



Nissan North America

Jon K. Holland, CPESC

Water Reuse

August 23, 2018

**NISSAN GROUP
OF NORTH AMERICA**



U.S. Footprint



Nissan North America
Headquarters
(Franklin, Tenn.)



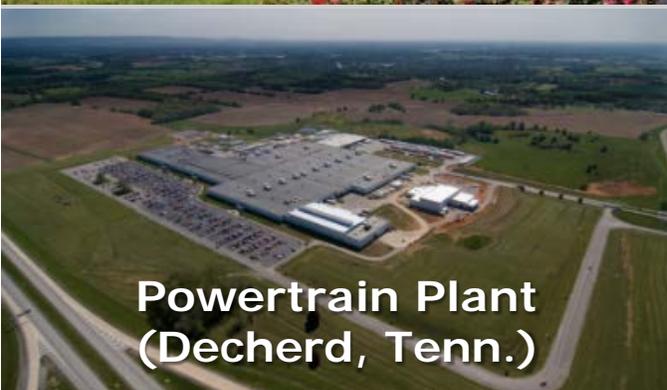
Vehicle Assembly Plant
(Canton, Miss.)



Vehicle Assembly Plant
(Smyrna, Tenn.)



Nissan Technical Center
(Farmington Hills,
Mich.)



Powertrain Plant
(Decherd, Tenn.)

More than **22,000** employees
in the U.S.



Arizona Technical
Center
(Chandler, Ariz.)



Nissan Design America
(San Diego, Calif.)



Nissan Motor Acceptance Corporation
(Dallas, Texas)



Advanced Research
Center
(Silicon Valley, Calif.)

U.S. Manufacturing & Investment



- Celebrated more than 30 years of U.S. Automotive Manufacturing since 1983
- \$11 billion manufacturing investment since 1981
- U.S. production has increased by more than 88% since 2010
- More than 300 suppliers in 30 states provide parts and materials to Nissan
- \$14 billion in U.S. parts and materials purchases in 2016
- 15 million vehicles, 10 million engines and 90,000 lithium ion battery packs proudly manufactured in the U.S.



Nissan Green Program



► Penetration of Zero-Emission Vehicles



► Wider Application of Fuel Efficient Vehicles

35%
FE improvement



► Minimize Corporate Carbon Footprint

20%
reduction



► Minimize the use of New Natural Resources

25%
recycled resource usage



Energy Commitments



Cost Reduction
On Energy Spend

Nissan Green
Program

ENERGY STAR®
Certification

DOE Better Plants /
Superior Energy
Performance®

Energy Treasure Hunts



Four treasure hunts held in 2017 have identified a potential annual savings of \$1 million," Wade Willatt, Senior Energy Engineer.

- Employees from various departments divided into teams.
- 3-day hunt
 - Where, how and how much energy is used by process?
 - How can energy use be reduced?
 - How can energy be used more efficiently?

Nissan Water Reduction Strategy



- Increased awareness within Treasure Hunts
 - Place increased emphasis in researching water saving opportunities during Treasure Hunts
- Increased water treatment contractor ownership for reduction projects
 - Project reviews monthly with Purchasing
 - Contractor attendance in bi-weekly utility meetings
- Research Director level water reduction KPI for individual plants
- Installation of metering is CRITICAL!

