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Water Resource Conservation Plan
Fall River, Massachusetts

TURA 20’th Anniversary Symposium
November 4, 2009

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Project Charter and Resource Selection. . .

Business Case

Reduction in Overhead Costs including Utilities and Water Reduces Cost / Unit Maximizing EBIT while preserving Natural Resources

Project Selection

Several Utility Projects involving Electricity and Natural Gas including High Efficiency Motors, VFD's, Low Temperature Cleaners and Plant Relighting were underway. We felt that the greatest benefit from the project would be the focus applied if water were selected

Opportunity

Produce and Provide Sustainable Lighting Systems with the least consumption of Energy and Other Natural Resources

Scope

- Create a Water Conservation Team
- Evaluate the usage and purpose of water facility wide
- Identify Reduction Options
- Select Options to be implemented
- Write a formal Plan including Goals and Implementation Schedule
- Measure Results and Continually Improve

Recent Projects

- **Factory Relighting Phase 1**

  83k investment, 63k savings

  43k rebate, 14k tax savings, 7 month payback

  Reduced Electricity by 323,000 kwh

  Final Phase 2010, 95k cost, 84k rebate, 247,000 kwh

- **Improved Air Compressor Management and Leak Repair**

  59k investment, 66k savings

  34k rebate, 6 month payback

  Reduced Electricity by 531,000 kwh

- **Ambient Temperature Cleaners (2 of 3 lines complete)**

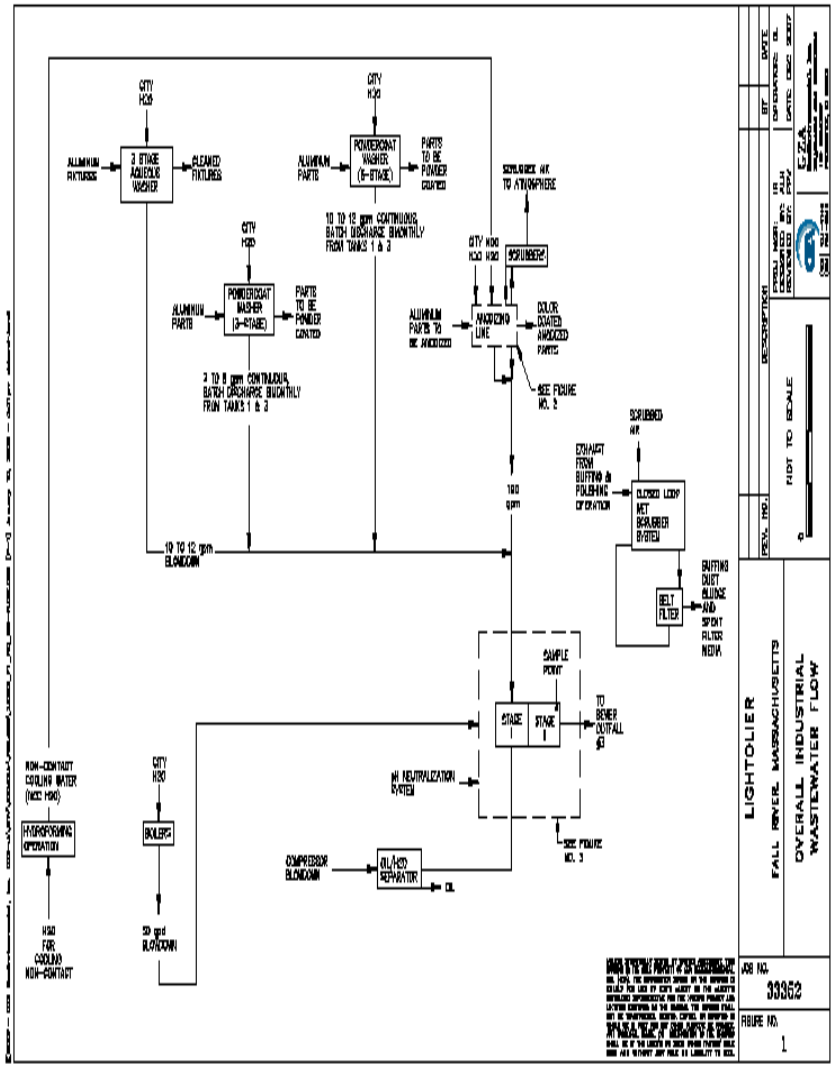
  No Investment, 67 k savings

  Reduced Natural Gas by 6,811 dth

Define and Describe

Project Approach . . .

