KPPC
Kentucky's Resource Center for Environmental Sustainability

Kentucky Pollution Prevention Center

Drought and Industrial Process Water Management (PWM)

Department of Commerce Forum on Industrial Water Use

September 23, 2010

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Executive Director

What is KPPC?

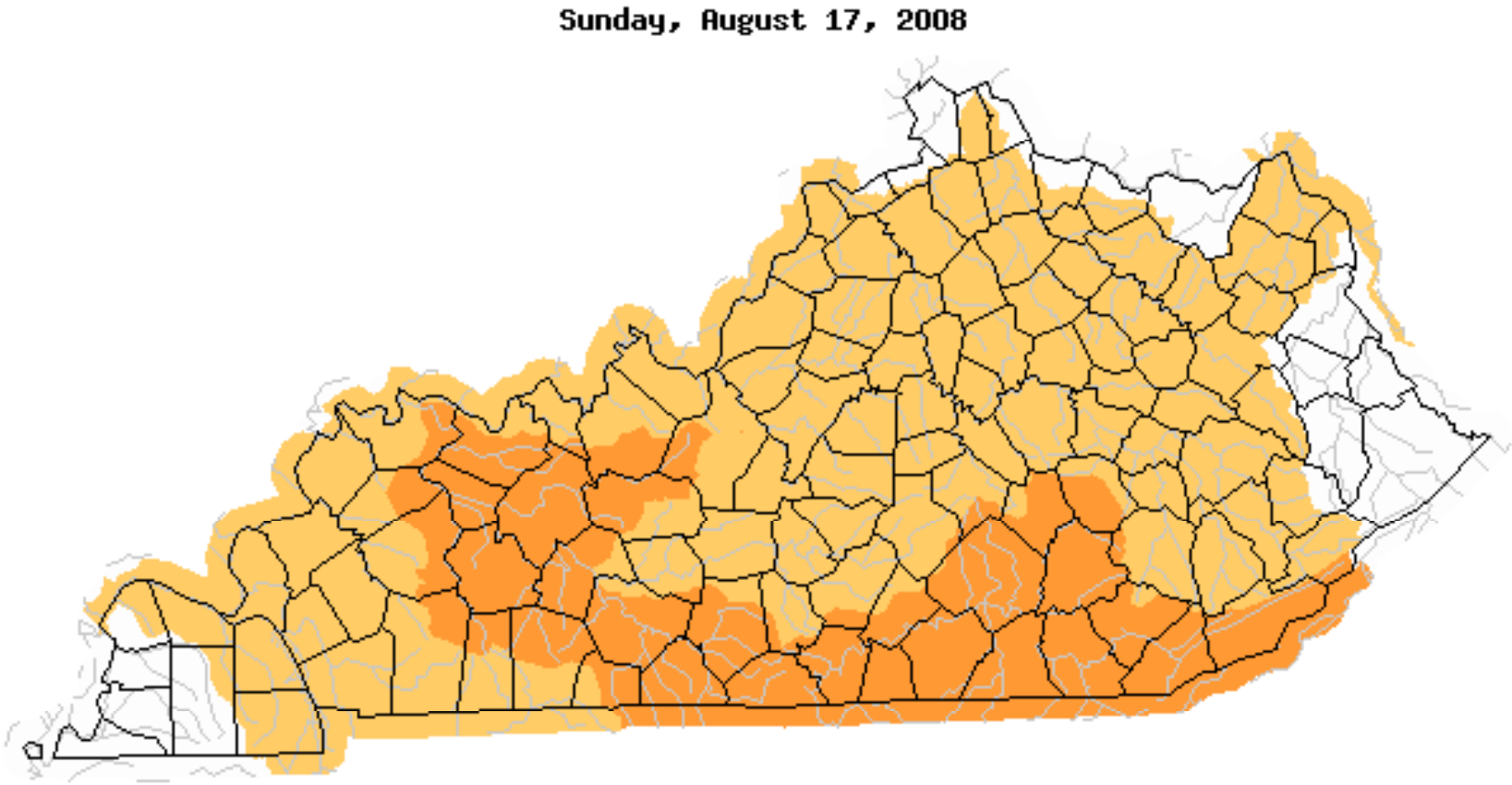
- KPPC is a non-profit organization established in 1994 through a state legislative mandate
- Provide statewide technical assistance & outreach programs
- Based at the *University of Louisville's* J.B. Speed School of Engineering
- Represents the *University of Louisville* as a nationally recognized Center of Excellence
- Provides hands-on training for students through the Cooperative Education Program at SSoE

KPPC Mission

KPPC is Kentucky's primary resource to help businesses, industries and other organizations develop environmentally sustainable, cost-saving solutions for improved efficiency.

