



Sierra Nevada Brewing Co. Water Conservation Efforts



Fred Strachan

Butte County, Ca. Water Source

- Underground Aquifer Source.
- Utility is Cal Water.
- Cal Water responsible for chlorination and overall water quality.
- SNBC is Cal Water's largest customer.
- Close relationship between the two parties, including partnering on conservation efforts.



Employee Education

- Periodic employee training and awareness sessions.
- Familiarize employees with the company measurement matrix.
- Have the utility company relate home usage and billing to brewery usage and billing.
- Management support is important for success.

Water Audits Presently in Place At SNBC

- Plant-wide CIP Audits.
- Plant Sanitation Audits.
- Fuel Cell Energy/Solar Audits.
- East and West Brewhouse Audits.
- Cooling Tower Audits.



Clean In/Out of Place Audits

- City Water Flow Meter installed on the supply side of the main CIP area
- Water use totals are captured by individual CIP system.
- Production trends do not necessarily mirror water use trends.
- Automatic programs adjusted to realize water savings.



Clean In/Out of Place Audits

- Burst rinsing incorporated, depending on spray device.
- Reduced “feed” tank volumes, both detergent and acid. (Up to 50 gall./CIP).
- For COP, incorporated test strips or pH strips for more accurate rinses. (25 gall.).
- Complete rebuilds of any system over 7 years to alleviate leaks. (YTD).



Plant Sanitation Audits

- Study the habits of our plant cleaning crew.
- Eliminate open ended hoses. Use spray guns instead. (3 gpm instead of 15 gpm).
- Incorporate “Water Brooms” to use on flat surfaces and roof tops. (5 gpm / 15 gpm).
- Truck wash uses pressure washer instead of hoses. (5 gpm / 15 gpm).

Fuel Cell Energy/Solar Audits

- RO feed to the Fuel Cells monitored for over-use/leaks.
- Waste heat captured as condensate and sent back to the boiler system. (15% of the boiler make up).
- Solar arrays monitored for performance and pressure washed only when performance drops below 90%.

East and West Brewhouse Audits

- CIP Systems optimized similar to above, including system re-build.
- Wort cooler CIP isolated and run more often for increased efficiency and less CIP water usage.
- Steam from kettles sent to a condenser to heat incoming city water.
- New kettle hops rinse uses wort, not water.



Cooling Tower Audits.

- Flow meters installed on the makeup and bleed lines.
- Monitor cycling for best practice.
- Share loading between systems.
- Scheduled clean-outs for better performance



Cal Water Audit Assistance

- SNBC Taproom Audit.
- SNBC “Big Room” Audit.
- SNBC Employee Training Session.



Taproom/Big Room Audit

- Cal Water uses third party source for audits.
- Data collected during the onsite inspection and subsequent interviews with site staff.
- All water using equipment and plumbing fixtures are inventoried.
- Recommendations detailed by water savings amount and ROI.



Water Use Categories

- Kitchen Water – 73.4%
- Sanitary Water Use – 22.8%
- Janitorial Water Use – 3.1%
- Irrigation – 0.2 %