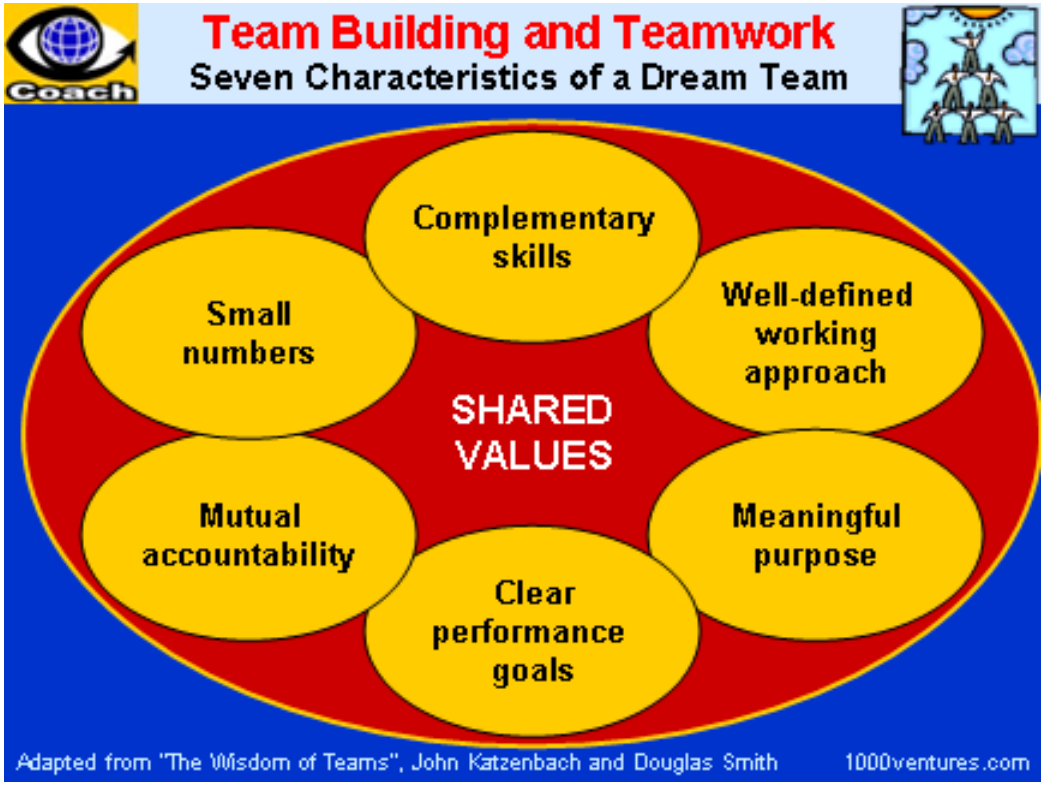
- Characterization of Water Use
- Goals
- Option Identification
- Screening of Options
- Purpose of Water
- Technical Evaluation
- Option Selection
- Implementation Schedule
- Measurement
- Continuation of Improvements



Our Team

Team Spirit . . .The Vision set the Goal, Team Focus Delivered Results

 # 1 Green Dream Visionaries



Gabe Vieira, Finishing

Ron Winiarski, Anodizing

Jim Fisher, Maintenance

Paul Pascoal, Powder Coat

Wendy Deng, Chemist

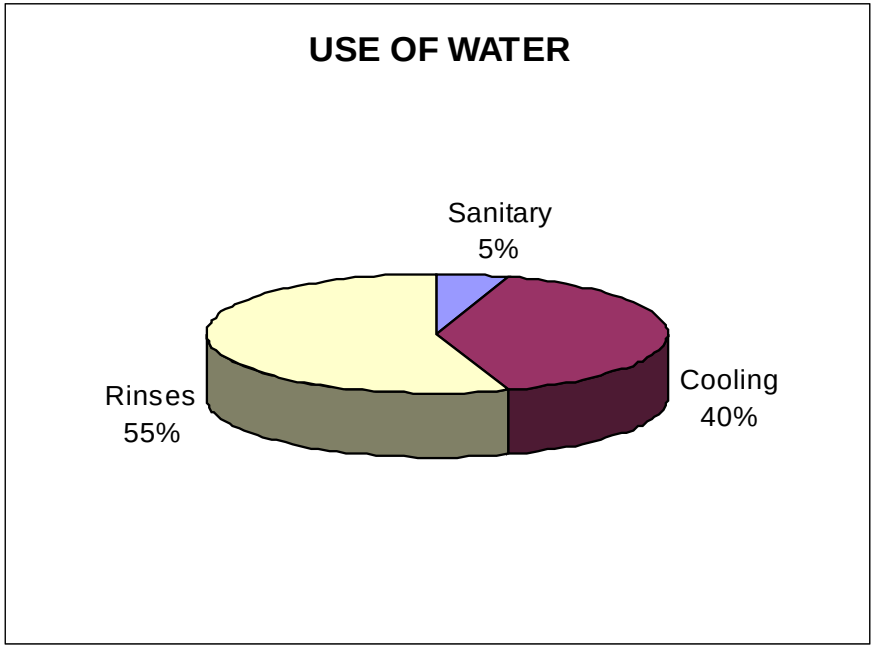
Ron Westgate, Operations

Our team brought together over 150 years experience

Meetings. . .

Water Conservation

We began the project with a training session and discussion with operations personnel of how and where we were using water



251,000 Gallons / Day

91,000,000 Gallons / Year

Annualized Cost $ 379,000

Measurements . . .

Facility Water Usage

For the period May 2007 through October 2007, 282,000 gallons / day

For the period November 2008 through April 2008, 225,000 gallons / day

For the period May 2008 through June 2008, 241,000 gallons / day

This equates to a 14 month average prior to our final Water Conservation Plan of June 2008 of 251,000 Gallons / day or 91 million gallons / yr.

Baseline 251,000 gallons / day

91 million gallons / year

Operations . . .

Facility Manufacturing Process Water Usage

1

Automated Reflector Manufacturing Cell

This state-of-the-art cell integrates the operations to process reflectors from raw aluminum circles through metal forming, piercing, cleaning, powder coating, laser etch and packaging. The high quality finished reflectors from this cell are fully packaged, bar coded and ready for distribution.

