

# Dragout Reduction

**Scott Lamb**

*Department of Ecology  
Toxics Reduction Specialist  
slam461@ecy.wa.gov  
425.649.7268*

**Judy Kennedy**

*Department of Ecology  
Toxics Reduction Engineer  
jken461@ecy.wa.gov  
360.407.6385*

# I'm The Cheap Guy!



# Dragout Impacts

- Increased plating chemical

# Dragout Impacts

- Increased plating chemical
- Increased rinse water or decreased rinse quality

# Dragout Impacts

- Increased plating chemical
- Increased rinse water or decreased rinse quality
- Increased dragin into next bath

# Dragout Impacts

- Increased plating chemical
- Increased rinse water or decreased rinse quality
- Increased dragin into next bath
- Decreased product quality

# Dragout Impacts

- Increased wastewater generation

# Dragout Impacts

- Increased wastewater generation
- Increased WWTS treatment chemicals use

# Dragout Impacts

- Increased wastewater generation
- Increased WWTS treatment chemicals use
- Increased WWTS filter cake generation

# Dragout Impacts

- Increased wastewater generation
- Increased WWTS treatment chemicals use
- Increased WWTS filter cake generation
- Increased metal concentration in the WWTS discharge

# Is This Happening at Your Shop?



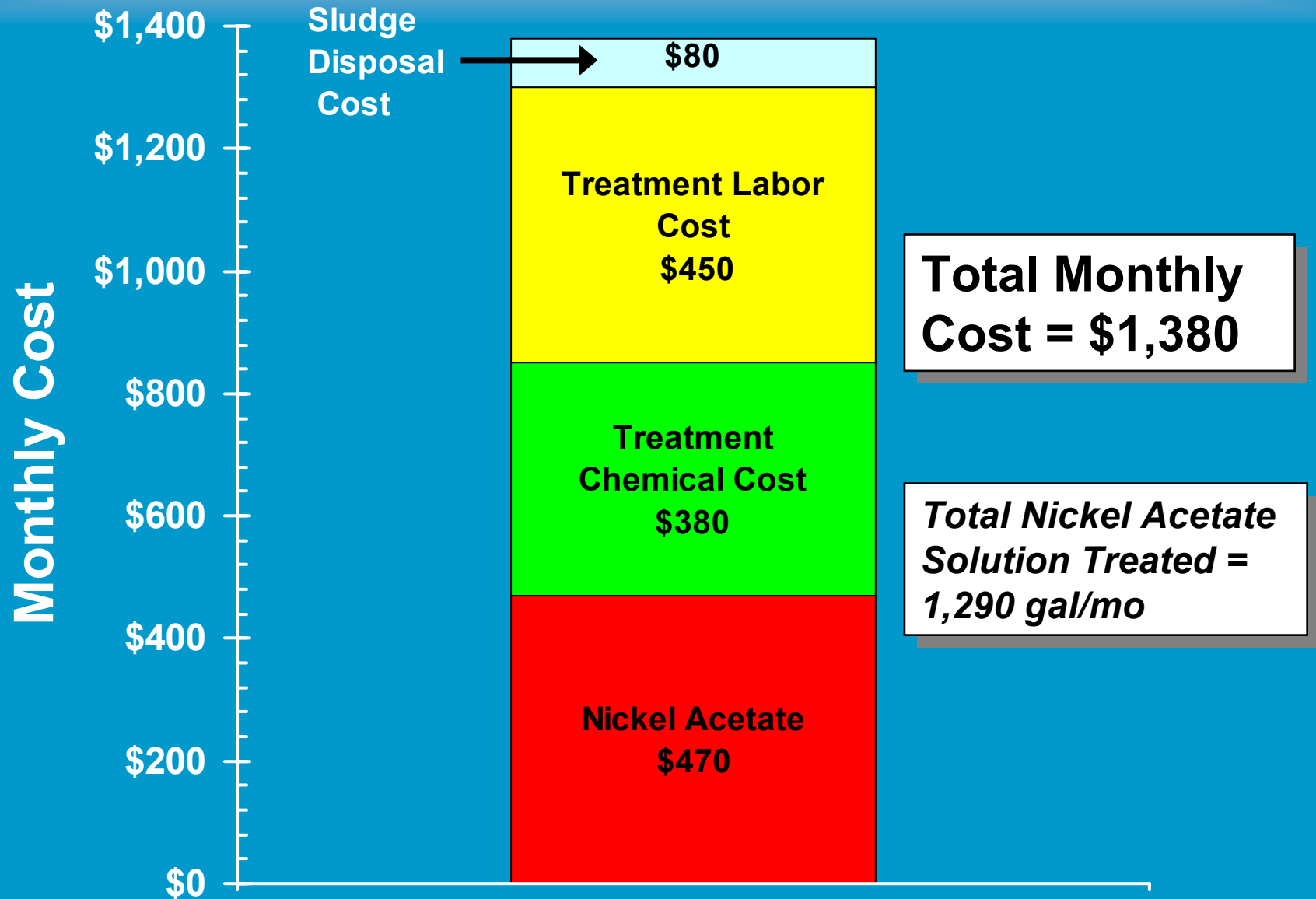
*\*see EPA Dragout Reduction video*

# How Much is Throughput Costing You?

- What is your rate-limiting step?
  - Process Bath
- Why is it important?
  - Increased dragout impacts = costs

