



The True Cost of Water

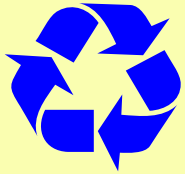
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Water is important vs. Water is Cheap

- Lean assessment performed at automotive assembly plant in Illinois
- Team included plant personnel, CMS provider, waste management provider & some Tier II suppliers





Phosphate Line: Cost of Water Assumptions

The cost of water estimate includes city water, DI water, WTP chemicals, process chemicals (book values), heating energy.

This estimate does not include sewer user fees, sewer discharge fees, WTP fixed costs, and phosphate line maintenance.





Is water really cheap?

Phosphate Line: True Cost of Water

What is the true cost of water?

~~\$2.25 per 1,000 gallons~~

On average, the true cost of water is...

\$80 per 1,000 gallons



Phosphate Line: Reducing Chemical & Water Consumption

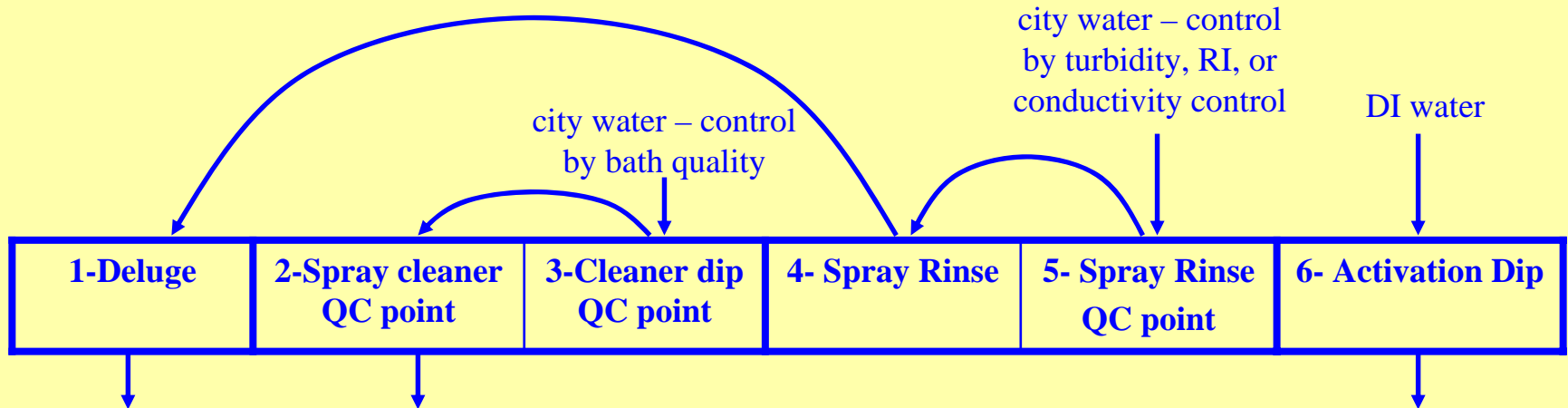
Decouple alkaline side overflows

Three distinct zones:

1. Rinse tanks

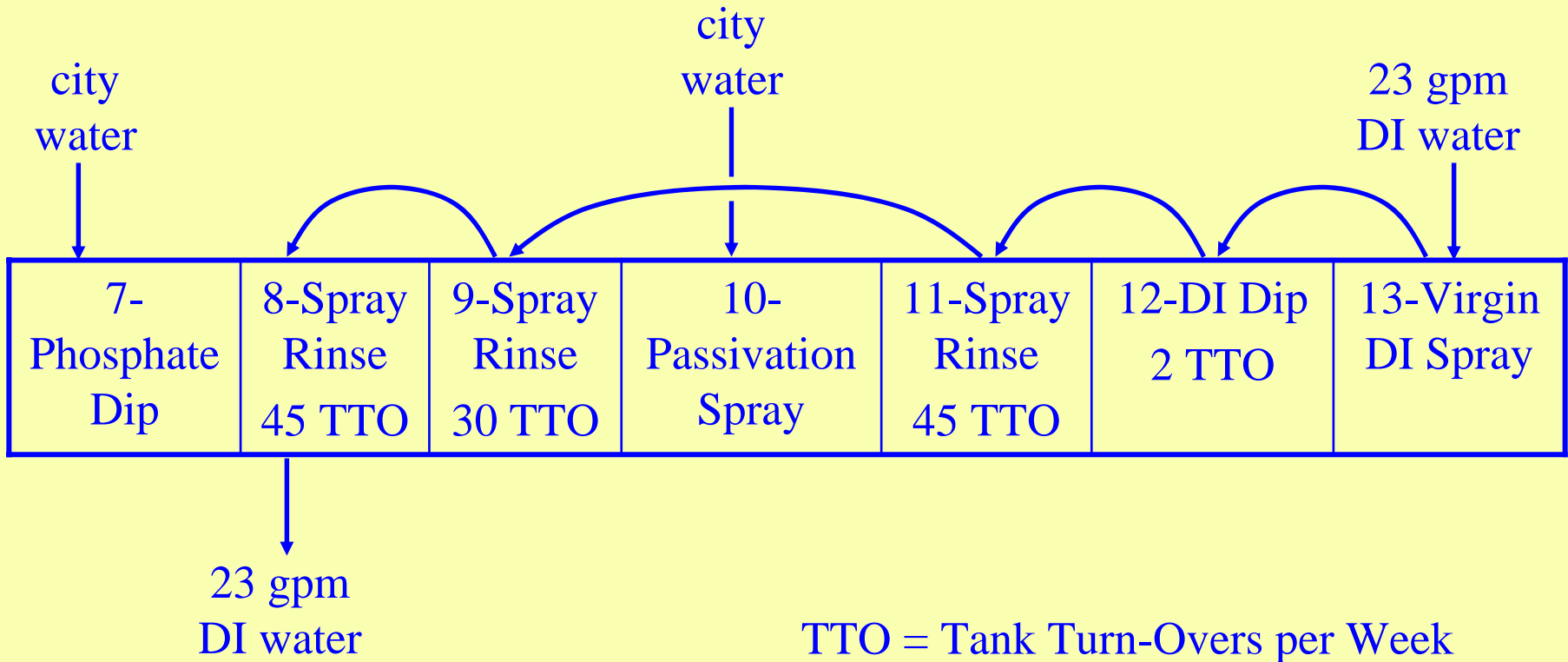
2. Cleaner tanks

3. Activation Dip tank



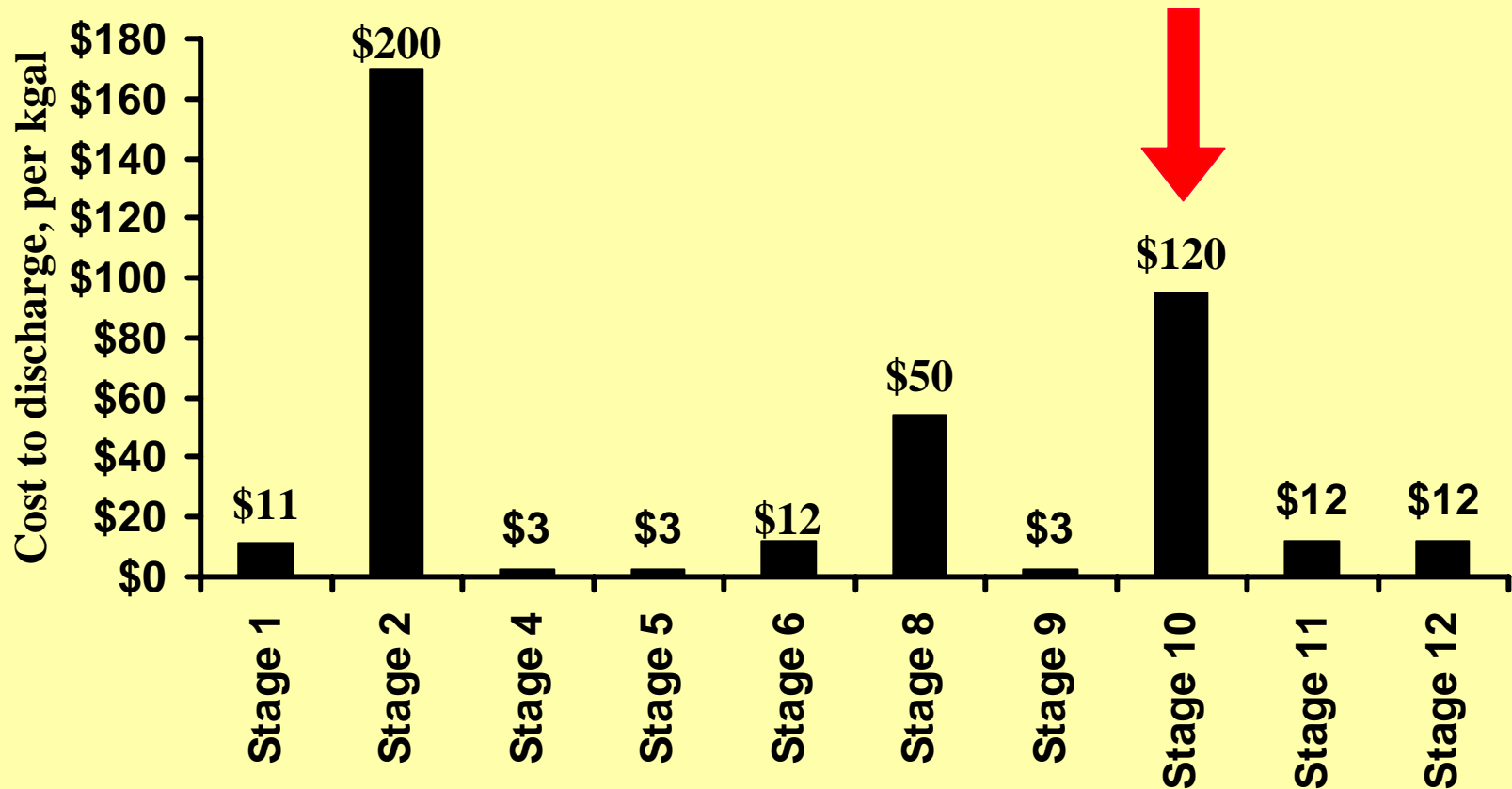


Phosphate Line: Cost of Water Overflow Assumptions, Acid Side



Phosphate Line: Cost of Water - Components