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Hydro Form

Eleven hydro form machines with associated presses, lathes and hydraulic pumps arranged in work cells allow us to control the reflector, cone and housing forming process insuring high quality components and maximum throughput.

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Aqueous Washer

This unit is used for process cleaning. It utilizes "environmentally friendly" water soluble chemicals to remove process oils and buffing compound from parts. In-house control of this process is of critical importance to the final quality of our painted and anodized finishes.

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Anodizing

Anodizing of reflectors is accomplished in three state-of-the-art computer controlled lines and provides the clear or tinted anodic finish required to protect the polished aluminum surface from environmental degradation. Stringent quality assurance in this department results in a highly reflective, durable and uniform component finish.

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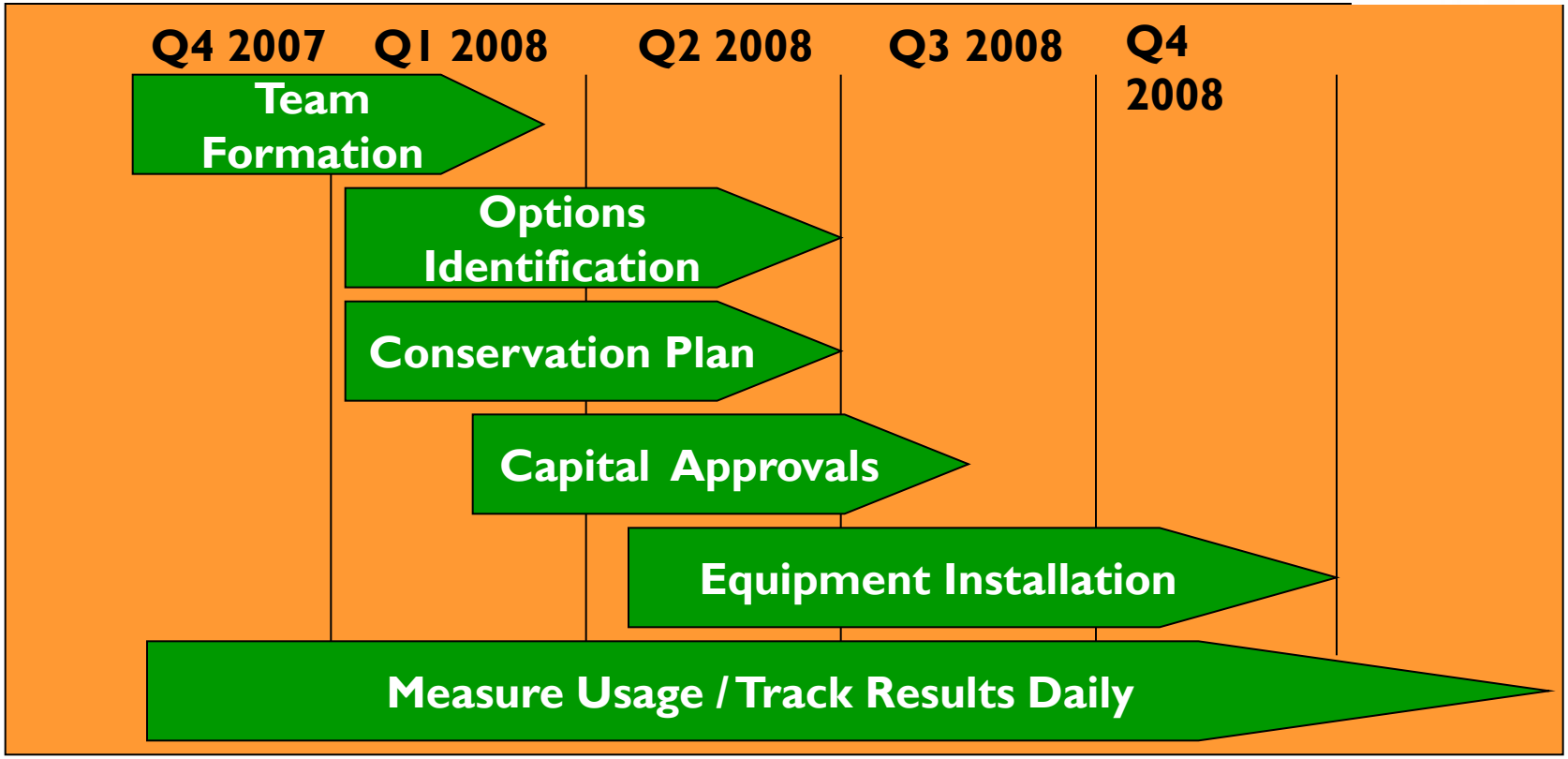
Timing . . .



Water Conservation Implementation Schedule

Measurable Goals . . .