Based at the University of Louisville J.B. Speed School of Engineering, KPPC provides technical information and assistance that is free, confidential and non-regulatory.

2008 Drought Status for KY



USGS

Drought Mitigation Planning

Goal: Identify data needs that must be addressed to effectively implement DM

- "Don't ignore the source."
  - How much water do we have?
  - How much water do we use?
  - Where are we using water?
- Smart Growth…Growth planning for infrastructure & water supply
  - Conservation programs exist but need to be incorporated into drought mitigation plan
- Industries Future Needs
  - Water Supply Planning Councils (15 ADDs)

Drought: Driver for "Water Intensive Manufacturer" Action Plan

Goal: Facilitate implementation of risk reduction activities (during non-drought years)

Goal: Develop institutional partnerships that work to reduce drought risk

- Communication & Outreach
  - Vulnerability assessment for "water intensive manufacturers"
  - Water quality issue needs to be determined (in advance)
  - Implementing Process Water Management (PWM) Program
- Reduce Drought Risk & Improve Competitive Edge
  - Optimization of water sources (operate water assets better)
  - PWM trials & demonstrations of water conservation technologies & practices

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Technology Diffusion Initiative (TDI)

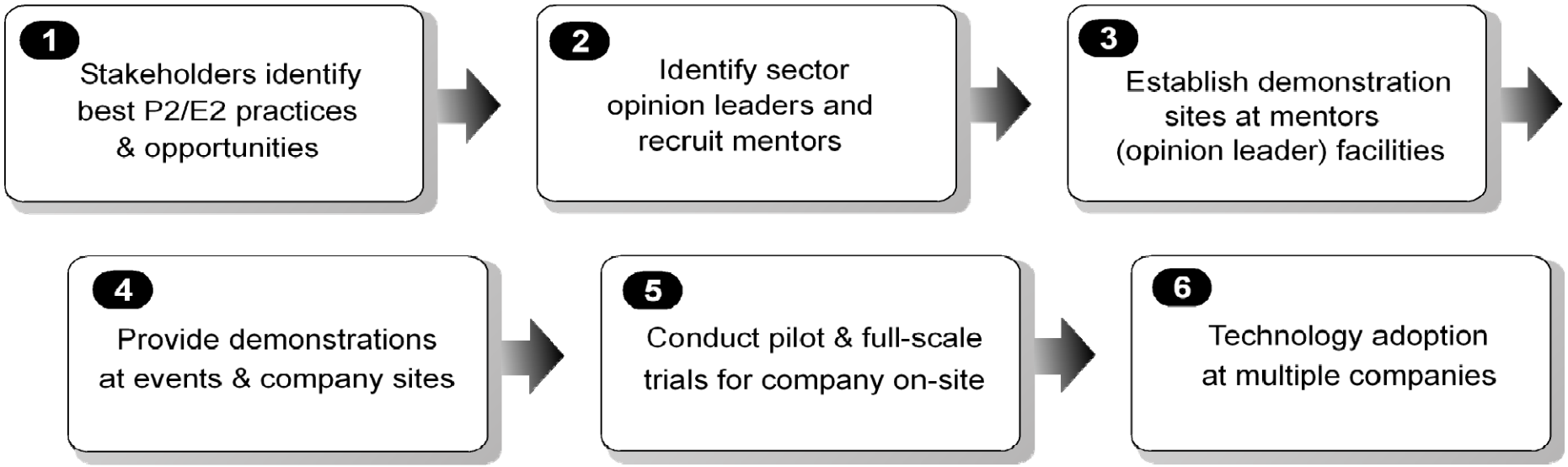
Diffusion = Demonstration + Deployment

- Federal appropriation & USEPA NRMRL grant
- Market conditioning for proven P2/E2 technologies & practices

Improve Market Conditioning

- No “buy in” for P2/E2 technologies being “pushed” upon industries with an “unnecessary” additional cost
- TDI marketing is “pull” approach that probes industry leaders & experts for their needs, viewpoints & demands
  - Stakeholder groups are a powerful tool