Nissan Water Reduction Challenges

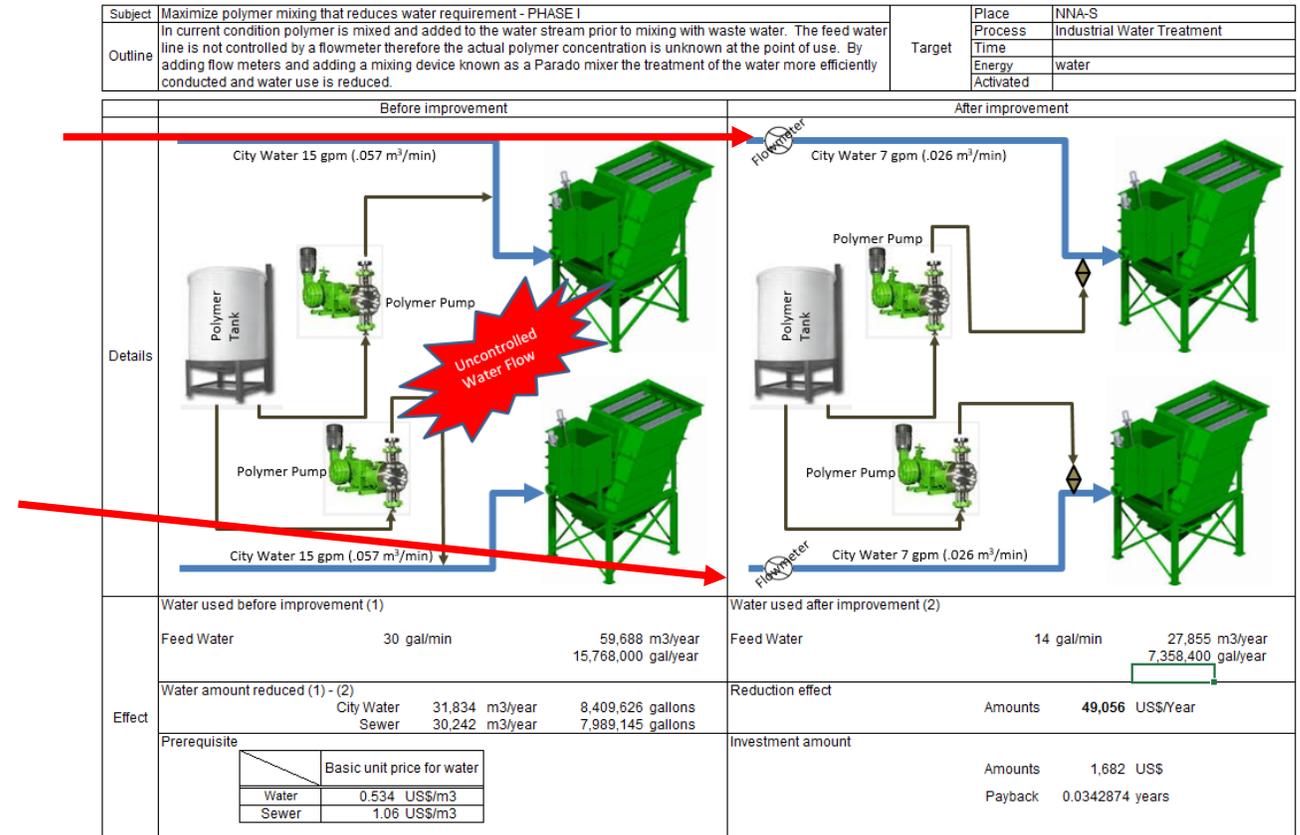


- Capital vs Ongoing Expense Justification
- Employee Engagement
- Magnitude of Priorities Of Each Plant (Paint Plant, Trim Plant, Power House)
- Water Is "Cheap"