Goal

- **Reduce Facility Wide Usage By 30 %**
- **Reduce Facility Wide Usage by 75,000 Gallons Per Day**
- **Reduce Facility Wide Usage by 27 Million Gallons Per Year**

S	M	A	R	T

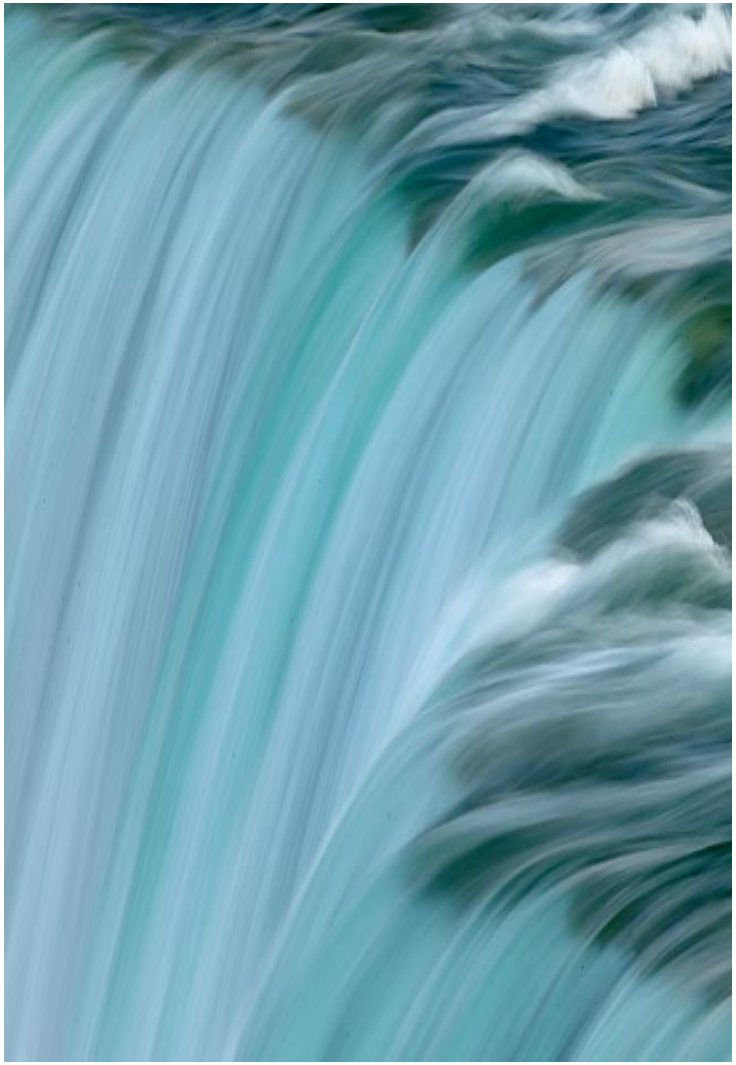
Specific:

Measurable:

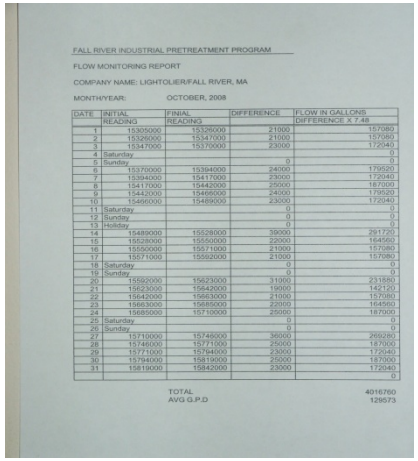
Ambitious:

Realizable:

Time-Phased:



Documentation and Plan Development . . .



FALL RIVER INDUSTRIAL PRETREATMENT PROGRAM

FLOW MONITORING REPORT

COMPANY NAME: LIGHTOLIER/FALL RIVER, MA

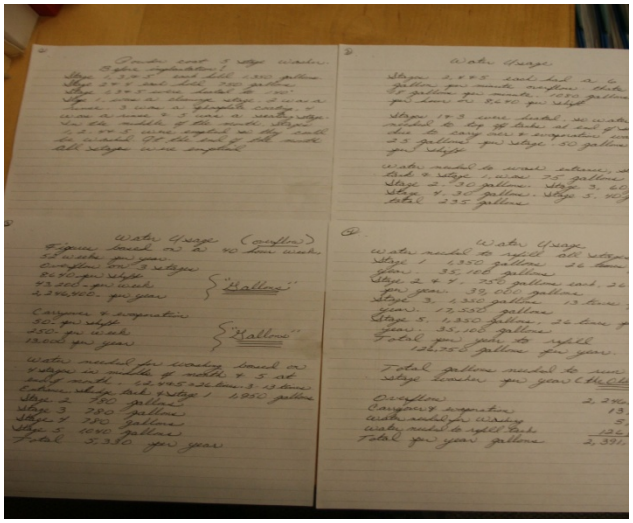
MONTH/YEAR: OCTOBER, 2008

DATE	INITIAL READING	FINIAL READING	DIFFERENCE	FLOW IN GALLONS DIFFERENCE X 7.48
1	15305000	15326000	21000	157080
2	15326000	15347000	21000	157080
3	15347000	15370000	23000	172040
4	Saturday		0	0
5	Sunday		0	0
6	15370000	15394000	24000	179520
7	15394000	15417000	23000	172040
8	15417000	15442000	25000	187000
9	15442000	15466000	24000	179520
10	15466000	15489000	23000	172040
11	Saturday		0	0
12	Sunday		0	0
13	Holiday		0	0
14	15489000	15528000	39000	291720
15	15528000	15550000	22000	164560
16	15550000	15571000	21000	157080
17	15571000	15592000	21000	157080
18	Saturday		0	0
19	Sunday		0	0
20	15592000	15623000	31000	231880
21	15623000	15642000	19000	142120
22	15642000	15663000	21000	157080
23	15663000	15685000	22000	164560
24	15685000	15710000	25000	187000
25	Saturday		0	0
26	Sunday		0	0
27	15710000	15746000	36000	269280
28	15746000	15771000	25000	187000
29	15771000	15794000	23000	172040
30	15794000	15819000	25000	187000
31	15819000	15842000	23000	172040
				0
		TOTAL		4016760
		AVG G.P.D		129573

