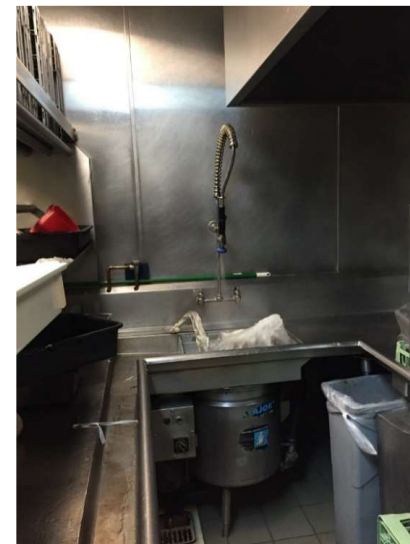


# Pre-Rinse Operations in Large Dishrooms



Amin Delagah  
Senior Engineer  
March 23, 2018



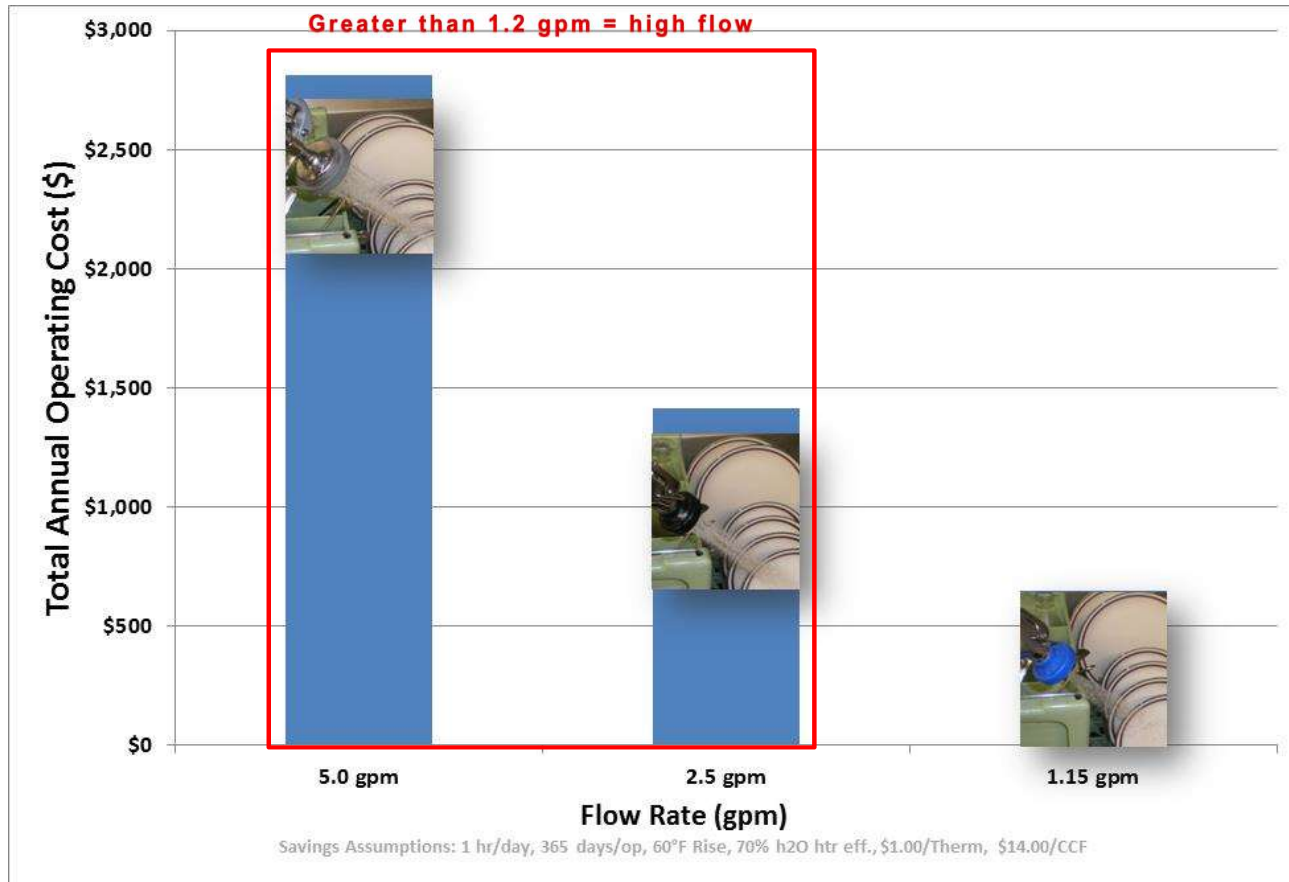


# Pre-Rinse Sprayers

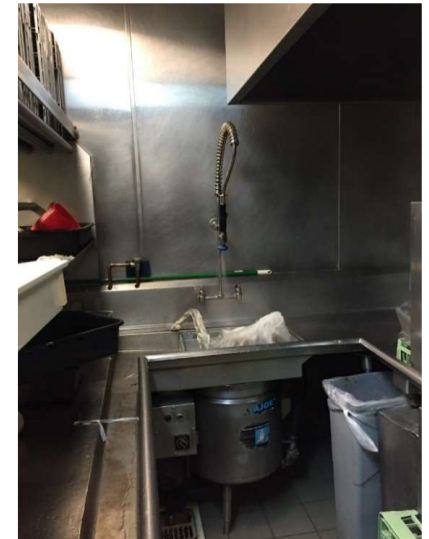


*The real workhorse of the dish room!*

## And a \$40 part that can deliver big savings!



# Pre-Rinse Sink ≠ Pre-Rinse Operation



- Pre-rinse sink is used in most dishrooms
- Using a pre-rinse spray valve (PRSV) is the most common way that wares are rinsed prior to placement on racks or directly into dishmachine

- Pre-Rinse Operation (PRO) is a combination of multiple practices including:
- Pre-rinse sinks, dry scrapping
  - Food waste collectors
  - Disposers, scrapping troughs



## Common Types of Cafeteria Style PRO



### Scrap Collector:

- 1 - 2 gpm of fresh water
- 8-30 gpm recirculated
- Typically cold water
- Sometimes tempered
- Alternative to disposers
- Can be on timer



### Disposers:

- 3 - 10 gpm of fresh water
- Low duration operation
- Typically cold water
- Water flow modulation based on waste load
- Can be on timer



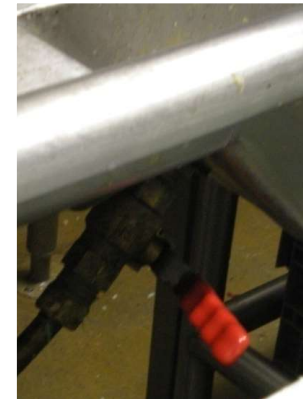
### Trough to Disposer or Scrapper:

- 5 - 15 gpm fresh
- 2 - 3 gpm recirculated
- Typically tempered water

# First Line of Conservation

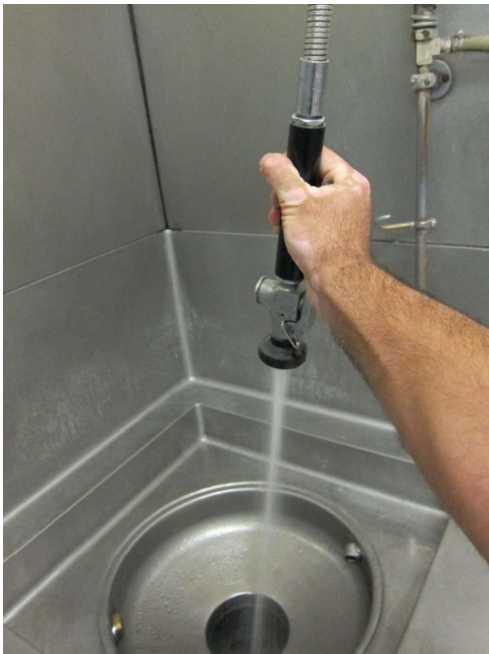


Replace damaged equipment



Enable and train control

## *K-6 Elementary School*



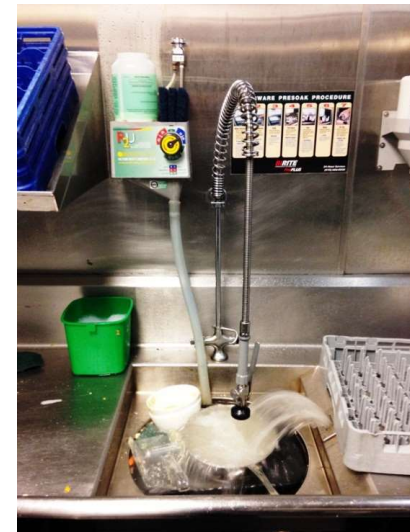
- PRSV 2.5 gpm: 164 gal, 94°F
- Disposer: 65 gal
- Total 229 gal
- 1.8 h of rinse (44" conveyor)
- 127 gal/h of rinse

# Pre-rinse Operations at 2 Café's on Tech Campus

Are they using a high-pressure low flow spray valve or not?  
How about that scrapper, how is that being operated?

## Big difference in water use

- **Cafeteria 1** used only 1.15 gpm PRSV, not using scrapper
  - Using **99 gal/d**, 90 hot, 9 cold
  - 5.4 h of rinse operation (86"-conveyor)
  - PRO Water Intensity is **18 gal/h** of rinse
- **Cafeteria 2** used 2.5 gpm PRSV with scrapper (2 gpm fresh) and degreaser hot water solution
  - Using **3,167 gal/d**, 2501 hot, 666 cold
  - 8.3 h of rinse operation (86"-conveyor)
  - PRO Water Intensity is **841 gal/h** of rinse



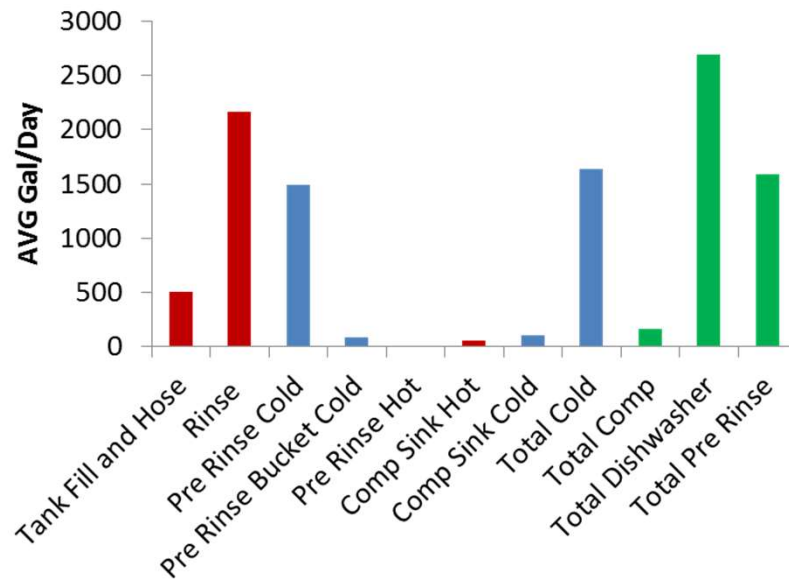


## Pre-Rinse Operation at University Cafeteria

- The trough system was no longer operational
- No pre-rinse spray valve assembly installed
- Staff was dragging over industrial hoses used for floor cleaning, high flow rate of 5 to 7 gpm
- 3 Hoses used a total of 1,282 gal/d
- 2.1 hours of rinse operating time for 86"-rack conveyor
- PRO Water Intensity is 623 gal/h rinse