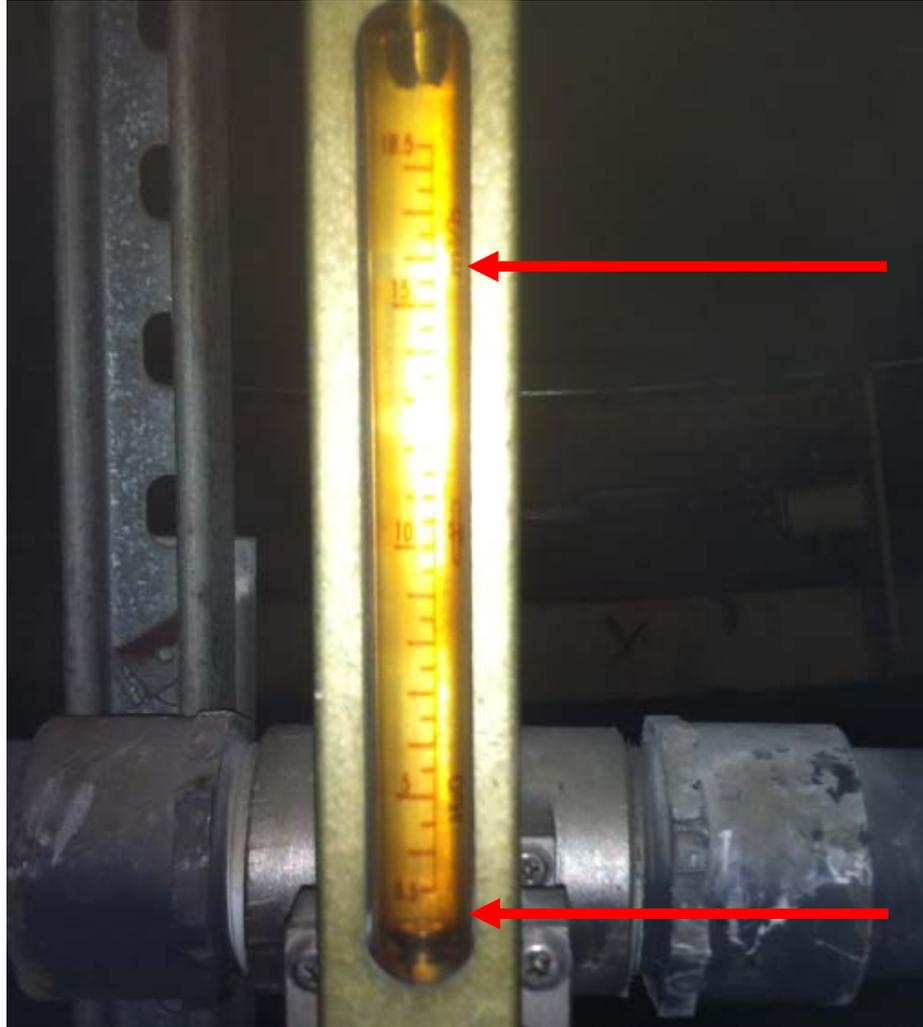
Nissan Metering Leads to Reduction



- Simple addition of flow meter to polymer mix line at industrial paint pretreatment plant resulted in almost \$50K annual savings.
- Reduction of 7 million gallons
- .03 yr payback!



Nissan Paint Pretreat Water Reuse



Pre project flow rate
16 m³/hr (70 gpm)

Current flow rate
3 m³/hr (13 gpm)

K Factor Filter Project

This photo visualizes the impact of one K Factor Filter project. This is one of four purchased filters.



Nissan Combine Similar Projects



Investment: Four Filtration Systems: \$640K

Water Savings: 61.5 million gallons annually

Payback periods for individual systems ranged from less than one year to five years.

Combining projects yielded ROI of 1.8 yrs

Nissan Temporary or Permanent?



INITIAL:

Pretreatment Plant seal cooling water on effluent pumps had uncontrolled flow.

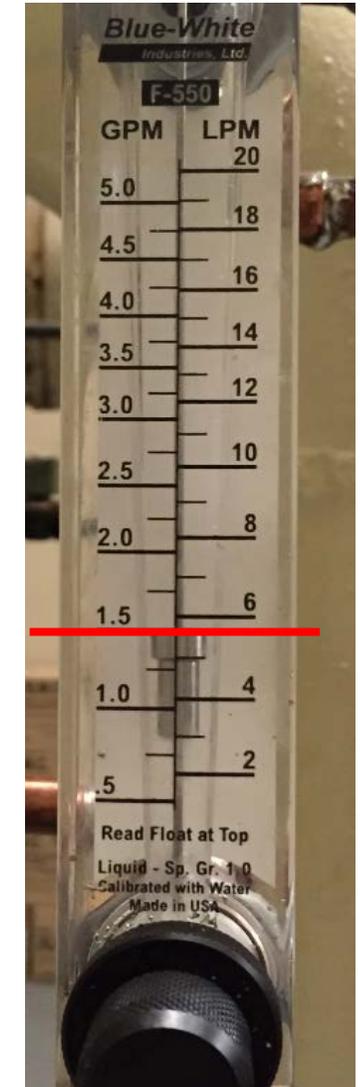
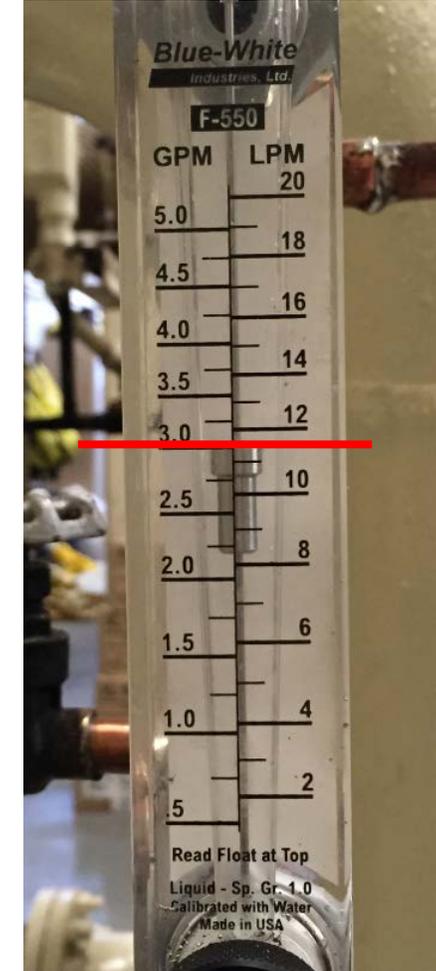