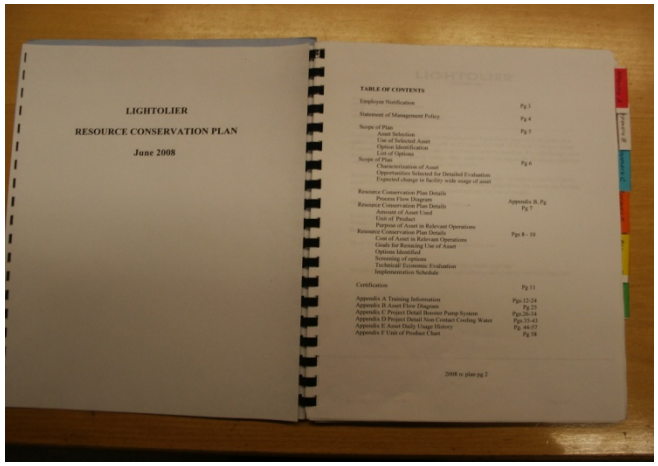
Daily Water Usage Log

Documentation

- Daily Logs
- Meeting Notes
- Technical Alternatives
- Innovative Solutions
- Financial Analysis



Meeting Notes and Calculations



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RESOURCE CONSERVATION PLAN

June 2008

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Water Conservation Plan

- ➢ The success of the project hinged on the development of the formal plan
- ➢ The Plan Analyzed each Usage and Alternative in Detail

Options Selected for Implementation . . .

1) Reduction of Plant Booster Pump pressure

2) Enhanced re-use of non-contact cooling water

3) Reduction of rinse rates at Anodizing, Powder Coating and Aqueous Wash

4) Reduction of Irrigation water used for the lawn

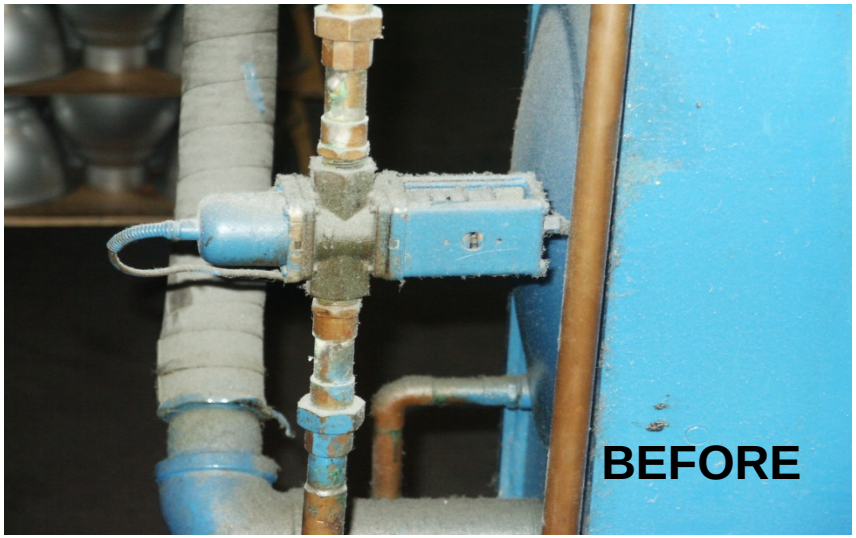
Reduction of Plant Water Pressure . . .

14,169,000 gallons per year reduction in water usage

- Pressure was reduced from 80 psi to 52 psi with new system
- Installed new pump system with VFD's
- Determined optimum pressure to be 52 psi, yield a 16 % reduction in water usage
- Investment $ 27,000
- Savings $ 55,000 / yr

Challenge - Elimination of Wasted Cooling Water Flow . . .

