



Water Conservation at Nico Products

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Driven to DiscoverSM

Nico Products

•Company Description

- Located in Minneapolis, MN
- Over 50 years of plating in this facility
- 100,000 sq ft facility
- 120 employees

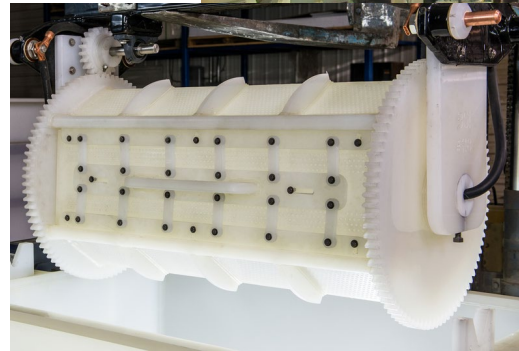
•Consumer Industries

- Aerospace
- Automotive
- Military
- Tech



Electroplating

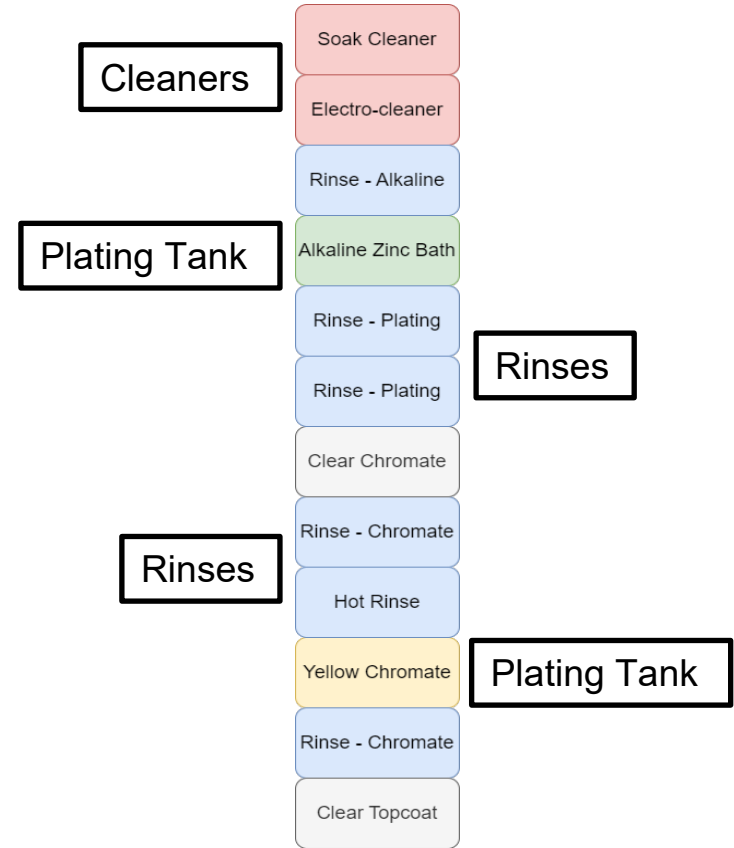
- **Electroplating:** depositing a metal onto another by hydrolysis and an electric current
- **Rack:** a frame designed to hold a variety of metal parts
- **Barrel:** a cylindrical container that holds several smaller metal parts



Not pictures taken at Nico Products

Electroplating

- **Cleaner Tank:** a tank at the start of the line that preps the parts for plating
- **Plating Tank:** any tank where the metal is being coated
- **Rinse tank:** a tank full of water to remove any residual chemicals



Incentives to Change

Current Situation:

- No flow map and few flow meters to confirm flowrates
- Over twice as much water use as Avtec at 23 MGY
- 160 heated tanks
- 10 one-ton bags of solid waste are disposed of every other week for \$500 a bag