INTERIM:

Installed temporary non destruction meter and determined excessive flow of four pumps.

FINAL:

Installed permanent flow meters on all four pumps.



Nissan Meters Lead to Creative Thoughts



Treated waste water being fed through meter.

Then an operator asked...

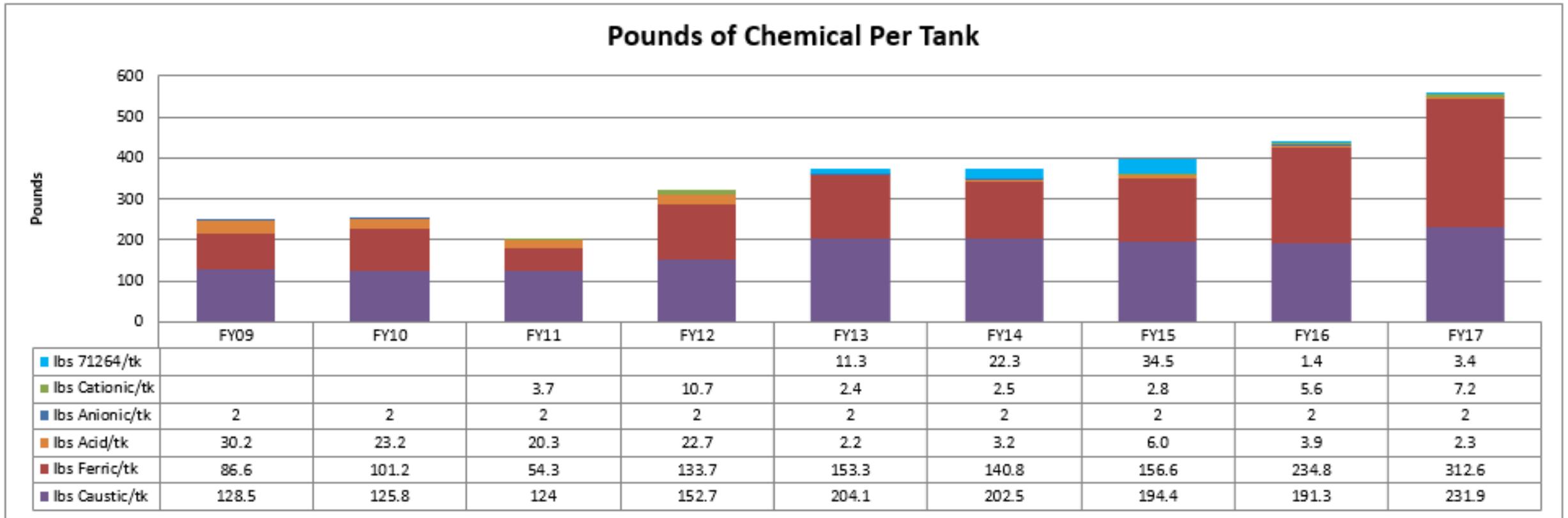
“Why are we using city water?”

That led to a reduced demand for city water in this one treatment plant from 22 million gallons of city water to 1.2 million gallons annually due to using treated waste water.