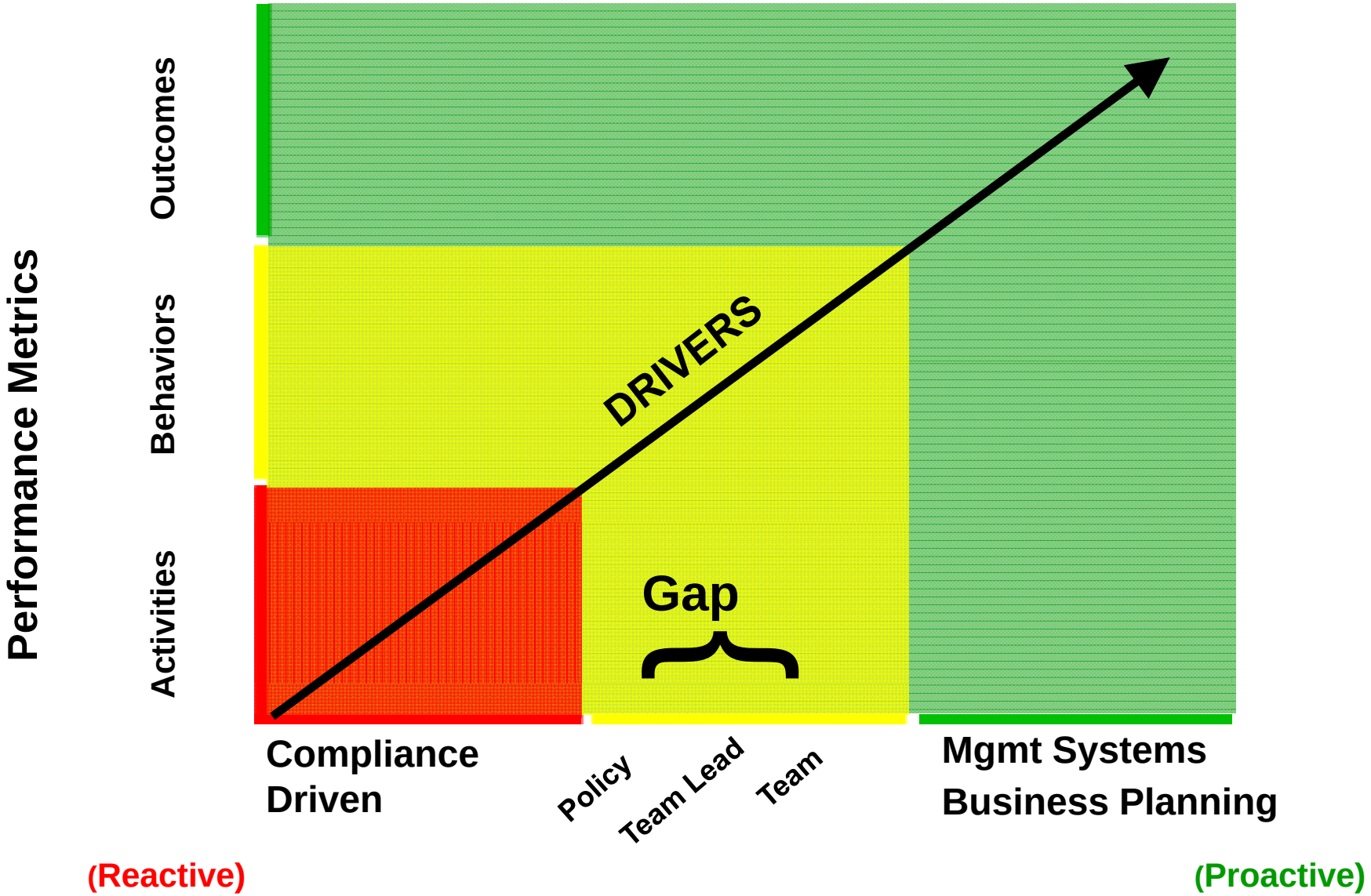
Figure 1 ADOP^{2}T^{TM} Program Process Map



Early in Phase 2, KPPC realized that:

- Client's organizational capacity for P2/E2 implementation needed to be improved
- The price & cost of water usage was not understood in water intensive industries
- Limited staff resources were assigned to TDI (2.5 FTEs)
- Refocused efforts on Process Water Management (PWM) program for all sectors

“Cultural Technology”



Organizational Capability

- Some client's organizations are not ready to explore & implement new technologies or concepts
- Calibrate with the client at the outset
- PWM allows organizations to successfully address, deploy & implement profitable environmental solutions
- 7-step process provides internal structure for transition from reactive to proactive