Incentives to Change

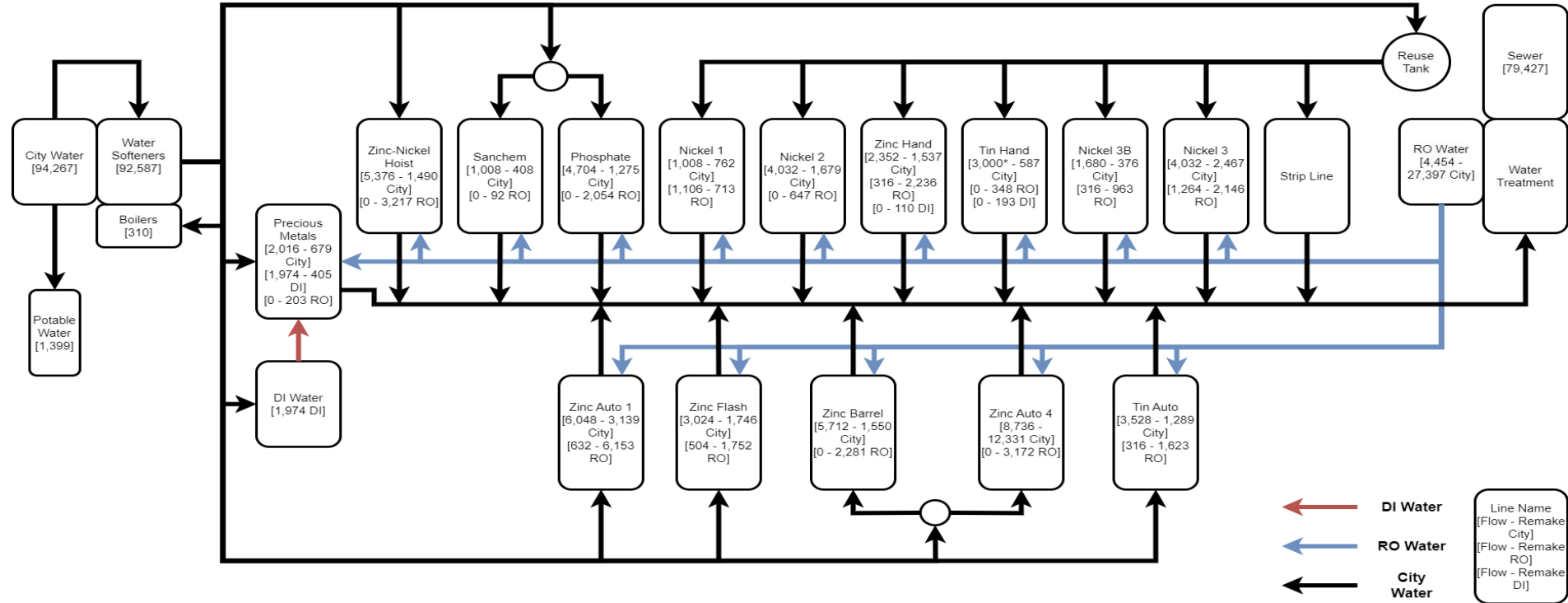
Deliverables:

- Record data for several processes
 - Flowrates of rinses
 - Evaporation rates
 - Rinse conductivity
 - Pressure of rinses
- Create flow map of facility



Use data to cut down on water use and overall waste produced

Daily Water Use



Evaporation Rates

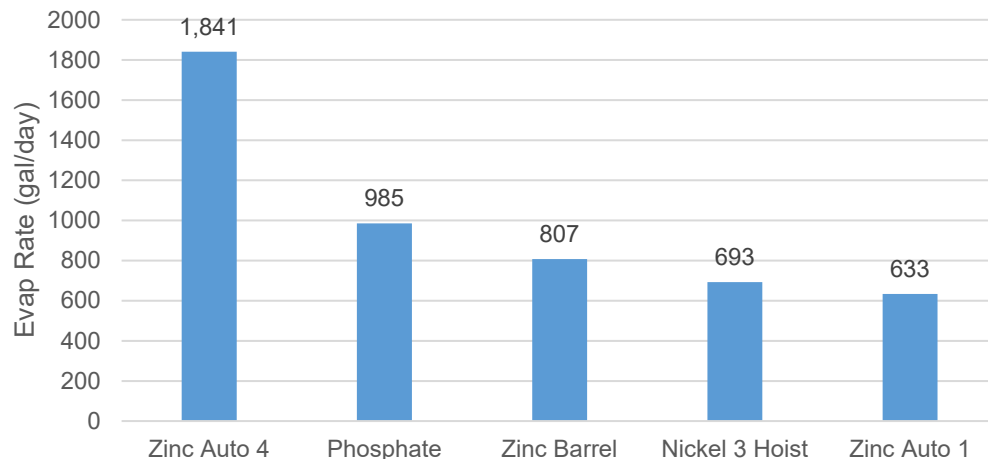
- Evaporation equations were used from an industry resource the STERC Rinsing Manual

- Evaporation Equation:

$$e^{((0.03226 * T) - 7.2)} * \left(\frac{A}{144}\right)$$

- Evaporation rates will fluctuate depending on air agitation, change in temp (seasonally or otherwise), etc.

Top 5 Contributors of Evaporation



	Operation Hours (5am-1am)	Non-Operation Hours (1am-5am)	Combined hours
Total (gal/hour)	414	26	8,385
Total (gal/year)	2,150,000	84,000	2,180,000

Barrel Line Floats

- **Barrel Line**

- 28 Tanks

- 5 Tanks over 100° F account for 92% of evaporation

- **Spherical Floats**

- Max temp for floats is 230° F

- Optimal floats are the 2" diameter polypropylene spherical floats



Barrel Line	Evap Rate (gal/hr)	Yearly Evap Loss	Initial Cost	Payback Period
Tanks over 100° F	36.85	\$5,954	---	---
With Sphere Floats	3.68	\$595	\$1,573	2.5 months

Solutions

Recommendation	Annual reduction	Total cost	Annual savings	Payback period	Status
Increased Drain Times with Drainboards	111,000 gal	\$0	\$24,000	Immediate	Recommended
Install Conductivity Sensors	3,100,000 gal	\$18,000	\$38,000	4 months	Recommended
Plating Floats for Barrel Line	19,000 gal	\$1,500	\$5,900	2.5 months	Recommended
Shutdown tanks when not in operation	84,000 gal	\$0	\$2,600	Immediate	Recommended

Personal Benefits

- Project management
- Insight into the electroplating industry
- Valued career experience
- Cool steel toed boots

