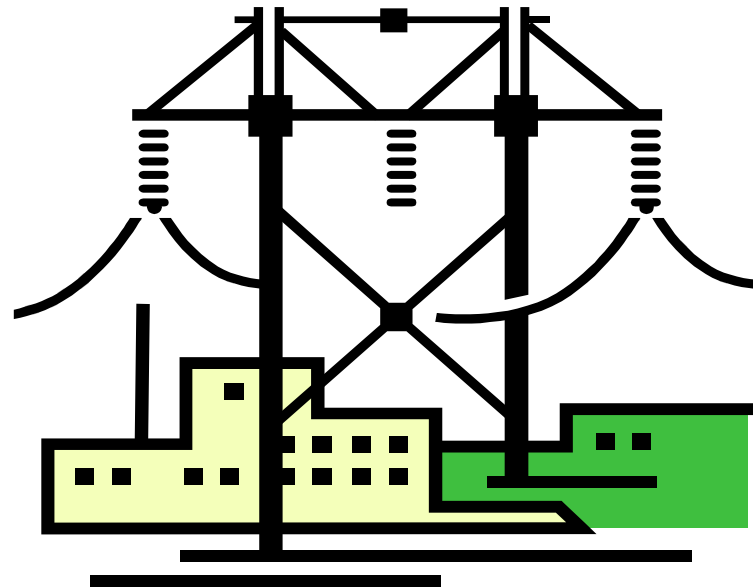
**Department:** Treatment Plant

**Project Title:** Treatment Plant Electrical Peak Demand Reduction

**Project Leader and Team:** Mike Bloedorn, Ray Schumer, Pete Utic and Bruce Bader

## **Project Description:**

*control electrical peak demand to lower the electric bill.*



***Project Results:***  
**Zst of 2.69**

***Project Goal:***  
*Control peaks of electrical usage for the treatment plant which will lower our overall electric bill.*