Speed does not always mean more profit

# Throughput May Be Costing You \$\$



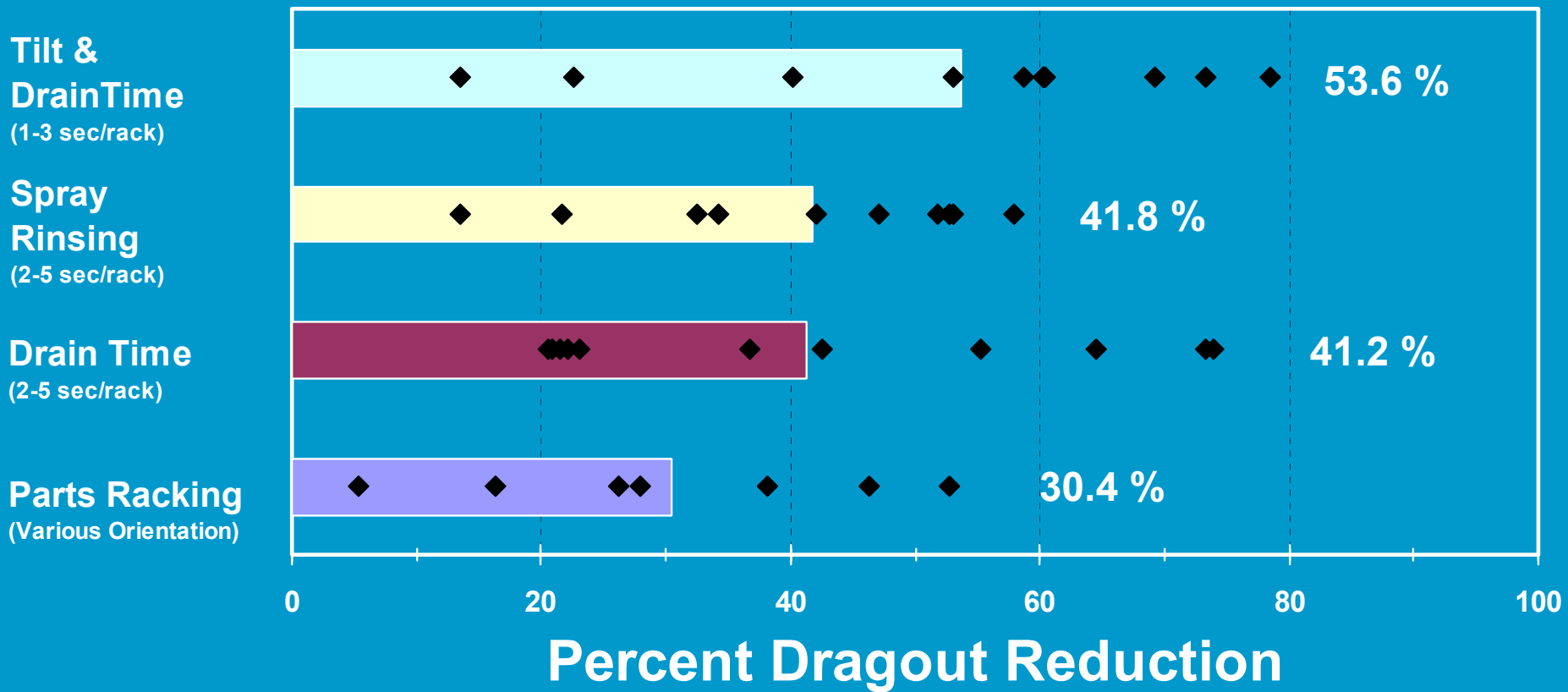
# Low-Cost of Dragout Reduction

Good technology can not replace good technique, but...

...good technique can often eliminate the need for good technology.



# Good Technique Matters!



# Good Technique

1. Racking techniques
2. Rack maintenance
3. Downtime
4. Withdrawal rate
5. Dragout reduction

# Racking Technique

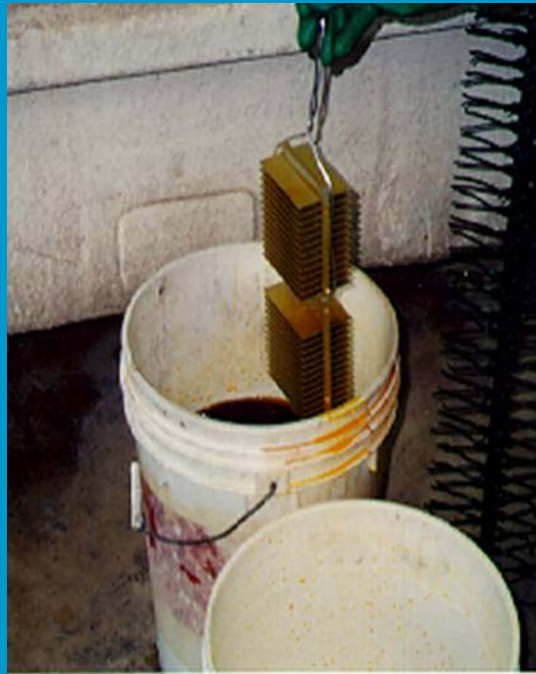
- 1 out of 10 metal finishers are missing this opportunity

# Racking Technique



*\*see EPA Dragout Reduction video*

# Impact of Racking



**Horizontal**



**Vertical**

Proper racking reduced dragout  
by 90% for these parts!!!

# Racking Maintenance Reduces Dragout



# Drain Time

- 35% of Washington's metal finishers are missing this opportunity
  - Hang bars
  - Winches with delay switches/tilting
  - Drain boards

Note that when we combine drain time and tilting we save 53.6% on dragout

# Drain Time



*\*see EPA Dragout Reduction video*

# Withdrawal Rate

- 44% of Washington's metal finishers are missing this opportunity

# Withdrawal Rate



*\*see EPA Dragout Reduction video*

# Dragout Tanks

- Reduce amount of dragout to rinse baths
- Possibly go back into making up the process bath