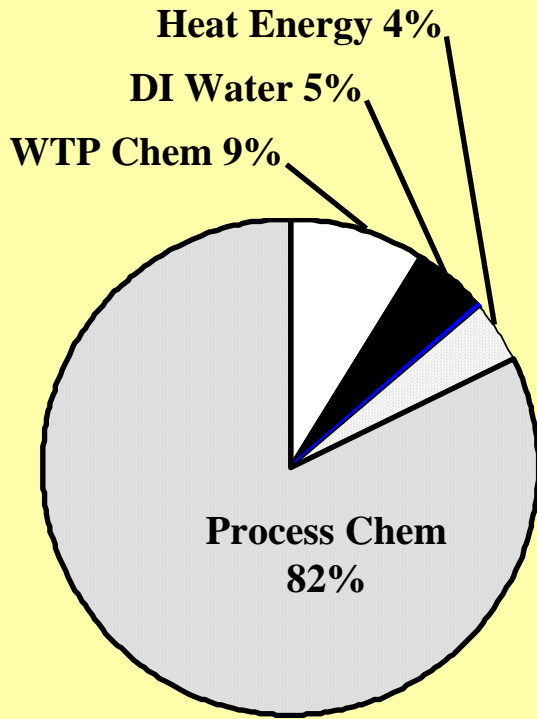
Stage 10 to be
eliminated



Phosphate Line: Cost of Water - Components

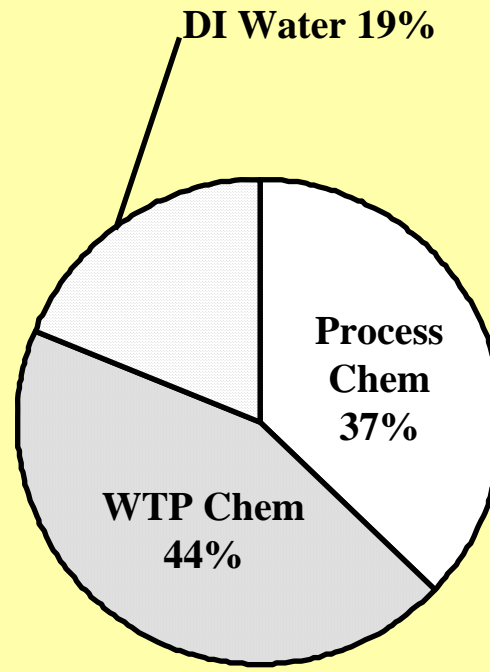
Stage 2 Cleaner Spray

\$200 per kgal



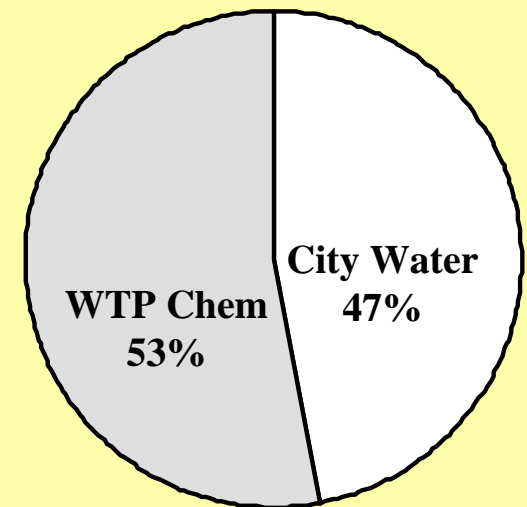
