



# Craft Brewers Forum **Optimizing Water Use**

TUESDAY, JUNE 18  
1:00 - 2:00 PM EASTERN



ENVIRONMENTAL  
FINANCE CENTER



SCHOOL OF GOVERNMENT  
Environmental Finance Center

*New England*  
**neefc**  
Environmental Finance Center

[www.betterbev.org](http://www.betterbev.org)

# Welcome!

- Session recorded
- Q&A after panel



# Panel intros



Dan Weber

**Dogfish Head  
Brewery**

MILTON, DELAWARE



Dano Ferons

**Mad Mole  
Brewing**

WILMINGTON, NORTH  
CAROLINA



Franklin Winslow

**Tarboro  
Brewing**

TARBORO, NORTH  
CAROLINA



Paul Upham &  
Eric Dumais

**Bissell  
Brothers  
Brewing**

PORTLAND, MAINE





Dan Weber  
**Dogfish Head  
Brewery**

MILTON, DELAWARE





# UNIQUE TO DOGFISH: WELL WATER



Our well water feeds through green sand filters and is pH and chlorine adjusted on the way to the Cold Water Tank □ Hot water tank





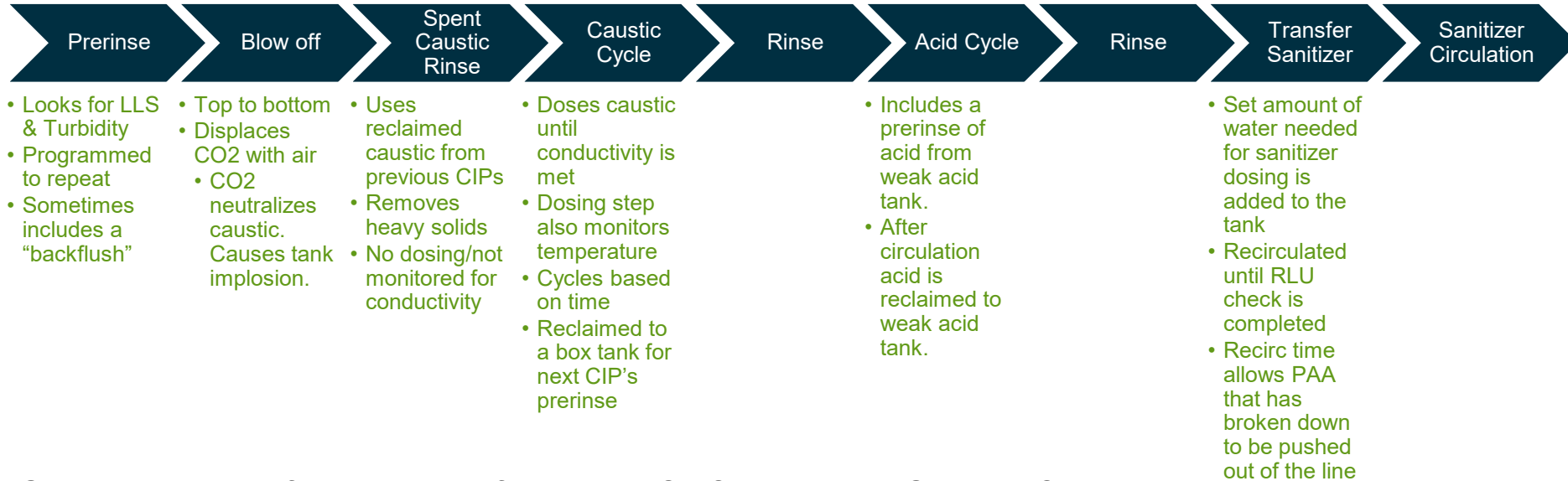


# OUR WASTEWATER





# ANATOMY OF A TANK CIP



**Other rules apply for BBT's: Re-fill with no CIP? Fresh Acid/Sanitizer? Full blowdown and Caustic/Acid/Sani?**

**We require each BBT get CAS at least once a month.**



# AUTOMATED PUSHOUTS AND RINSES

10.1.111.212 - Remote Desktop Connection

**brewmaxx**

Cellar

Production

- Process screens
- Order list
- Current messages
- Warehouse overview
- Material overview
- Goods entry
- Goods issue
- Goods blockage
- Goods release
- Goods relocation
- Material redeclaration
- Inventory
- Master data
  - Materials
  - Booking keys
- Recipes
- Procedures
- Global process variables
- Investigation
- My favorites

Diagnosis...  
Settings  
Info

Dashboard | Process screen "YBT1/DHT" | Process screen "Mash Tun Z" | Procedures | Procedure "CIP b5 b6 - 623-630 cold dr..."