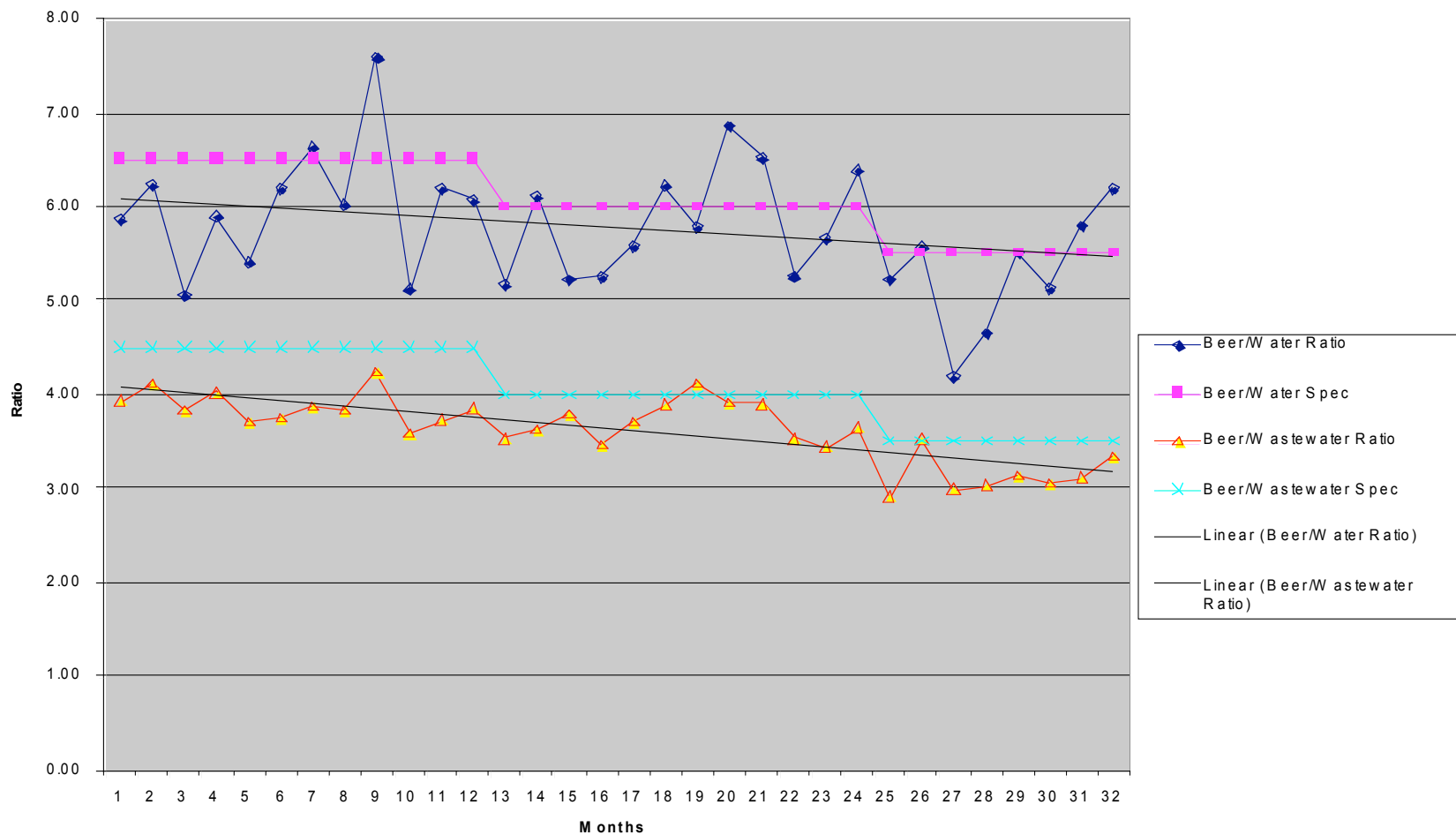
Taproom/Big Room Audit Results

- Replace Bathroom Faucet Aerators – 208,692 gallons/yr. Immediate payback.
- Retrofit flush valve toilets w/ dual flush handles – 76,296 g/yr. 0.7 year payback.
- Install Air-Cooled Ice Machine – 834,768 g/yr. 1.5 year payback.
- Replace Pre-Rinse Spray Valves – 261,052 g/yr. Immediate payback.

Water Usage Measurement Matrix

- Monthly measurement of the amount of beer packaged compared to the total city water supply. (2009 goal is 5.5).
- Monthly measurement of the amount of beer packaged compared to the total water treated. (2009 goal is 3.5).

Water Usage Measurement Matrix

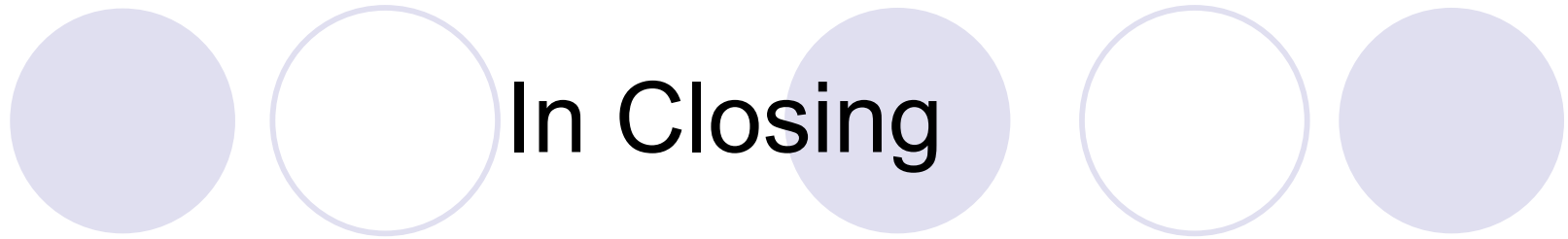


Future Conservation Projects

- Treated Water for Hop Field Irrigation.
(Potential of reusing 4M gallons per month for 4 -5 months per year).
- Incoming Water Filtration.
- CIP Rinse Water Fluorescence Tracing.
(Potential of 1 – 3% savings in the first year).

Future Conservation Projects

- Dry Chain Lube in Bottling (Potential 1M gallon savings per year).
- Filler Vacuum Pump and Rinser Water Recovery. (Potential 1M gallon savings per year).



In Closing

- Look at “low-hanging fruit first.
- Refer to the local water utility company for ideas/suggestions.
- Educate employees, with the help of the local water utility company.
- There are many opportunities in the brewery for big ticket savings ideas.



- SNBC – Ken Grossman – President
- SNBC – Cheri Chastain – Sustainability Coordinator
- Cal Water – Mike Pembroke – District Manager – Chico
- Cal Water – Pete Bonacich – Asst. Manager - Chico
- Lucy Saunders