# Define

## What is the Project Charter?

### Project Objectives

#### Problem Statement:

**High electrical peak demand in treatment plant means higher costs for 12 months.**

#### Current State:

**Electrical usage in the treatment plant is unmanaged.**

#### Desired State:

**Take steps to control our peaks to lower our overall electrical bill.**

### Project Scope

#### In Scope

**Electrical peak demand charges for the treatment plant substation.**

#### Out of Scope

**Evaluation of peak demand charges for other substations in the mill.**

**Other energy usage for the treatment plant such as natural gas will not be considered.**

### Business Case

#### Financial:

**\$9,600 savings every year for every reduction of 100KW**

#### Strategic Imperatives:

**Understanding what causes a new peak demand in electrical usage for the treatment plant.**

### Team & Schedule

#### Core Team:

**Mike Bloedorn, Ray Schumer, Pete Utic and Bruce Bader**

#### Key Stakeholders:

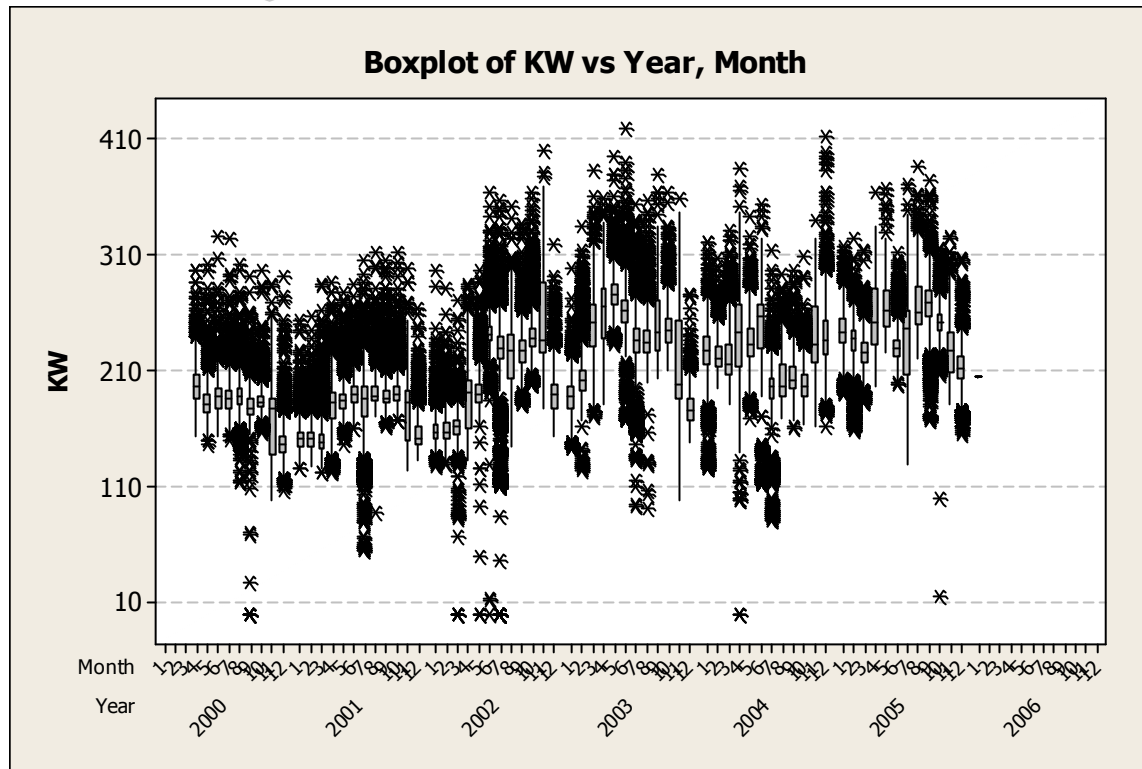
**LRC Employees and LRC Shareholders**

#### Planned Timing of Major Project Milestones:

Define Phase complete by January.  
Measure and Analyze Phases complete by May  
Control Phase complete by July

# Define

What is the High Level Problem, and Why Is It Important? Who Are Customers and Stakeholders?



High Level Problem:

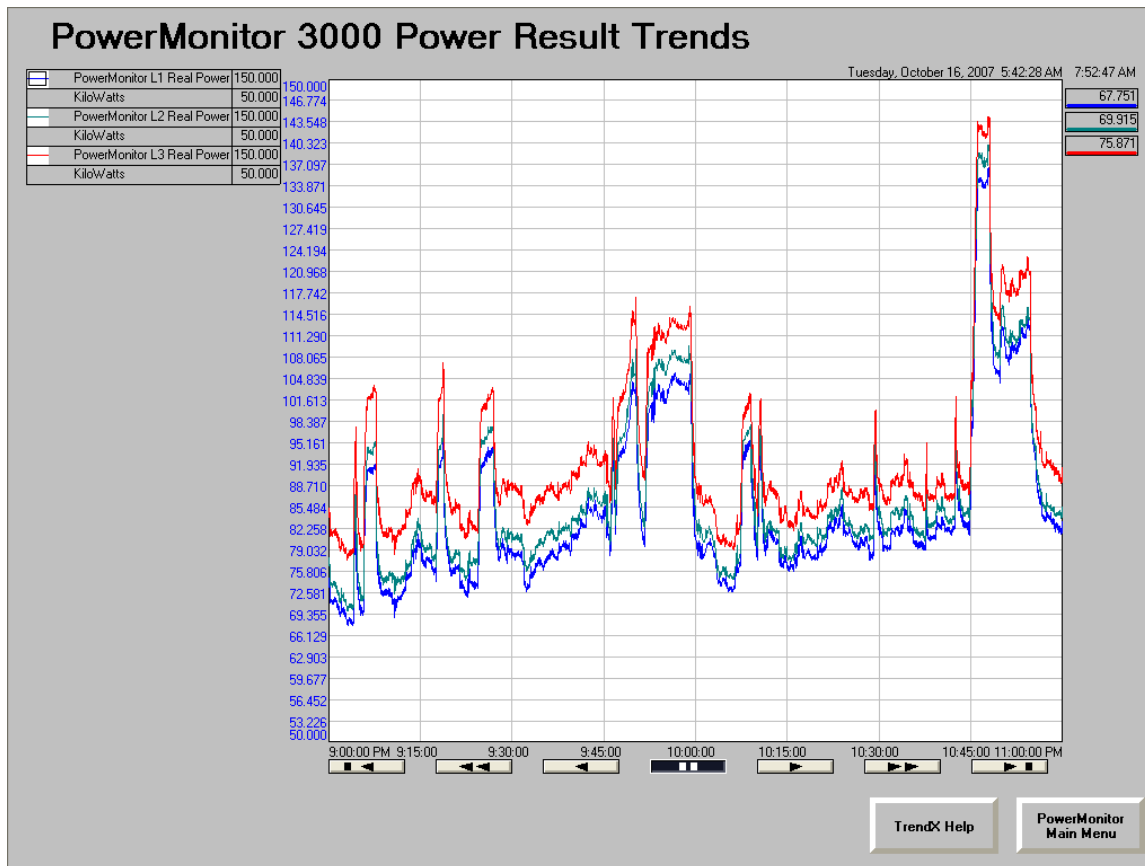
**15 Min Peak**  
⇒ 12 month rate

**High rate means  
paying more for  
the same  
amount of  
electricity**

***Takeaways:*** The CTQ for this project is simply the elimination of high peak demands of energy.

# Measure

What is Important and How Can I Measure It?