7,300,000 gallons per year reduction in water usage



- **Solenoid Actuated Valves Eliminated "Flow Through "**

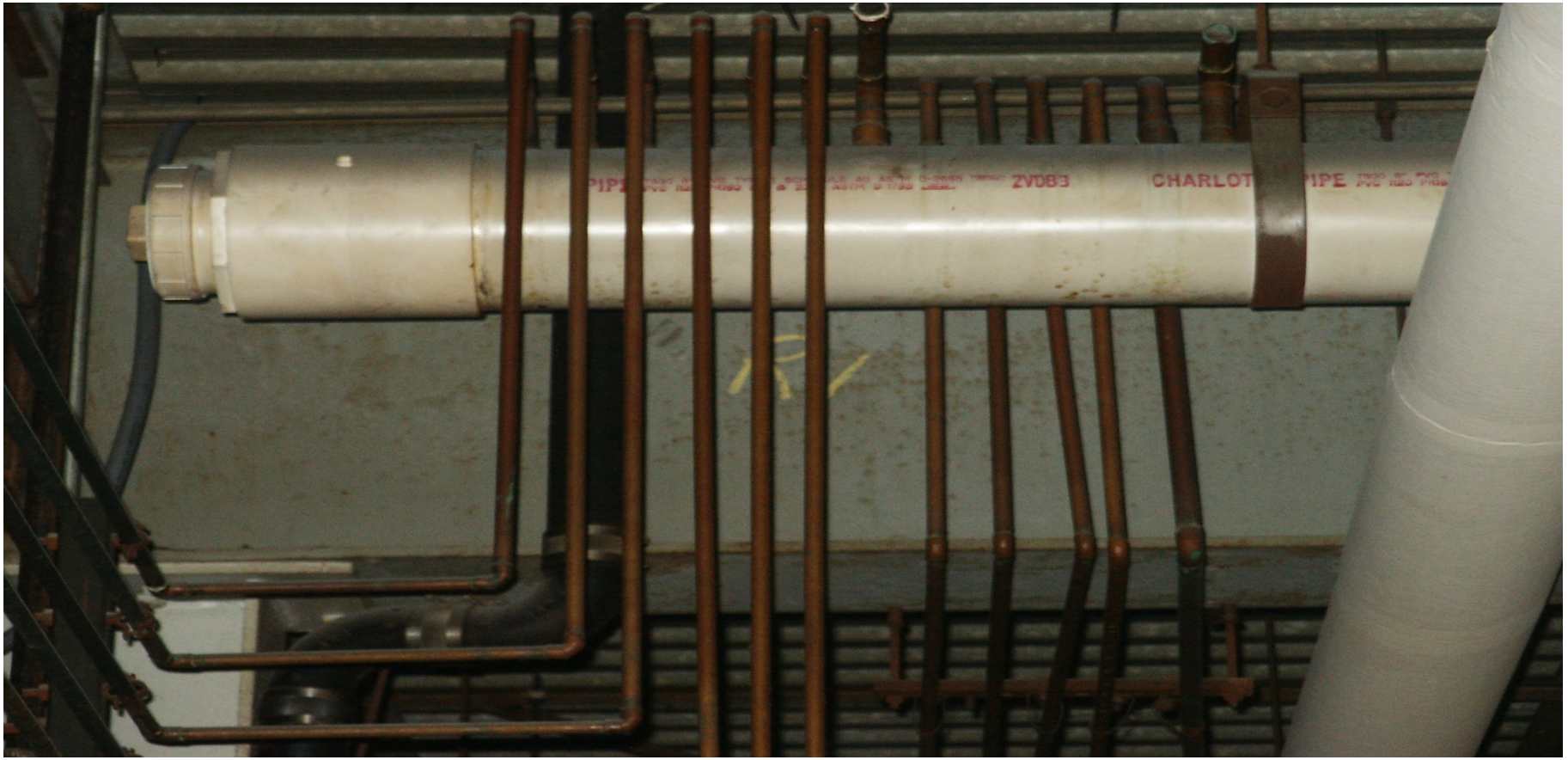
Investment $ 7,643

Savings $ 30,441

- **Temperature Controlled Valves DO NOT WORK !**
- **They are prone to rust and other particulate not allowing them to seat allowing flow through**

Innovative and Cost Effective

Our Cooling Water to Finishing Rinse Station Aqueduct



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sense and simplicity

Reduction of Rinse Rates . . .

EXAMPLE:

5 Stage Wash Line

Many Rinses were set at 3-6 Gallons per min overflow

We were able to reduce rinses to 0 – 1 1/2 Gallons per min overflow

Reduced System Cleaning Frequency and refill of tanks

We determined that the product was sufficiently rinsed and verified through conductivity readings

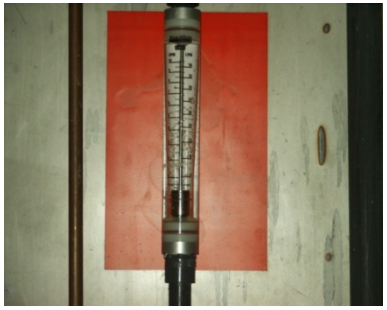
Investment $ 300

Savings $ 9,576 / yr

2,296,540 gallons per year reduction in water usage

93 % REDUCTION

At Powder



“You Cant Manage What You Can’t Measure”

Challenge – No Contamination of Critical Rinses . .

Flows of up to 60 GPM

Needed an Innovative and Cost Effective Solution

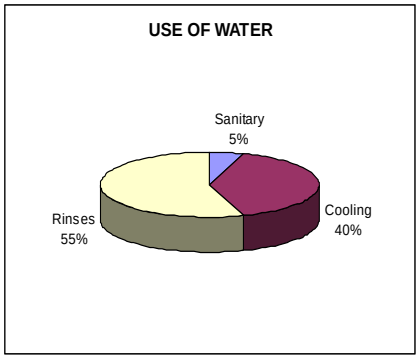
Solution…Continuous Oil Monitor Technology as used on submarines can detect ppm

Alarms will Alert personnel to divert water from rinses if heat exchanger failure occurs