Stage 8 Phosphate Rinse

\$60 per kgal



Stage 9 Rinse Spray

\$3 per kgal



Phosphate Line: Process Variation

How much CK171ALF is needed at Stages 2 and 3?

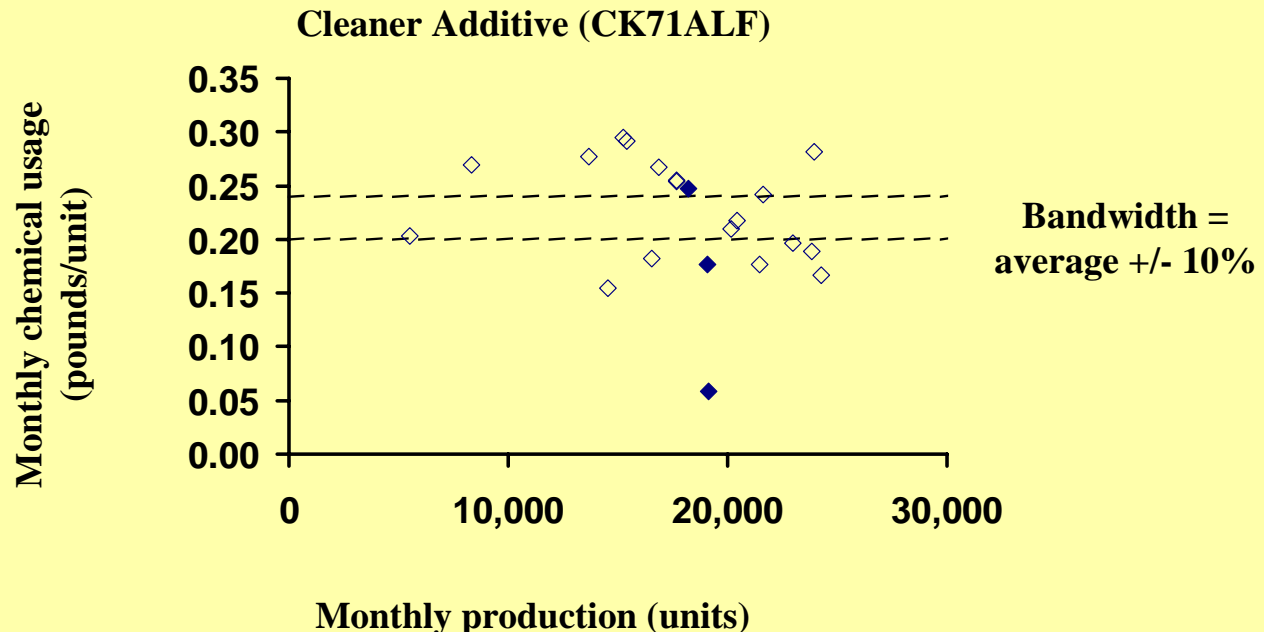
Minimum usage is 0.06 lbs per unit.