**15 Minute Kilowatt  
Usage  
as Supplied by the Utility  
Company  
Years 2000 - 2005**

**Specification is to  
have no 15 minute  
average above 300  
KW**

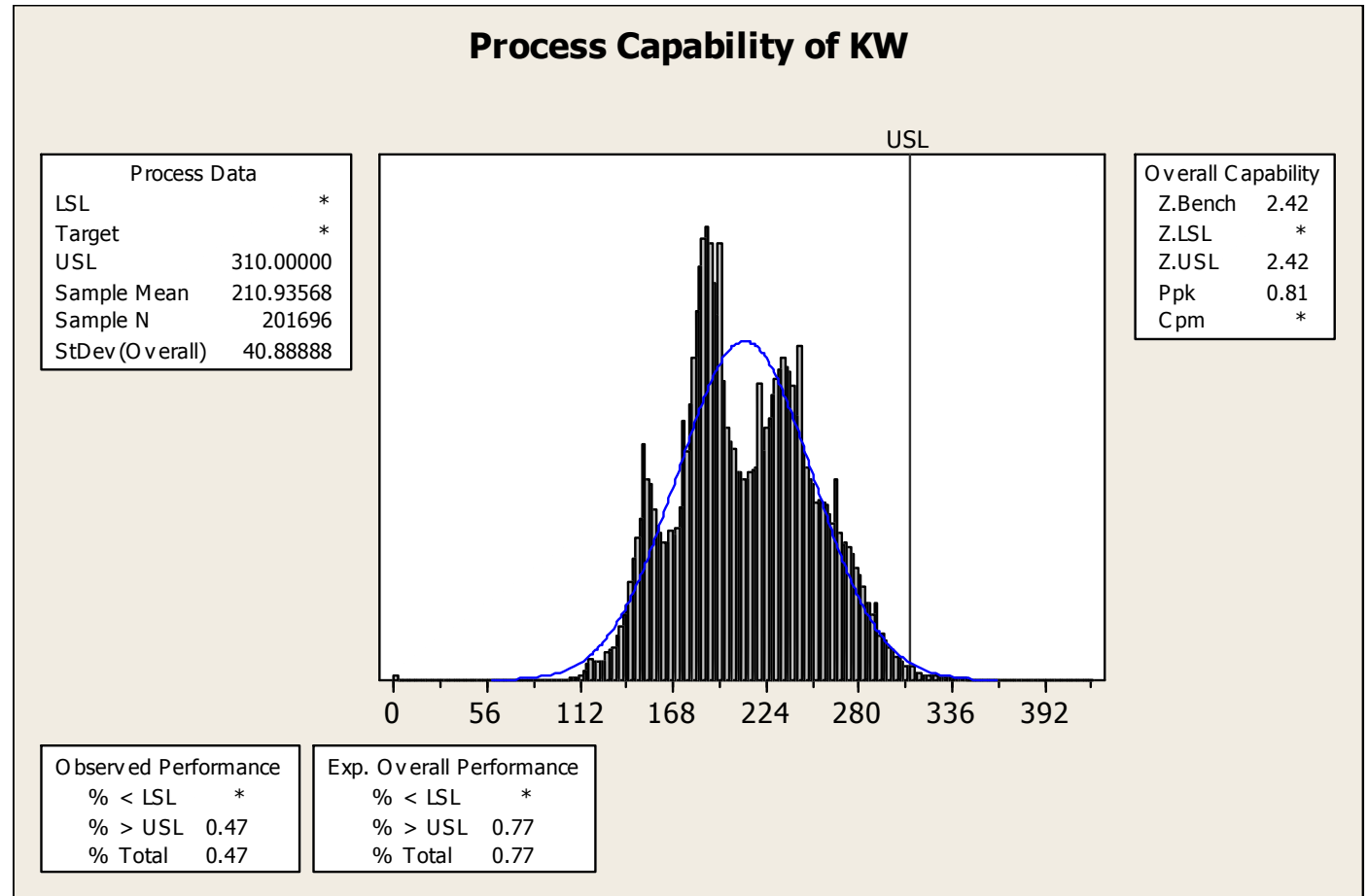
*Takeaways:*



# Analyze

**What is Current Performance and Where Do I Need to Be? What Is the Gap?**

Five year mean is 210KW with a standard deviation of 40.9 KW



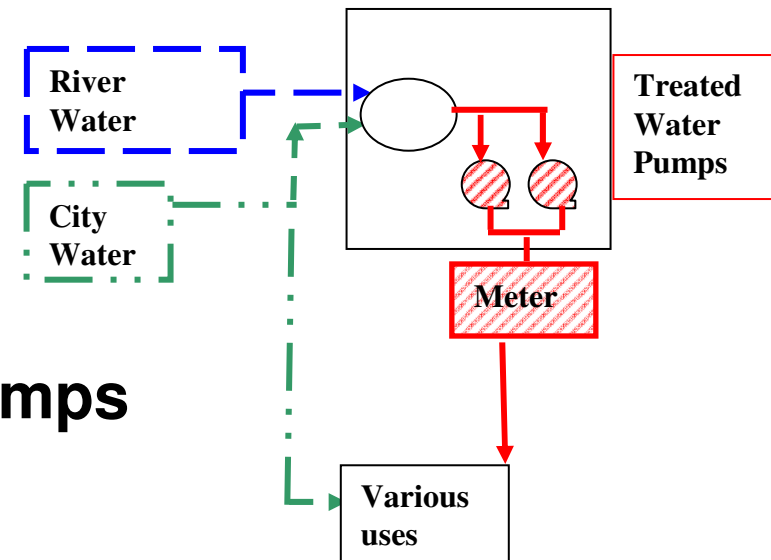