# Military Cafeteria Dishroom Water Consumption





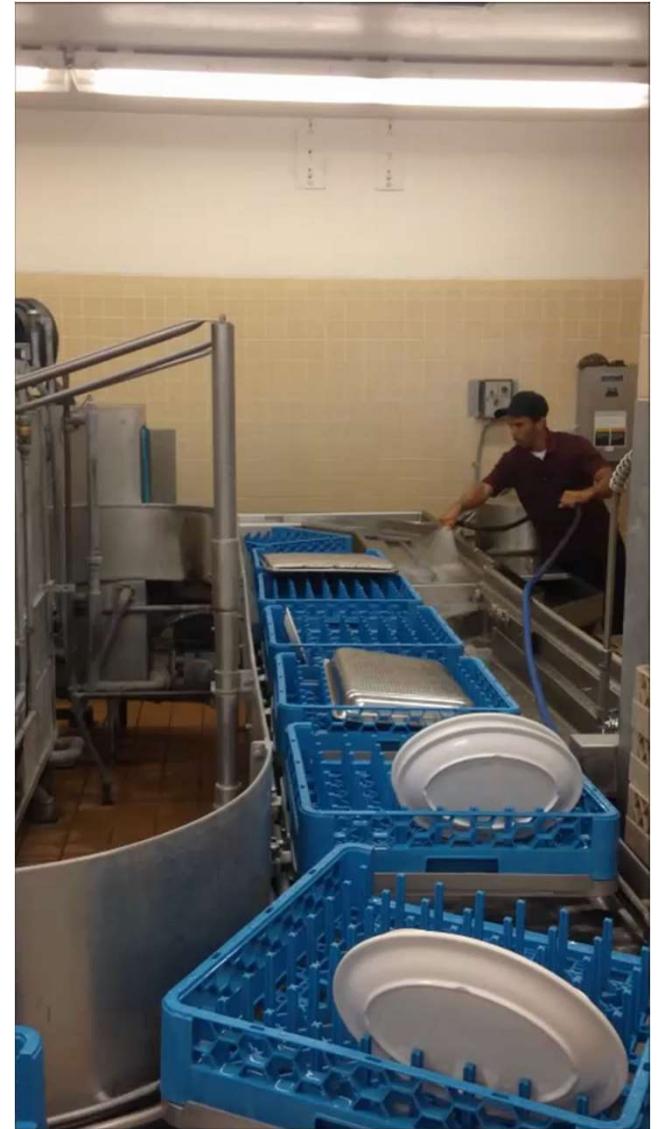
# Original PreRinse Practices (Scrap Only)