# Dragout Tanks

Plating



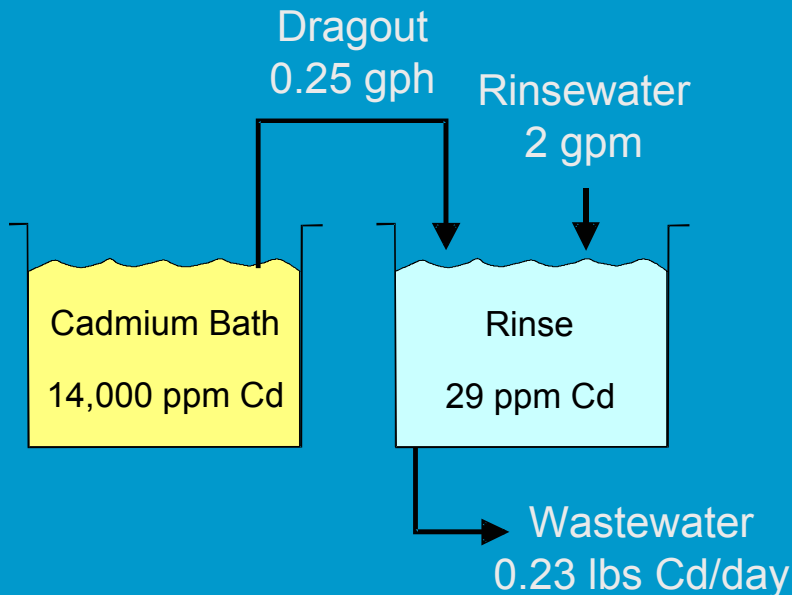
Dragout



*\*see EPA Dragout Reduction video*

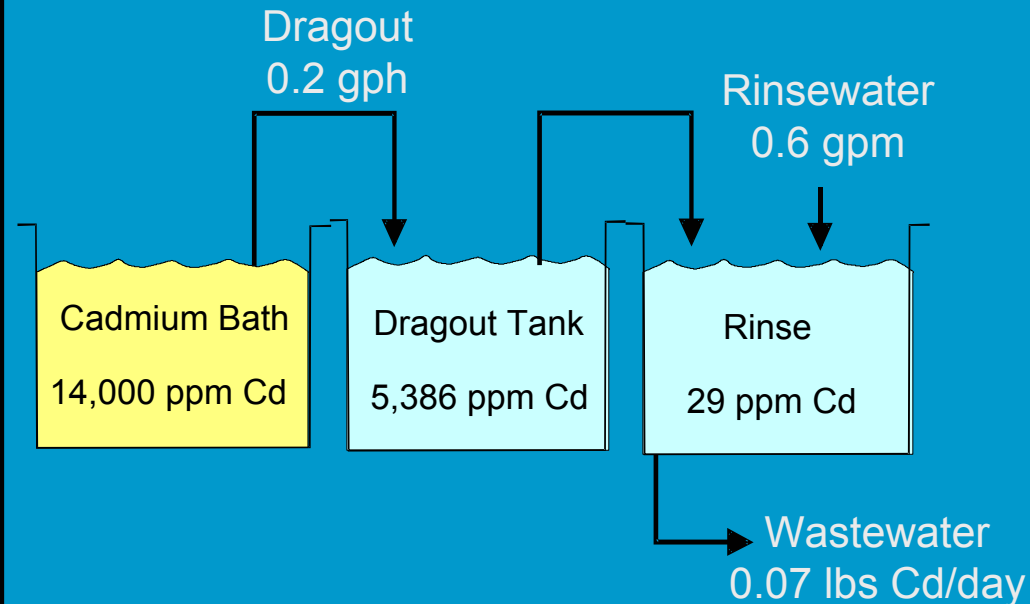
# Dragout Tanks

## Before



- Rinse water flow rate = 2 gpm
- Dragout rate = 0.25 gph
- Cadmium discharge = 0.23 lb/day

## After



- Rinse water flow rate = 0.6 gpm
- Dragout rate = 0.20 gph
- Cadmium discharge = 0.07 lb/day

# Bath Maintenance\*

- Too much bath chemical increases the amount of dragout
- More dragout means
  - More treatment
  - More sludge
  - More cost per part