**Takeaways:** even though there is a respectable Z value there still remains over 100 outliers each year

# Analyze

## What Are Potential Xs that Can Be Used To Close the Performance Gap?

### *Possible Sources of Peak KW Usages for the Treatment Plant Substation*

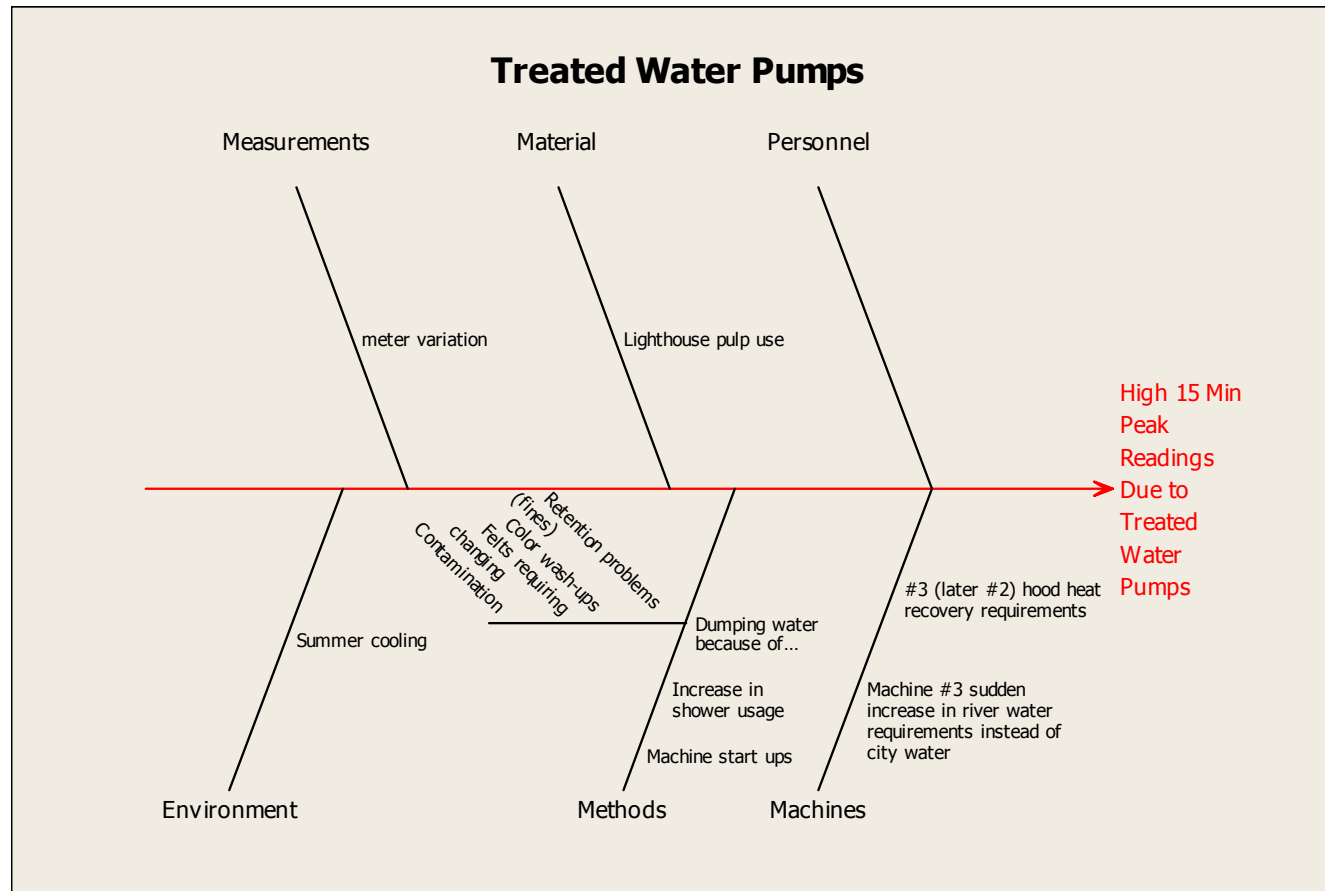
- **Treated water pumps**
- **Aeration blowers**
- **Dissolved Oxygen pumps**
- **Sludge dewatering conveying**