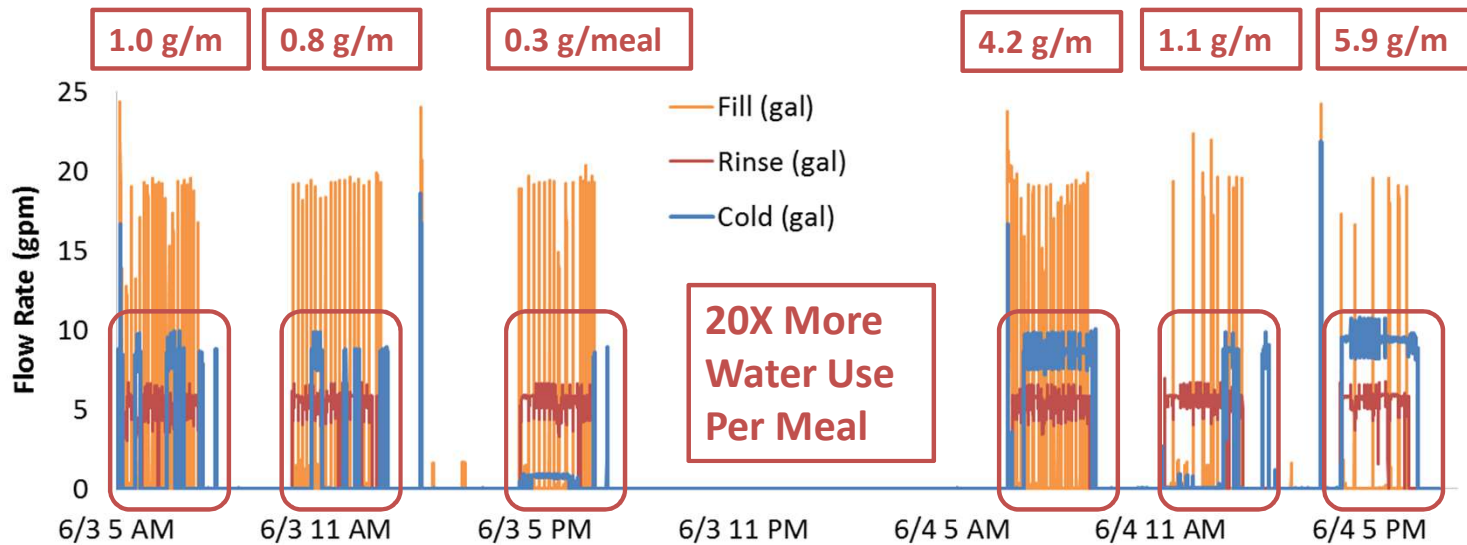
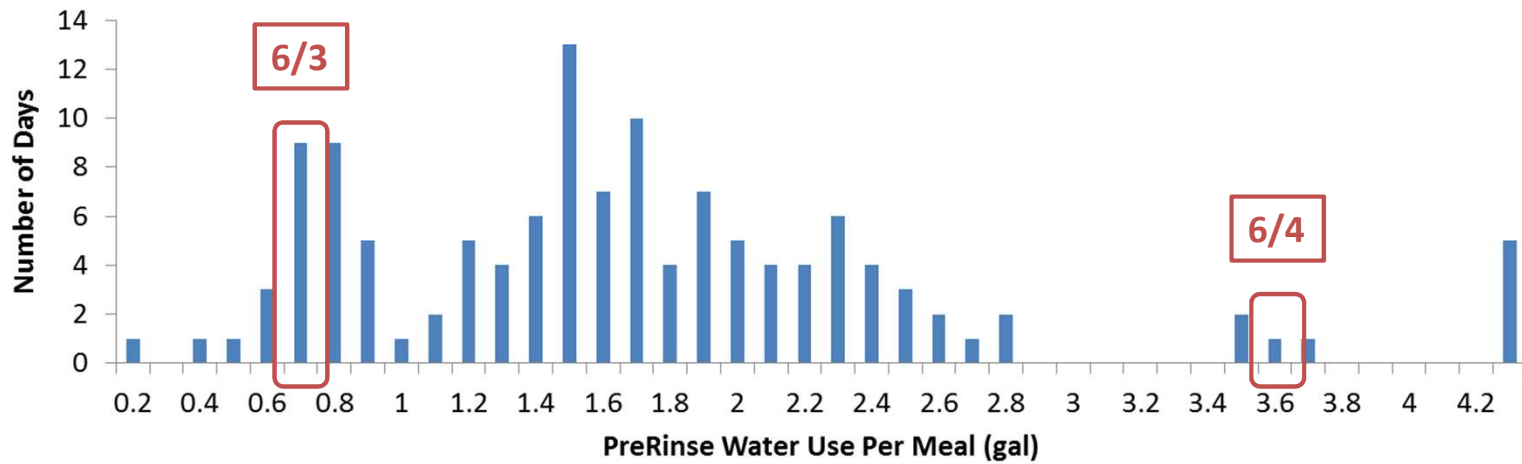
# Original PreRinse Practices (Scrap & Bucket)



# Original PreRinse Practices (Cold Water Hose)



# Pre-Rinse Water Use Per Meal



# Pre-rinse Operations at Military Cafeteria (Pre & Post)

**Original Cafeteria** used a PRSV into bucket and cold water hose with no valve

- Using **1,586 gal/d**, all cold
- 6.4 h of rinse but normalized to replacement time of 1.6 h (86"-conveyor)
- PRO Water Intensity is **985 gal/h** of rinse