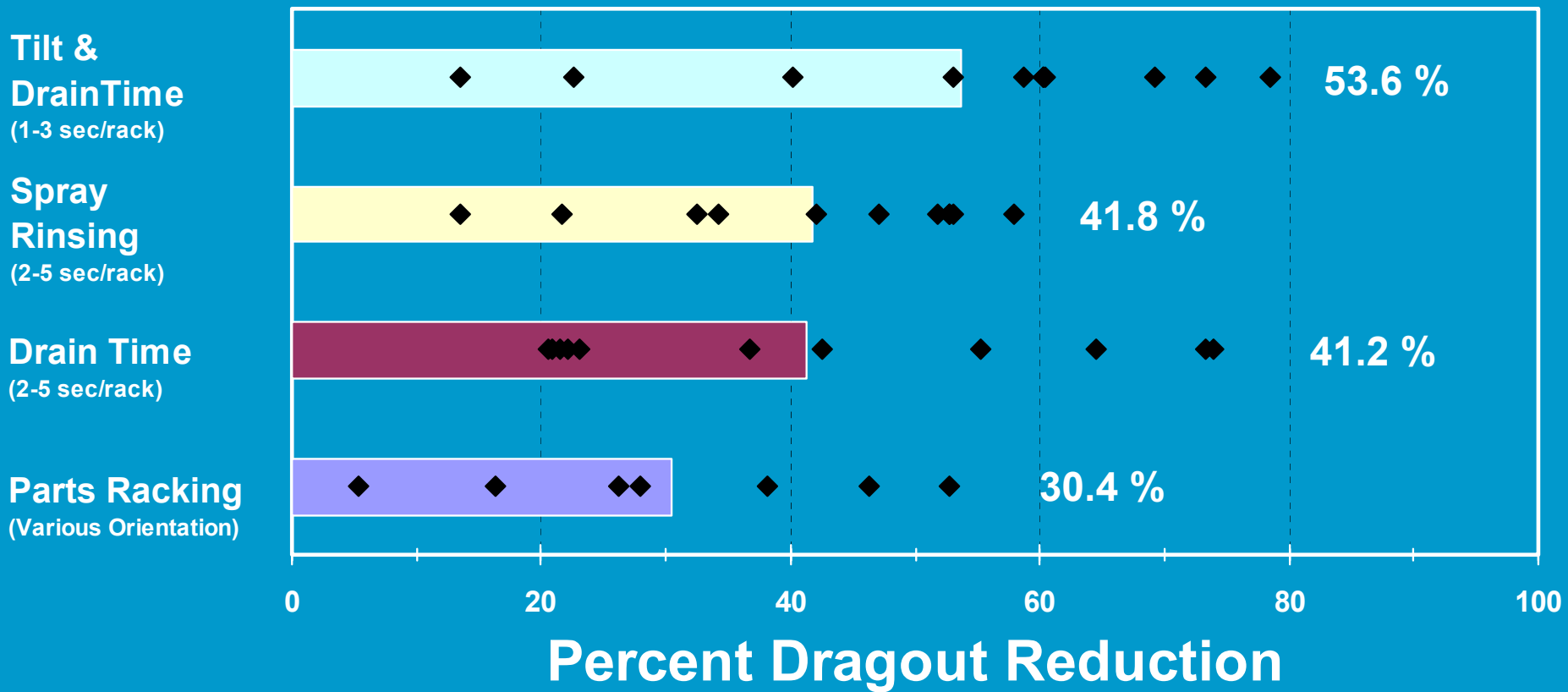
\*See Bath Maintenance Presentation and Tool Box