**Takeaways:** Treated water pumps are the largest motors so logic would say start there.

# Analyze

## What Are Potential Xs that Can Be Used To Close the Performance Gap?



**Takeaways:** correlate to water flow, shutdowns, seasons, water dumping

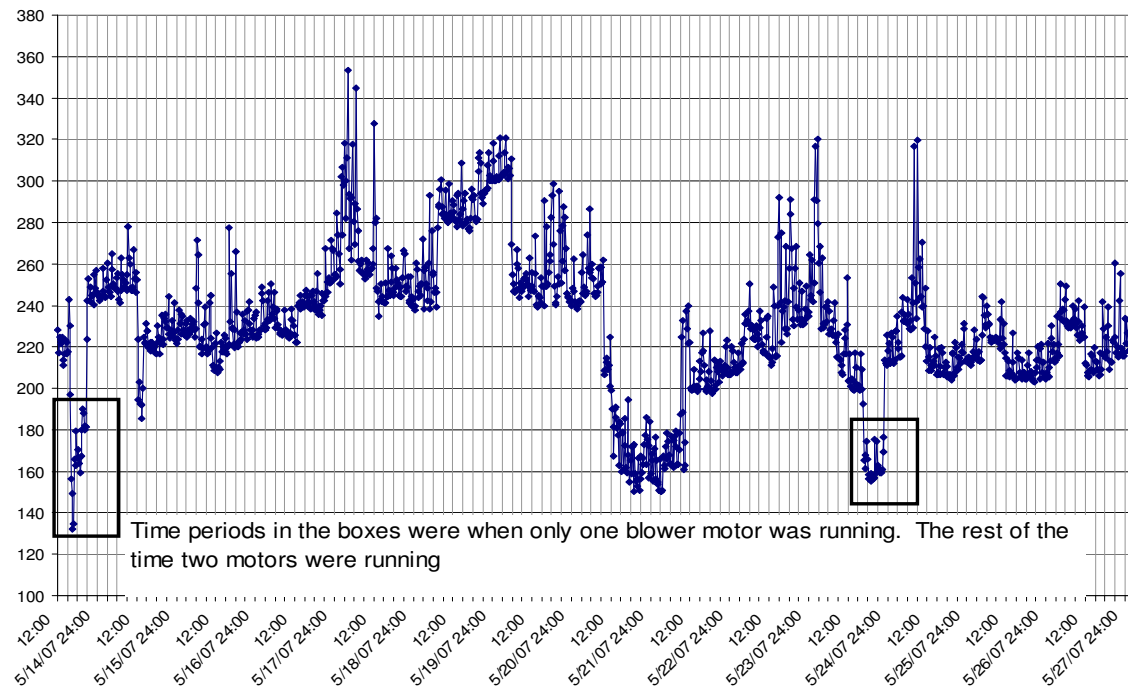
Improve

## Prioritizing the Critical X Properties based on Amount of Affect

$$\Delta Y = (0.0456)\Delta F + (45)\Delta K + (50)\Delta B + (30)\Delta P + 65KW.$$

May 23-28 KW usage

By using historical data correlations were found



**Takeaways:** Although the primary element the effects KW peaks is sudden increases in water flow other elements can effect peaks.