Nissan Unwanted Results



Less waste water resulted in more concentrated waste water

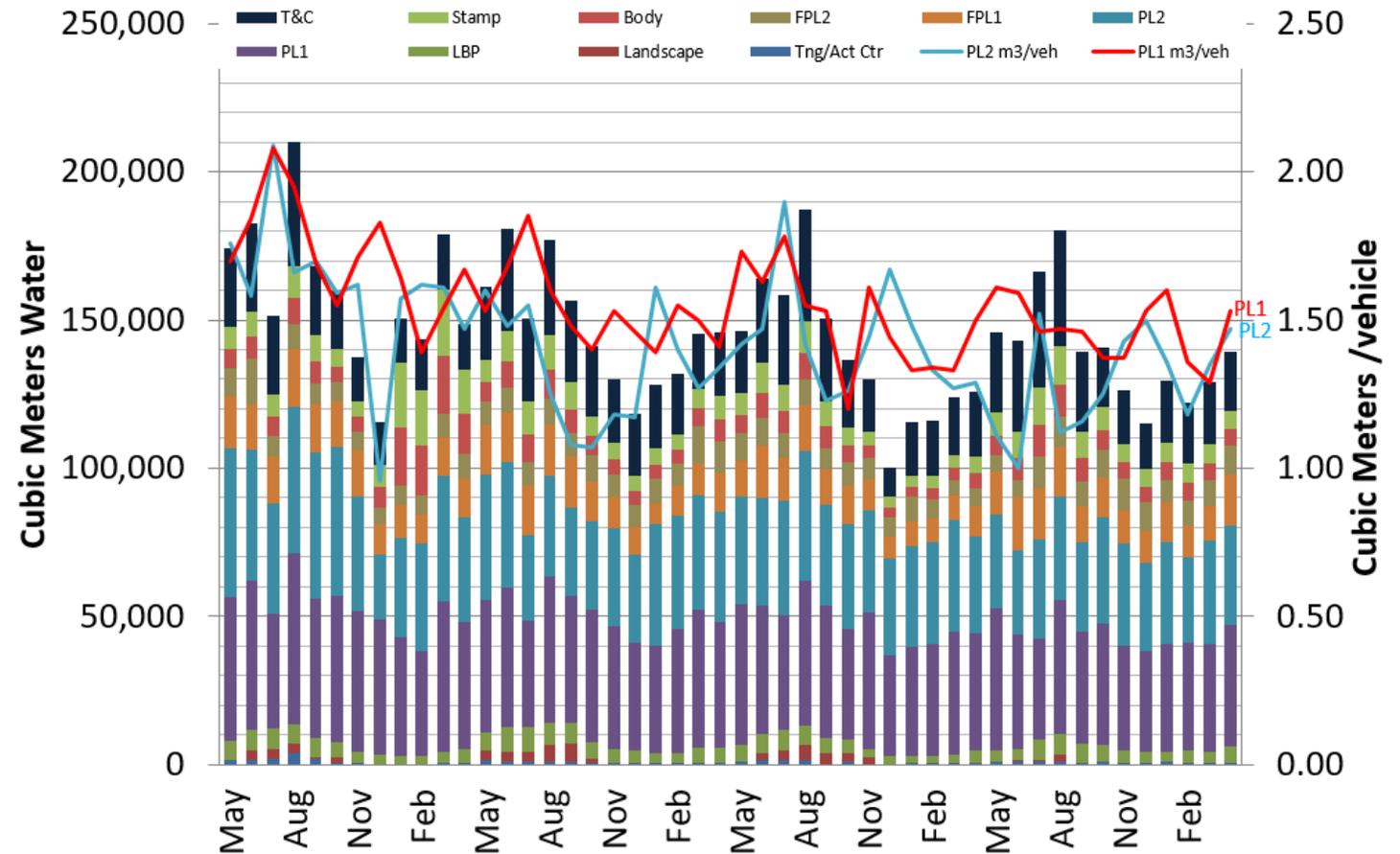


Nissan Metering Reveals Trends



NNA-S Water Use Per Plant

- Water use is consistently higher per vehicle in one paint plant than the other paint plant.
- Reduction in production definitely impacts water reduction metric results.



Nissan North America HQ



Natural Resources

- Wetlands
- Pond
 - Refilled from a well
 - Irrigate 40% of property
 - Chemical free; use grass carp to eat algae for food
 - Installed pressure reducing valve on city water (slower water = less use)
 - Changed irrigation heads to lower gallons per minute
 - Stopped watering mature plants and trees
 - Cost savings of over \$5k per year



Nissan Water Use Results



- 49% reduction of water required to manufacture a vehicle since 2010
- Global sharing between facilities of water reduction projects
- The old saying that you cannot measure what you don't meter is absolutely true.

THANK YOU!