Cost is \$20,000 per year.

Average usage is 0.22 lbs per unit.

Cost is \$70,000 per year.

*based on 200,000 units per year

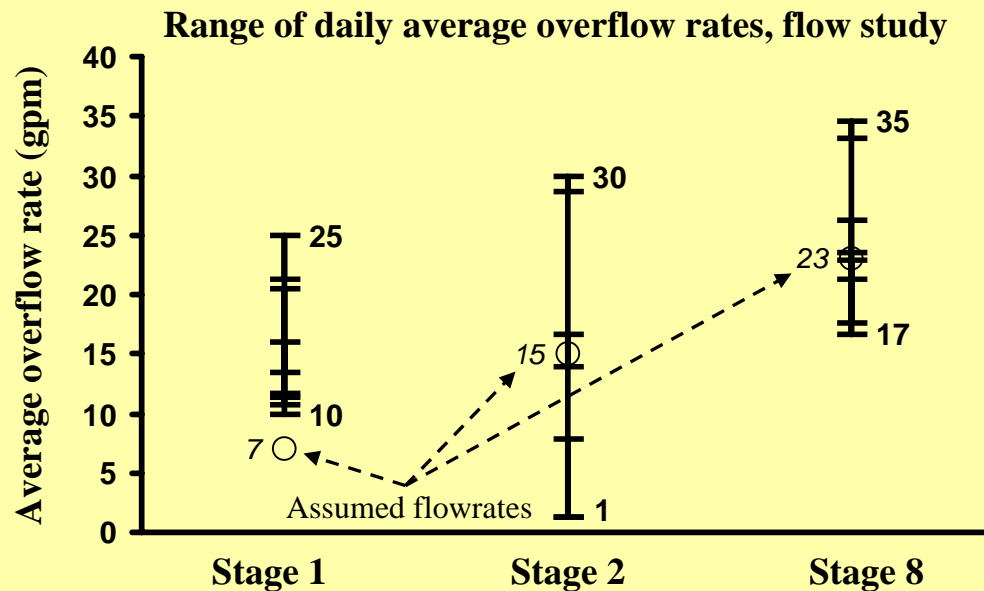


Phosphate Line: Process Variation

February 2004 Flow Study Results

Erratic Flow Control

Average daily flow rates are highly variable, despite near constant production



**Water usage drives the bus on
chemical usage!!!!**

Chemicals are metered into water
based on detected levels in the water

**Who pays for the high cost of
water?**

CMS provider

Who Controls Water Flow?

Plant Personnel

**Should CMS Providers Manage
Water?**



Chemical and Water Savings Potential

- Process chemicals savings potential: \$550,000 per year
 - Stages 2 & 3: \$250,000
 - Stage 6: \$100,000
 - Stage 7: \$200,000
- Water savings potential
 - At least 3,000,000 gallons per year
 - At least \$30,000 per year
 - Up to \$60,000 per year in WTP chemicals
- Wasted heat energy: \$15,000 per year





The Quality Paradox

Plant is reluctant to Test
process improvements

Might affect product quality

Impact on Quality is unknown

Process data is limited

Data not
Collected

Available Data
Not Used

Process quality is not
improved because it
might affect product quality



Water is expensive and
important!!!!