Save | Save as Data | Discard | Display unit procedure header | Display unit procedure lines | Display description line | Display comment | Display unit procedure details | Display description editing | Display unit procedure sequence | Display OCM columns | View

CIP b5 b6 - 623-630 cold dryhop [Version: 1]

General | Unit procedure parameter

Station name: DogFish-AS01  
SEQ instance: CIP tanks Bay5Bay6  
Profile: 01 CIP  
Material class of the raw material:  
Attribute 1:  
Attribute 2:  
Equipment parameter change at: 23/02/2018 1:08:41 PM  
Step change by: Prolet  
Step change at: 26/03/2018 2:27:02 PM  
Changed on: 26/03/2018 2:27:02 PM

Comment:

Runtime | Function | Setpoints | Index | Jump targets | OCM activation | Flags

Operation no.	Operation	Step Name	Monitoring time	Runtime	Step time [sec]	ating time [s]	lotion time 1	lotion time 2	lotion time 3	CIP supply [l]	level tank [%]	concentration	concentration	strature supp	strature retur	isure ret
25	263	Rinse by	Rinse by CW	00:00	00:00	00:02	00:00	00:00	00:00	00:00	85.0	0	0.0	0.0	0	0
26	270	Dosing	Caustic dosin	00:00	00:00	00:04	00:00	06:00	00:00	00:00	85.0	0	5.5	0.5	0	0
27	279	Empty T2 to tank	Empty T2 to tank	00:00	00:00	00:05	00:00	00:00	00:00	00:00	0.0	5	0.0	0.0	0	0
28	268	Circulation	Caustic circulat	00:00	00:00	00:02	00:00	25:00	05:00	05:00	85.0	0	0.0	0.0	0	0
29	269	at discharge	at discharge	00:00	00:00	00:20	00:00	00:00	00:00	00:00	0.0	30	0.0	0.0	0	0
30	272	rc. PR/RR T2	rc. PR/RR T2	00:00	00:00	00:02	00:00	01:00	00:00	00:00	110.0	0	0.0	0.0	0	0
31	273	Backwash	Backwash	00:00	00:00	00:02	00:00	00:00	00:00	00:00	110.0	10	0.0	0.0	0	0
32	263	Empty T2 to tank	Empty T2 to tank	00:00	00:00	00:05	00:00	00:00	00:00	00:00	0.0	5	0.0	0.0	0	0

Values | OCM activation | Flags

Name	Replacement mode	Setpoint	Unit	Input mode	Report	Lower limit	Upper limit	Default value	Setpoint raw format
Monitoring time	Local	00:00	sec	Standard	No			00:00	0
Runtime	Local	00:00	sec	Standard	No			00:00	0
General									
[VALUE_02]	Local	0.000	[-]	Invisible	No			0.000	0.000
[VALUE_03]	Local	0.000	[-]	Invisible	No			0.000	0.000
Amount 1	Local	160	gal	Standard	No			0	160