**Improve**

**How Do I Close the Gap Between Current and Desired Performance? (Critical Xs)**

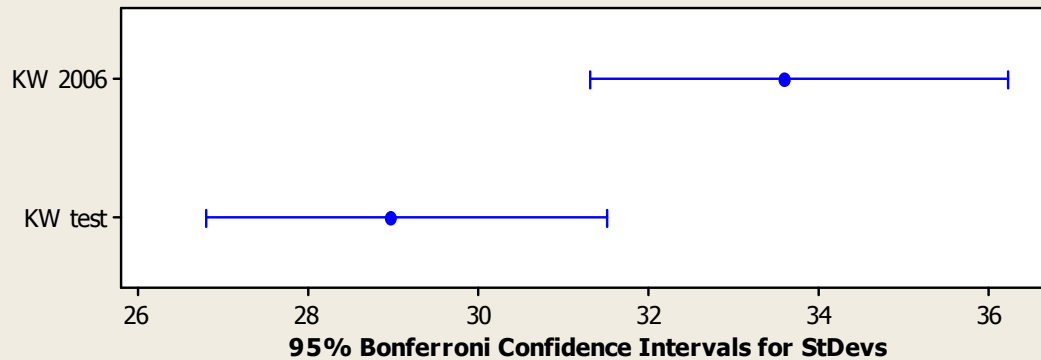
- 1. Minimize the number of blowers running during refilling of pulpers (reduce  $\Delta K$  and  $\Delta B$ )**
- 2. Refill “dump chest” slowly while waiting for next batch. (reduce  $\Delta F$ )**
- 3. Allow no flows of over 2400 gpm to last for more than 5 min in a 15 min time frame**

***Takeaways:*** the changes may required equipment changes if we do not enforce the procedure changes

Improve

## Can We Confirm the Solution on a Small Test?

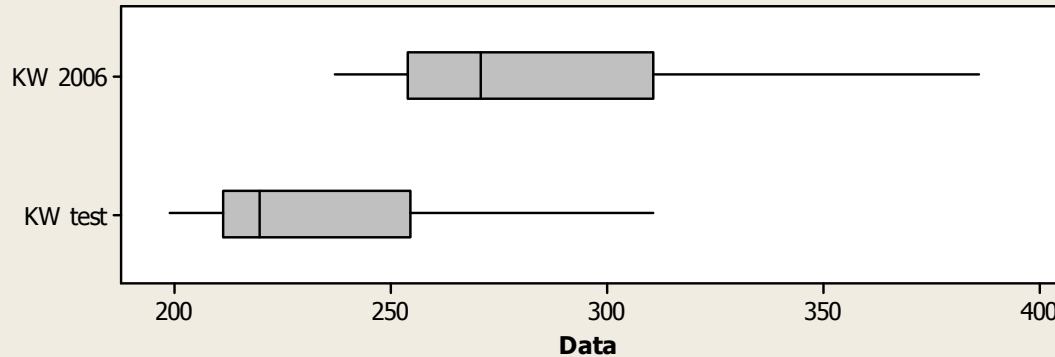
### Test for Equal Variances for KW 8/29-9/2 2006 Vs 8/29-9/22 2007,



F-Test	
Test Statistic	1.34
P-Value	0.002

Levene's Test	
Test Statistic	12.79
P-Value	0.000



**Takeaways:** by controlling the rate of pulper refill the energy peaks are reduced even in summer.

# Control

How Will Critical Xs be Controlled?