**Replacement Cafeteria** used 1.15 gpm PRSV with dry scrapping

- Using **64 gal/d**, 49 hot, 7 cold, 8 hot hose
- 1.6 h of rinse operation (64"-conveyor)
- PRO Water Intensity is **40 gal/h** of rinse





# *Stanford Schwab Cafeteria and Banquet Services*



- PRSV: 18 gal
- Disposer: 38 gal
- Total 56 gal
- 1.4 h of rinse (44" conveyor)
- **40 gal/h** of rinse

## *Stanford Arrillaga*

- PRSV: 55 gal hot, 31 gal cold
- Scrapper: 791 gal hot, 825 gal cold
- Total 1702 gal
- 9.6 h of rinse (44" conveyor)
- **177 gal/h** of rinse



# Stanford Lakeside



- 2 PRSV: 117 gal hot, 14 gal cold
- Scrapper: 464 gal hot, 0 gal cold
- Total 596 gal
- Est. **3h** of rinse (64" conveyor)
- **199 gal/h** of rinse

## Corporate Café MP3



- 2 PRSV: 150 gal hot, 5 gal cold
- Hose: 169 gal hot, 4 gal cold
- Pulper: 783 gal hot, 60 gal cold
- Total 1,172 gal
- 5.4 h of rinse (44" conveyor)
- **215 gal/h of rinse**

# Marriott San Ramon



- Dry Scrapping: 0 gal
- Hose: 496 gal
- Total 496 gal
- 6.6 h of rinse (flight conveyor)
- **75 gal/h** of rinse

## *Gate Gourmet In-Flight Catering*



- Dry Scrapping: 0 gal
- Total 0 gal
- 15 to 16 h of rinse (flight conveyor)
- **0 gal/h** of rinse

# Summary of Pre-Rinse Operations

PRO Method	Pre-Rinse Use (gal/d)	Hours of Rinse Operation (h/d)	PRO per hour Dishmachine Rinse (gal/h_rinse)
Dry Scrapping	0	15.6	0
Dry Scrapping	0	14.9	0
PRSV	99	5.4	18
Dry Scrapping with PRSV	64	1.6	40
Disposer with PRSV	56	1.4	40
Dry Scrapping and Hose	496	6.6	75
Disposer with PRSV	229	1.8	127
Scraper with PRSV	1702	9.6	177
Scraper with PRSV	596	3.0	199
Pulper with 2 PRSV	1172	5.4	215
Scraper with Hose	1056	3.5	298
Scraper with PRSV and Hose	1946	3.3	584
3 Pre-Rinse Hoses and Rinse Valves	1282	2.1	623
Scraper with PRSV	3167	3.8	841
Cold Water Hose with No Valve	1586	1.6	985

# Summary of Pre-Rinse and Dishmachine Operations

PRO Method	PRO per hour Dishmachine Rinse (gal/h_rinse)	Dishmachine per hour Rinse (gal/h_rinse)	Dishwasher and PRO Per Hour of Rinse (gal/h_rinse)	PRO as Percentage of Total
Dry Scrapping	0	143	143	0%
Dry Scrapping	0	223	223	0%
Scrapper with PRSV	18	243	262	7%
Disposer with PRSV	40	414	454	9%
Disposer with PRSV	127	164	292	44%
3 Industrial Hoses and Rinse Valves	623	667	1289	48%
Scrapper with PRSV	841	367	1208	70%
Cold Water Hose with No Valve	985	1711	2696	37%

- Data is all over the place
- Equipment and operating practices have a huge impact
- Water and energy intensity in the dishroom can vary by 20X



# Smart metering available

## Current utility water metering practice

- Water use data is typically provided in one or two month intervals
- This is too low of a resolution

## Low cost (\$350) smart metering is available!

- 5-min interval metering using 3G cellular
- 10-year plan
- Data stored on server for easy download
- Leak detection



***Innov8  
Smart Register***



**Or we can Maintain the Status Quo**



*Thank you  
for your  
Attention!*

Email: [adelagah@frontierenergy.com](mailto:adelagah@frontierenergy.com)