According to category | Alphabetically | According to structure

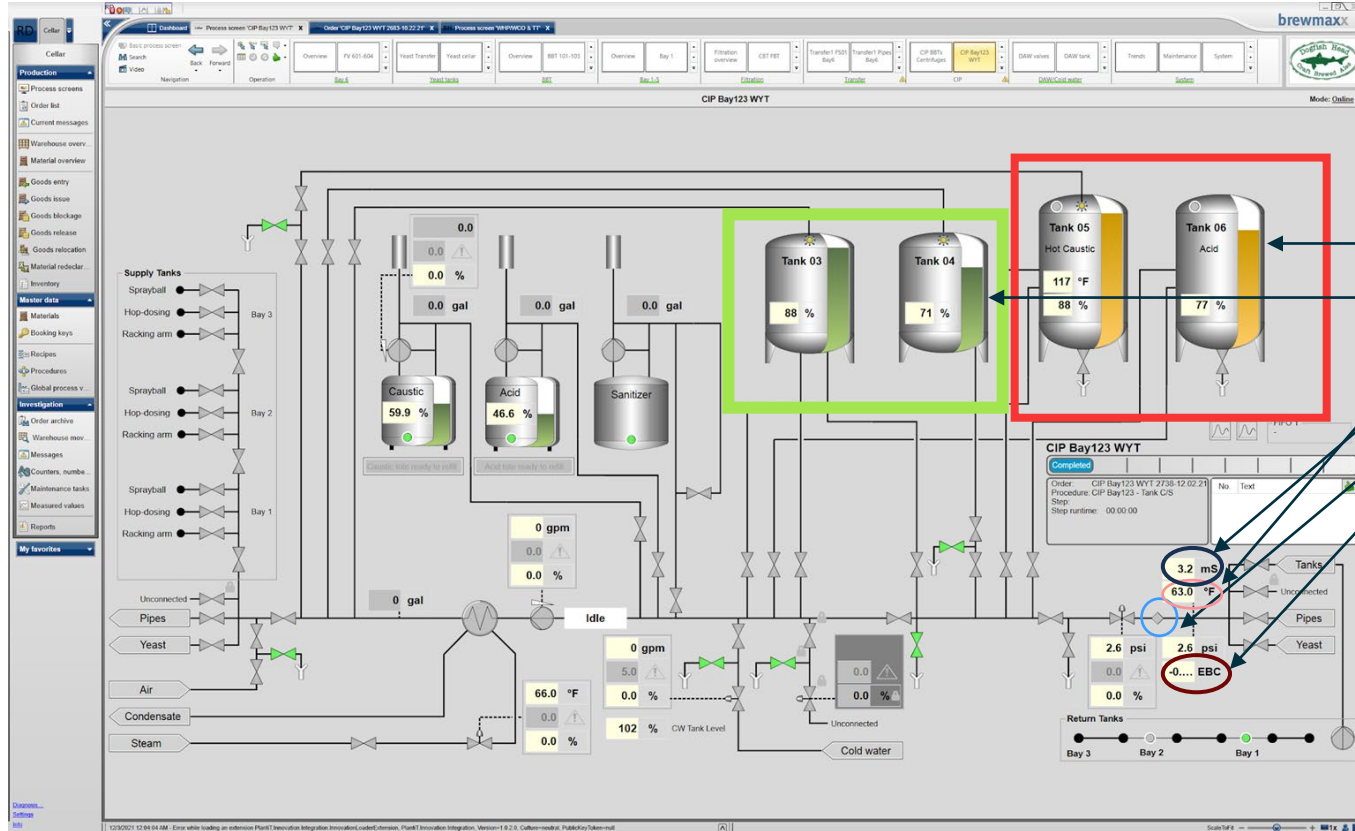
General | CIP tanks Bay5Bay6

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# AUTOMATED SKIDS



Bulk Tank

Mixing tanks/"Box tanks"

Temperature sensor

Conductivity meter

Flow switch

Turbidity meter



# TIPS FOR SAVING WATER

- **Automation only adds to consistency. All of our rinses, circulations, and different recipes were all figured out manually. You can do the same.**
- **Figure out how much water each step takes... Use that same amount every time. SOPs = Important.**
  - Measure your hose pushouts. Look for a difference in pH, conductivity, or temperature
  - Different beer styles require different tank CIP's to optimize water usage.
  - Every water savings saves you money twice....
- **If something isn't getting clean with the same procedure as always, it's likely another issue (clogged sprayball? Pump issue?)**



Dano Ferons

# Mad Mole Brewing

WILMINGTON, NORTH  
CAROLINA





# Water Usage during CIP

- All CIP are run by an employee with a pump
  - SOPs made to dictate water usage
  - pH strips and hot water utilized to maximize rinse efficiency
- Brite Tanks Acid washed under pressure
  - Opened once a month – Purged with water that is recaptured in HLT
- Keg Washer recirculates cleaning solution



# Mueller Serving Tanks



# Advancement through Partnerships

- UNCW Environmental Science Internship Program
  - Trub side stream and composting
  - Sweeping not washing
  - Rotating eyes on problems
- Local Environmental Non-profits
- Research into utilizing brewery waste in wastewater treatment





# Re-evaluating Water Outside of the Brewery

- Stormwater movement and restrictions
- US EPA 319 Grant
  - Watershed restoration through stormwater mitigation
  - Matching Grant
  - Partnership with environmental nonprofit required
- Using available land and other resources to help slow speed of stormwater runoff





Franklin Winslow

# **Tarboro Brewing**

TARBORO, NORTH  
CAROLINA



# Waterwise:

*Understanding Your Total Usage*



## Who We Are:

### Tarboro Brewing Company

- Small production brewery & taproom in Eastern North Carolina
- Producing just less than 700 BBL/ yr

## Water Consumption:

- 200K-300K gallons per year TOTAL USAGE (Water utility)
  - Production
  - Taproom
    - Bathrooms
- 13 Gallons H<sub>2</sub>O/ Gallon Beer!
  - 5.5 Gallons H<sub>2</sub>O/ Gallon Beer

## Tar River:

- Source of our water
- Donate to

**SOUND RIVERS**



# Water Considerations

## Incoming Water:

- Volume
- Cost
- (Flow Rate)
- (Number of Accounts)

## Outgoing Wastewater:

- Volume
  - TDS
  - BOD / COD
  - Sampling
    - Location
    - Frequency
-

# Incoming Water

## Measure it

- Flow Meters
  - TBC has a flow meter on BH
  - Monitors process water & HL
- Monitor Tank Volumes
  - Sight Glass
  - Draw a line on a CIP vessel
- Calculate it
  - How fast to fill a 5 gal bucket?
- Water Utility Bill

## Standardize Usage

SOP! SOP! SOP!