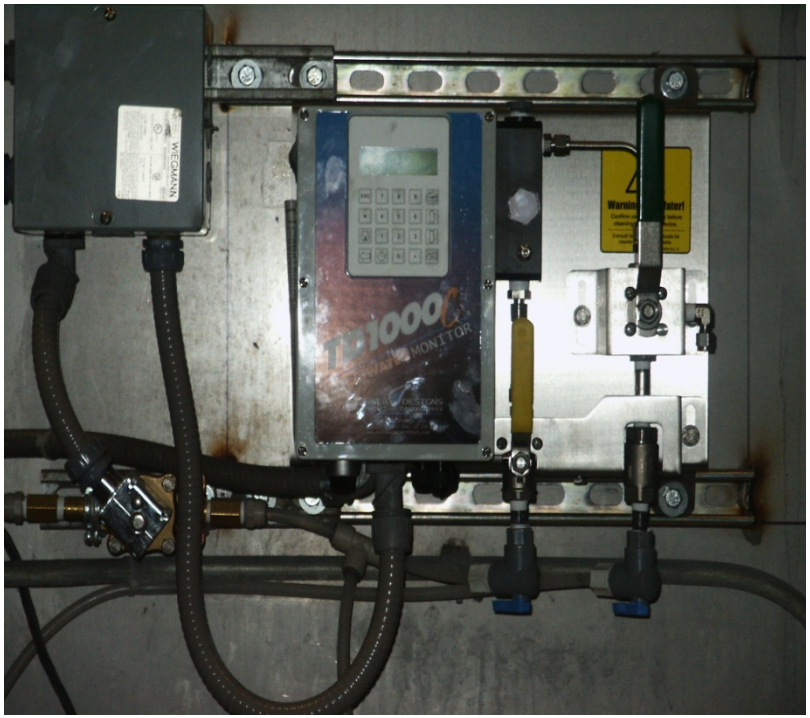
Monitored flow through meter is re-directed to a rinse

Investment $ 19,000

Savings $ 46,375



11,121,000 gallons per year reduction in water usage



Reduction of Rinse Rates . . .

EXAMPLE:

Anodize Line # 3

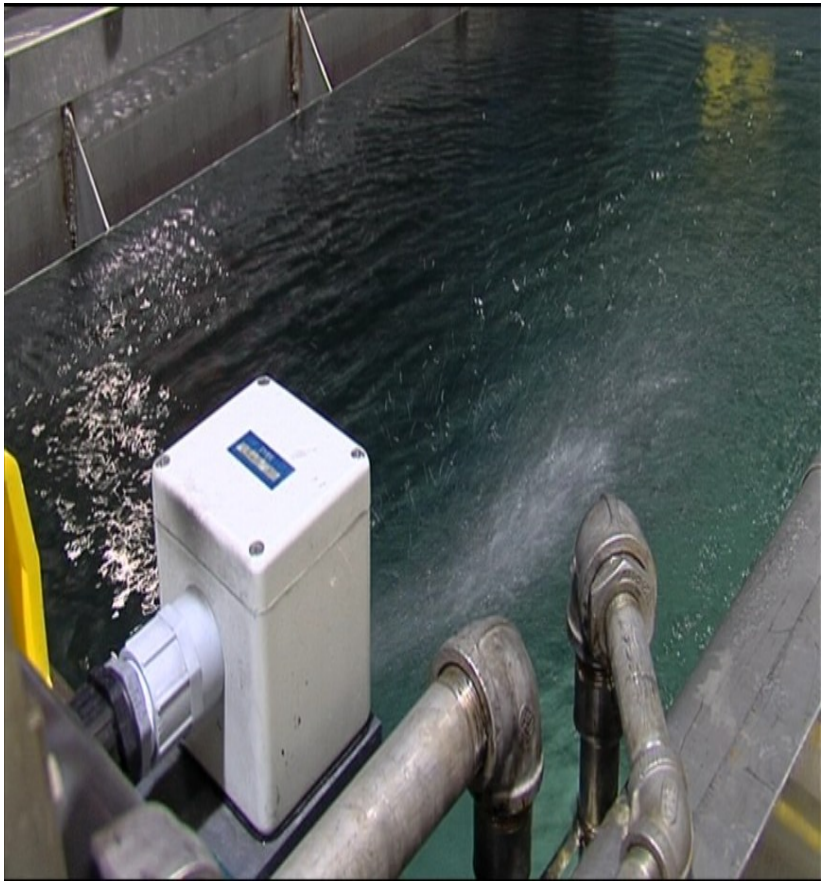
Following the Reduction of Rinse Rates, sufficient cooling water was available to pipe into Line # 3

All 3 Lines were balanced for proper flow by throttling the ball valves orifice at each tank and the city water was able to be turned off