7-Step Process Water Management (PWM) Process

MANAGEMENT

1. COMMITMENT TO CONTINUAL IMPROVEMENT
3. SET GOALS
4. ACTION PLAN
5. IMPLEMENT PLAN
6. EVALUATE PROGRESS
7. RECOGNIZE ACHIEVEMENTS

TECHNICAL

2. MONITOR & MEASURE

DEVELOP BASELINE for Water Use & Costs

P2 OPPORTUNITY ASSESSMENTS

PWM Drivers

- Water intensive companies engage in PWM projects because it is a tangible, visible & a familiar media
- Water media is less complex than trying to attack everything at once
- Early successes help energize the team to identify other operations where significant environmentally related cost savings can be identified
- PWM connects to offline support operations such as RO units, DI units, boilers, air compressors & cooling towers

The Short & Sweet of PWM
Price vs. Cost

- <u>PRICE of water</u>
  - Incoming H_20 at the meter + sewer charge = price
  - Usually not recognized as a significant cost
- <u>COST of water</u>
  - Cost = price + added costs as it flows through processes & waste water treatment
  - Could be a big number & is usually lost in overhead
    - 4-5 cents per gallon or up to 50 cents
  - Example: Price = $200,000
    Actual = $7,000,000
- PWM identifies all costs & quantifies savings opportunities at each identified process step for water, chemical & energy use

KPPC's Excel Spreadsheet Tool Kit

- Provides a "utility" cost & usage analysis
- Provides the client user with a means of tracking each process for usage & costs:
  - Water, sewer, raw materials, natural gas, fuel oil, propane, electric (including ancillary & treatment processes)
- Ongoing tracking of processes to identify trends & recognize unexplained increases in cost or usage

Analyze Existing Data

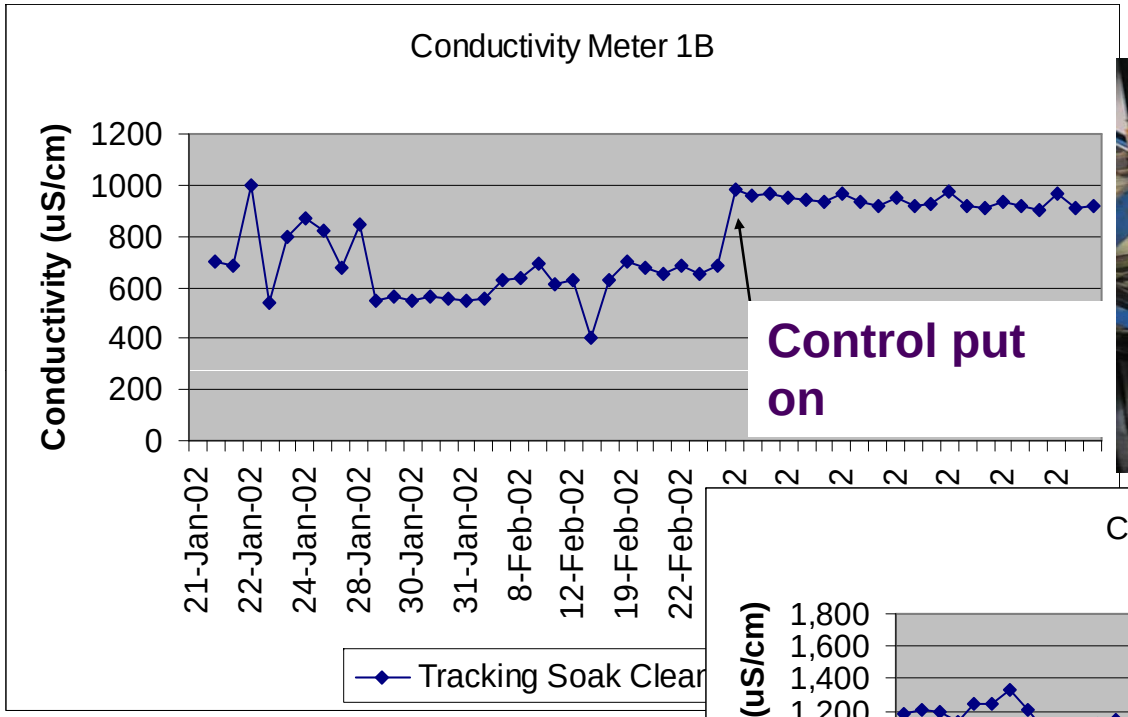
WATER USAGE DETAIL			12.12.07				
SIGNIFICANT H2O USERS			Source:	Water Study			
PROCESS	MEASURED	H20 MONTHLY	H20 ANNUAL	USAGE		H2O FLOW	MEAS.
DESCRIPTION	FLOWRATE	USAGE GALS.	USAGE GALS.	MEASURED	COMMENTS	STATUS	NEEDED
	DAILY gals.	or Tank Cap.					
Line A - Parts Washer	300	6,000	72,000	Yes	3 tank capacity	Continuous	
Line A	97200	1,944,000	23,328,000	Estimated	Multiple overflows	Continuous	Yes
Line B	69600	1,392,000	16,704,000	Estimated	Multiple overflows	Continuous	Yes
Line C	Unknown	365	Unknown	Estimated	Pit capacity??????	Continuous	Yes
Coating	Unknown	3,400	Unknown	Estimated	Multiple overflows	Continuous	Yes
Plant Sanitary	6180	123,600	1,483,200	Estimated	Based on 20gal/person		
Total	167100	3,342,000	40,104,000				
Invoiced Usage		6,000,000	72,000,000				
		2,658,000	31,896,000		Unaccounted for usage		