## Procedures Vs equipment ???

### Quick Fixes

- Operate the screw press on off hours
- Check with the Crew Manager before starting blower

### Long-Term procedure changes

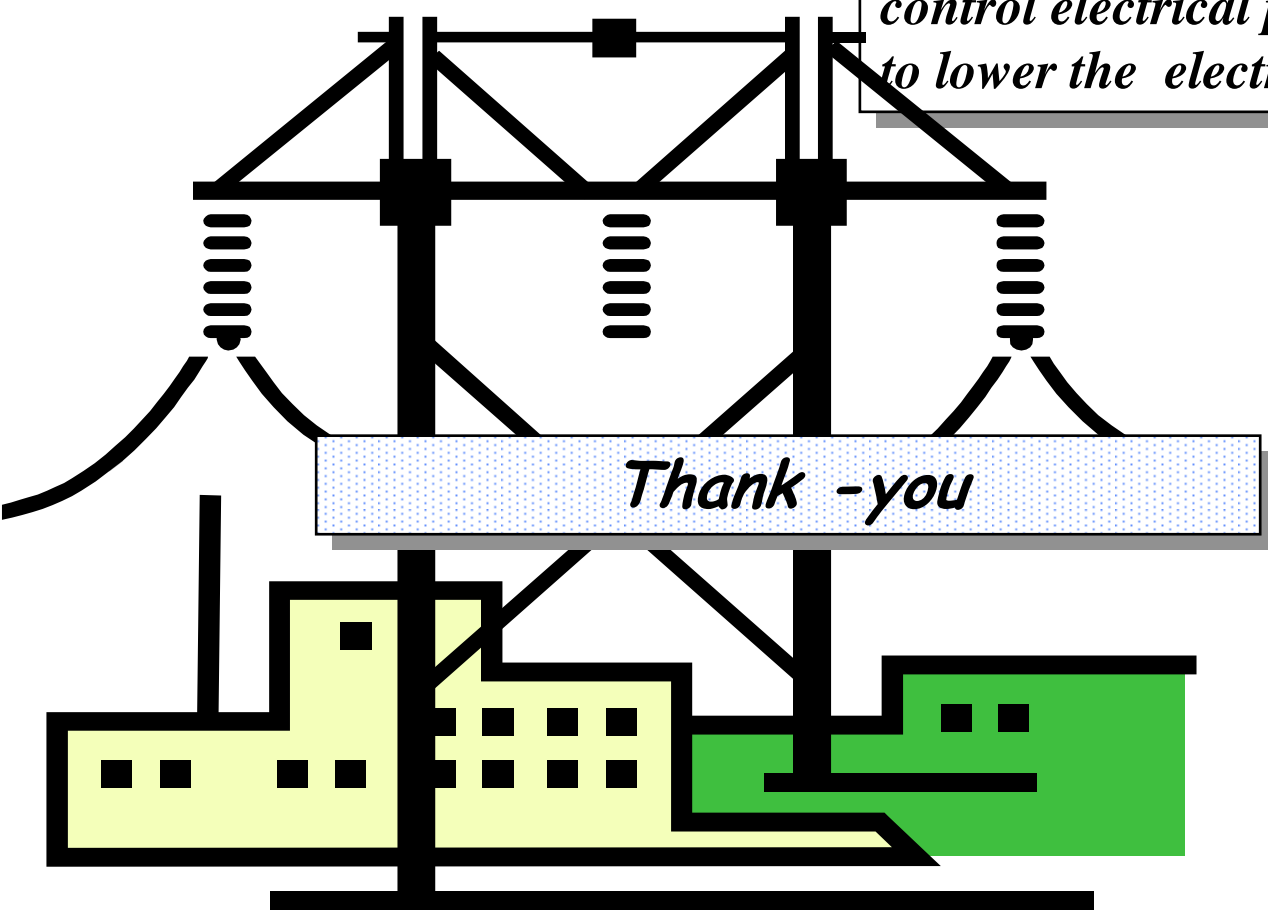
- Minimize the number of blowers running during refilling of pulpers
- Keep “emergency” flows of over 2400 gpm to 5 mins or less within a 15 min time frame
- Refill “dump chest” slowly while waiting for next batch.
- Inform Crew Manager when starting up a blower

# Monitor

**Are Expected Results Achieved and Sustained?  
What Metrics Will Be Monitored Long Term?**

## *Management Tools.*

- ✓ **Inform managers of real time energy usage at the treatment plant.**
- ✓ **Purchase of variable speed motors for appropriate amount of aeration (not too much and not too little).**
- ✓ **Coordinate the filling of all equipment.**



**Project Description:**  
*control electrical peak demand  
to lower the electric bill.*

*Thank -you*

**Project Goal:**  
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