Investment $ 11,400

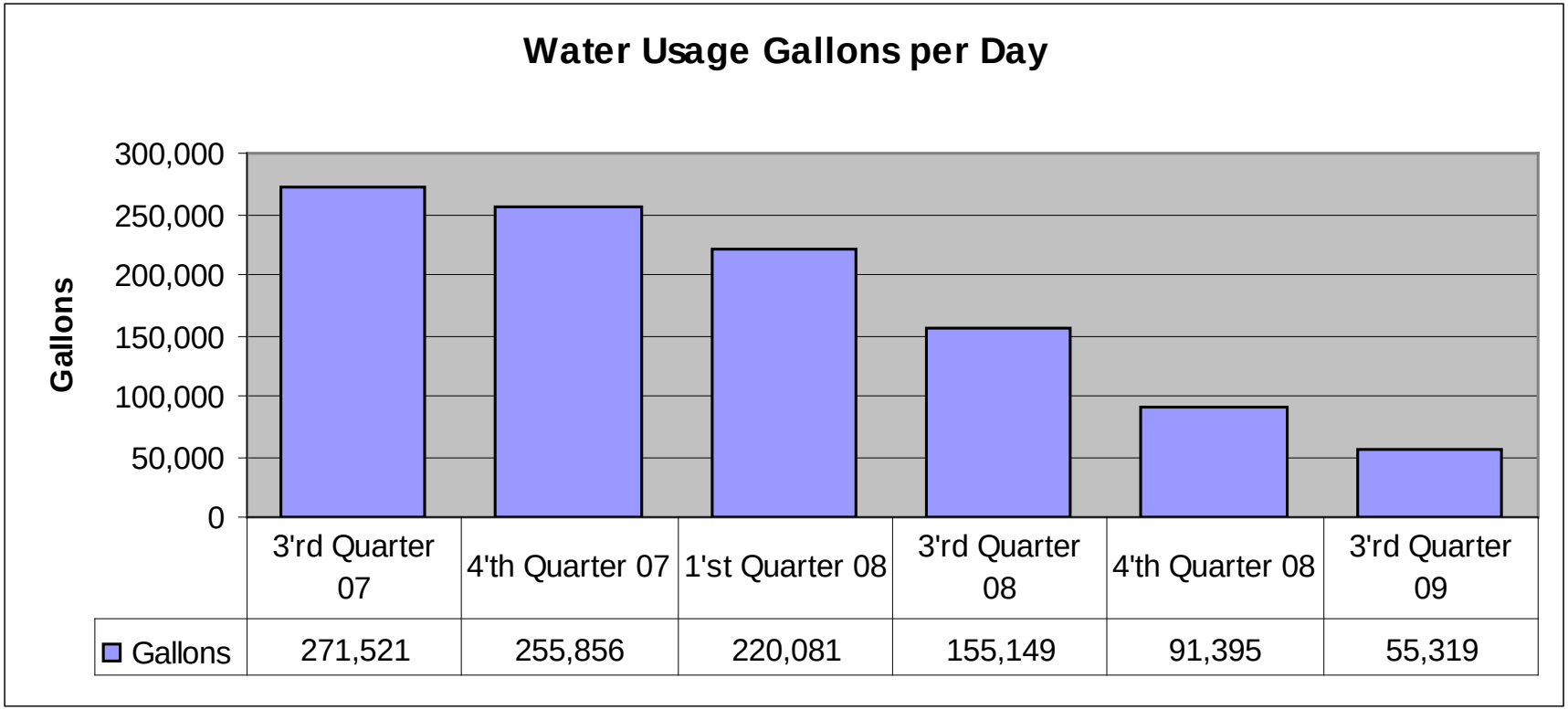
Savings $ 68,492

16,425,000 gallons per year reduction in water usage



Measured and Confirmed . . .

Measurements are based on the Metered Daily Water Consumption Logs, Cost is at a fixed rate of $ .00417 / Gallon of Water



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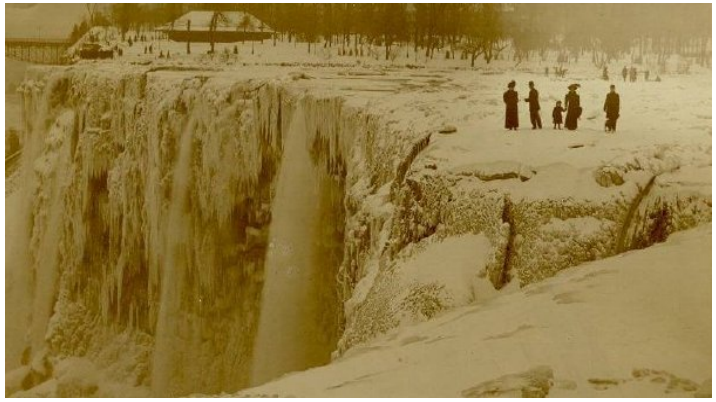
Results

Sustainability . . .



- ❑ Reduced Facility Wide Usage by **78 %**
  (Goal 30 %)
- ❑ Reduced Facility Wide Usage by **194,000 Gallons Per Day**
  (Goal 75,000 Gallons / Day)
- ❑ Reduced Facility Wide Usage by **71 Million Gallons Per Year**
  (Goal 27 Million Gallons / Year)

- ➢ Investment $ 65,343
- ➢ Annualized Savings 71 MGY x $.00417 /gal = $ 296,070

THIS DAILY REDUCTION EQUATES TO PROVIDING EACH OF THE 125,000 WORLDIDE PHILIPS EMPLOYEES **NINTEEN** **BOTTLES** OF BOTTLED WATER EACH AND EVERY DAY EVERY DAY

Customer Impact . . .

Relates directly to our Project Charter and Business Case

- **Internal Customers**

  Our Employees:

  Reducing fixed O.H.

- **External Customers**

  Our Distributors and End Users:

  Sustainable Lighting Systems from Green Production

- **Our Community**

  A company commitment to Preserve Energy and Other Natural Resources

Continuous Improvement

Future Opportunities . . .Continue Improvements and Conservation

Re- Evaluate the entire Plan since the reduction implementation to identify new use based options

Apply this Formalized Planning Technique to other projects

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THANK YOU!

Our Challenge to You…

Create a Vision …

Set 1 Goal that helps to preserve the Environment…