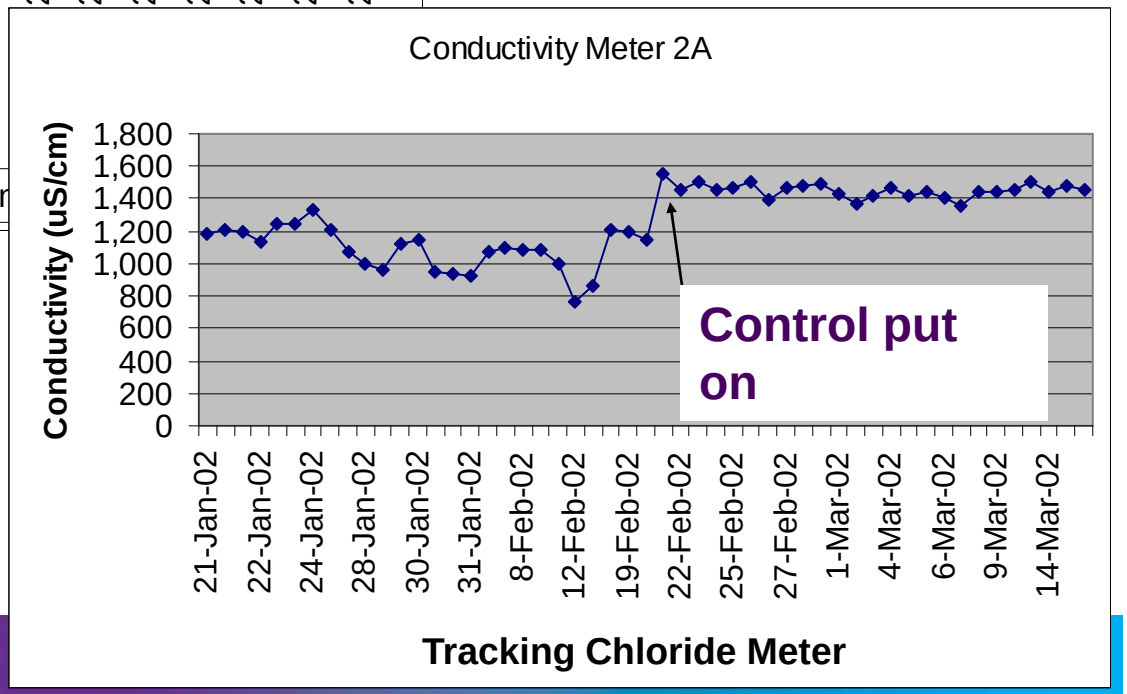
Source: Cost Improvement Water Study

Water & Sewer Rate Increased 35% per year for 3 years

2006 Cost = $265K 2007 = $357K 2008 = $482K

Operational Control & Monitoring & Measurement

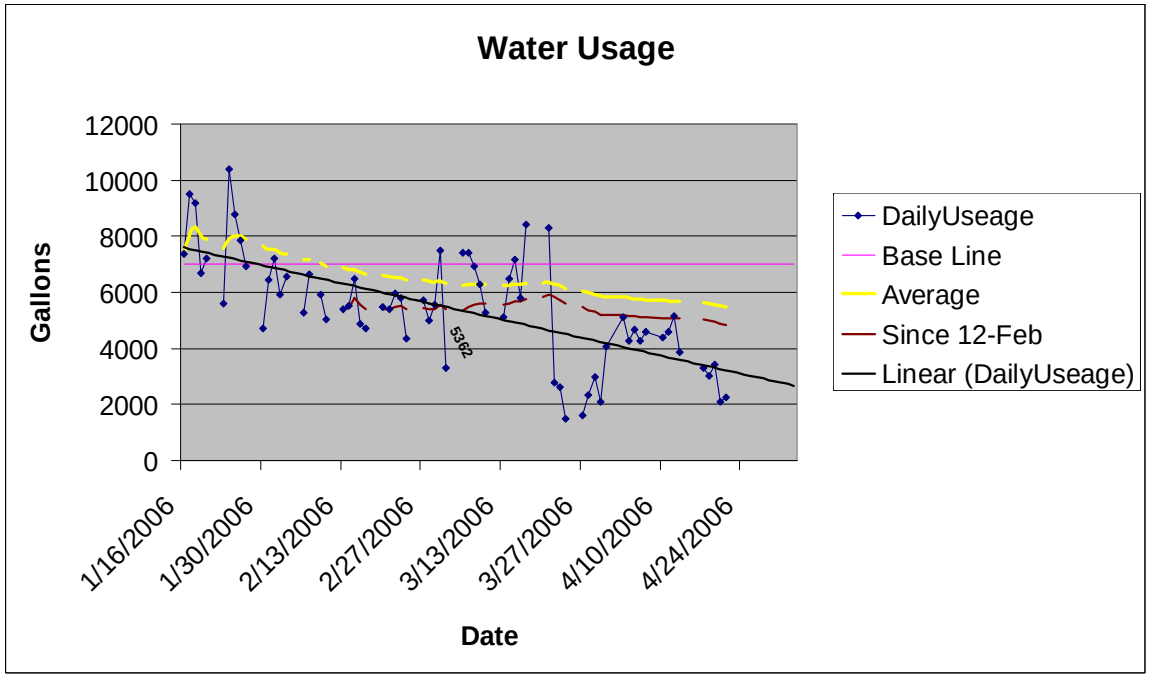




Conductivity Rinse Water Controllers for Electro Deposition Paint Line

Automobile Parts Manufacturer

- Before trial used 7,600 GPD
- After 3 months trending to 2,700 GPD
- Conserves water resources
- Saves money in treatment chemicals & sludge hauling



EPA WATER EFFICIENCY LEADER AWARD

PROGRAM SUMMARY	GALLONS	POUNDS	KWHs	MM BTUs	DOLLARS
WATER					
Water Use Reduce Gallons	2,128,688,200				
$ Savings Meter & Sewer $$					$1,431,727
CHEMICALS					
WWT Chemical LBS. Savings		175,200			
Other Chemical LBS. Savings		2,256,170			
$ Chemical Savings $$					$411,955
ENERGY					
Electricity = KWH			5,552,401		
Natural Gas = BTUs MM				131.87	
$ Energy Savings $$					$1,133,966
WASTE					
Solid Waste LBS.		5,107,300			
Liquid Waste Reduce Gallons	30,513,600				
$ Waste Savings $$					$433,050
SAVINGS & INCOME					
$ Other Savings $$					$671,643
$ Income Produced $$					$16,987
OUTCOMES =	2,159,201,800	7,538,670	5,552,401	131.87	$4,099,328
	GALLONS	POUNDS	KWHs	MM BTUs	DOLLARS

Sustainable Water Resource Management

- Help provide the conditioning necessary for market penetration of innovative PWM technologies & practices
- Link technology & product developers with the end-users that are trying to solve real-world problems
- Build confidence by verifying the technologies effectiveness through demonstration
- Demonstrate how PWM improves environmental performance & competitiveness

Strengths for TAPs

- Good approach for scoping out new projects that will result in a higher implementation rate
- Most companies do not have the technical savvy or time to evaluate P2/E2 technologies
- With TAP assistance, opinion leaders can “test drive” P2/E2 technologies before committing to full implementation & large capital investment
- Demonstrations help companies develop an understanding of what the technology can do and how it works in a real world situation (product quality and throughput rates)

Weaknesses

- Pilots & demonstration projects are hard to set up
- These projects require a team approach to implement
- Requires significant company &TAP's staff resources
- Project can last over a month or more depending on the technology being trialed
- Project results are promising but it is very likely that none of the opportunities evaluated in this project would have been implemented without a TAP's assistance

Winner US EPA's 2007
National Water Efficiency Leader Award
For NGO Category

EPA
WATER EFFICIENCY
LEADER AWARD

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STAY FOCUSED ON THE TASK

My Old Kentucky Home

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