# Bath Maintenance\*

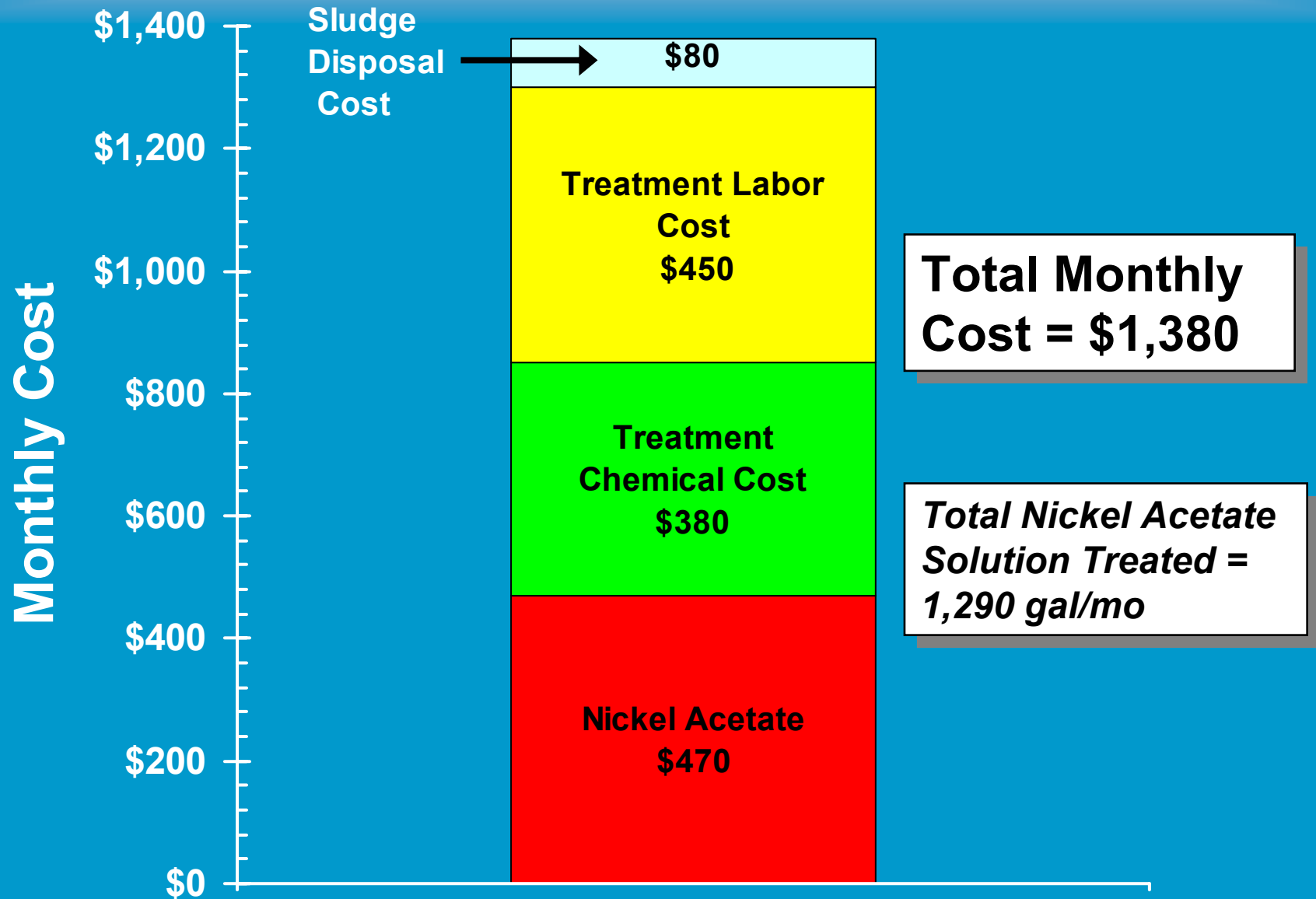


*\*see EPA Dragout Reduction video*

# Good Technique Matters!



# Throughput May Be Costing You \$\$



# Case Study

## *Northwest Etch Technology*

- Parts holders
- Equipment maintenance
- Air knives
- Pinch rollers
- New technology
- Reduced dragout waste by 60%
- Saving \$14,000 a year in disposal alone

# Toolkit For Teaching Dragout Reduction

- Racking
- Drain Time
- Withdrawal
- Dragout Tanks
- Bath Maintenance

# Tools

- Dragout reduction training video
- Vendor information
- Training
- Management oversight
- Networking with peers
- TREE
- Technical Assistance Visits

# We Know How to Train



# Remember!!

- Look at your rate limiting steps and through-put
- Use good techniques
- Waste will be reduced which means \$
- We know how to train—Call our staff
- I'm the cheap guy. Call our technical assistance staff.