- Create an SOP
- Prove SOP works
  - Rinse Water
- Test methods to reduce usage
  - Rinse Water Metric
- Update the SOP
  - Make sure everyone knows!

# Further Thoughts on Tracking Usage

- Easy To Do
  - Can be part of SOP (track in cleaning log)
- Water Utility Bill = Monthly/ Yearly
- Benchmarking Tool
  - Compare Month vs. Month
  - Compare Year vs. Year
  - Consider Monthly/ Seasonal changes
- Finding LEAKS the hard way
- Add cost comparisons if you need motivation



	Water Usage In gallons 2020	Barrels	Water usage in Gallons per barrel
Jan-20	17,000	50	340.00
Feb-20	25,000	28	892.86
Mar-20	11,500	19	605.26
Apr-20	14,300	9	1,588.89
May-20	4,900	17	288.24
Jun-20	49,800	50	996.00
Jul-20	15,400	14	1,100.00
Aug-20	10,900	54	201.85
Sep-20	15,600	21	742.86
Oct-20	16,300	28	582.14
Nov-20	15,700	17	923.53
Dec-20	16,700	16	1,043.75
Avg	17,758	26.91666667	775.45
Total	213,100	323	9,305

# Water Reduction Ideas

- Burst Rinsing During CIP
  - 3 x 30 seconds rinse, draining after each
  - Reduce based on rinse water
- Minimizing washdown volumes
  - Use rinse water for washdown
  - Only washdown at the end of a process, or when necessary
- Optimize BBT cleanings
  - Clean Under Pressure (Acid-based)
  - Re-use with same batch / brands?



Paul Upham  
and Eric Dumais

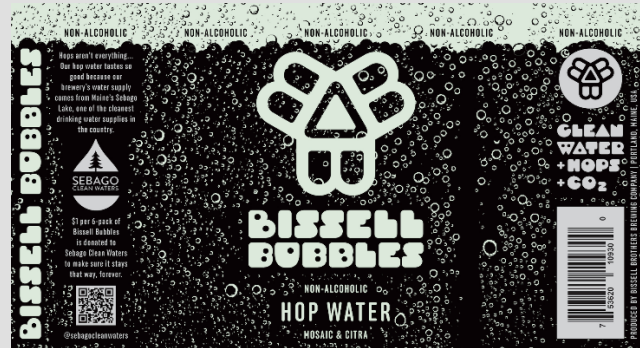
**Bissell  
Brothers  
Brewing**

PORTLAND, MAINE



# Bissell Brothers - Sebago Clean Waters Partnership

- Brewery Partnership with Sebago Clean Waters
  - An organization whose goal is to conserve the forested land that surrounds the Sebago Lake watershed, to protect the ecosystem that is our watershed.
  - Bissell Bubbles - a non alcoholic hop water we launched in January of 2024. 5% of all can sales go directly to Sebago Clean Waters.





# Bissell Brothers - Wastewater Neutralization/Side Streaming

- Spent CIP Chemical Collection/Neutralization
  - When a given CIP cycle is completed, staff pump those spent chemicals into a designated process line that runs to a collection tank.
  - Both acids & bases are collected in this tank, so there is some natural neutralization, but sometimes additional acid is required to bring the pH into the range of 5-9



# Bissell Brothers - Low Tech Water Conservation Strategies

- Brite Tank Cleaning
  - **Acid Under Pressure ~90 gallons of water used**  
Rinse/Clean/Rinse/Sanitize a 60 bbl tank
  - **Alkaline - ~320 gallons of water used**  
Rinse/Clean/Rinse/Sanitize a 60 bbl tank
    - the primary difference is added water needed to preheat and then cool down the tank for the hot alkaline cycle
    - Also then need to repurge
  - We will keep BTs under pressure for up to 6 uses if the yeast strain is the same. If the yeast changes, an alkaline cycle is required.
  - Mitigating 1 less alkaline cycle per week saves 12,000 gallons of water annually in our brewery.



# Questions and discussion

- Raise virtual hand to ask a question / share a thought
- Or type into chat





# Thank you!

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