

Microbrewery

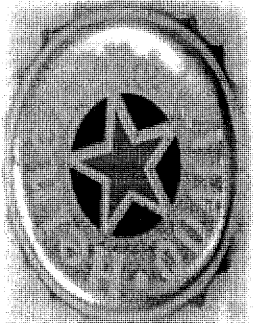


David W. Houston

Pretreatment Compliance Program Manager

City of Austin | Austin Water

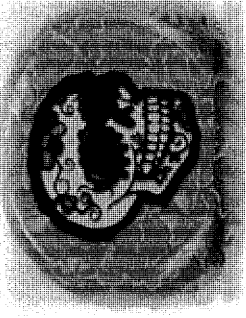
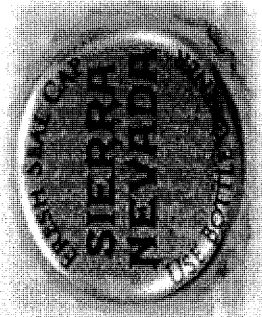
Special Services Division



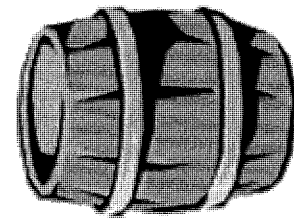
Types of Breweries



- **Brewpub** – sale of food on premises while also manufacturing, brewing, bottling, canning, packaging and labeling malt liquor, ale and beer not to exceed 10,000 barrels annually.
- **Microbrewery** – dispense the taste of malt liquor, ale, and beer to consumers on premises while also manufacturing, brewing, bottling, canning, packaging and labeling malt liquor, ale and beer not to exceed 15,000 barrels annually.
- **Regional Brewery** – dispense the taste of malt liquor, ale, and beer to consumers on premises while also manufacturing, brewing, bottling, canning, packaging and labeling malt liquor, ale and beer in excess of 15,000 barrels annually.

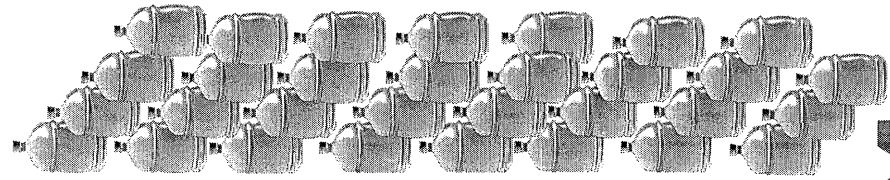


FYI



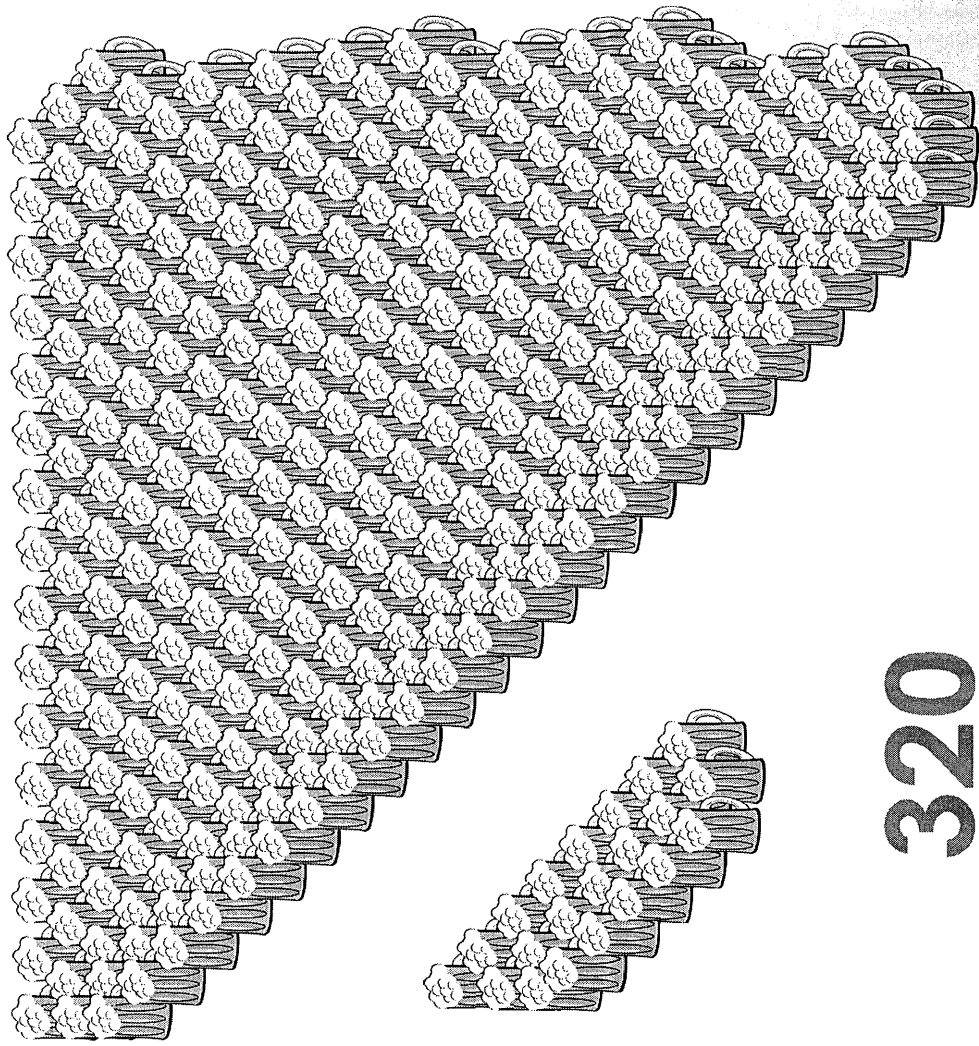
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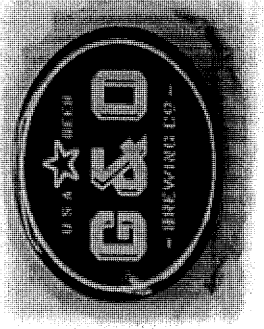
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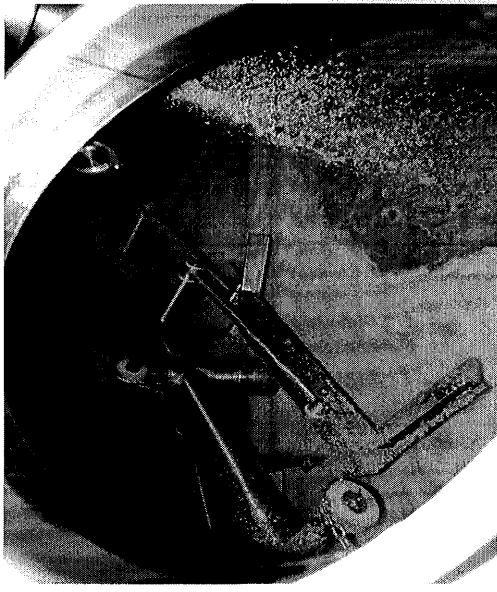
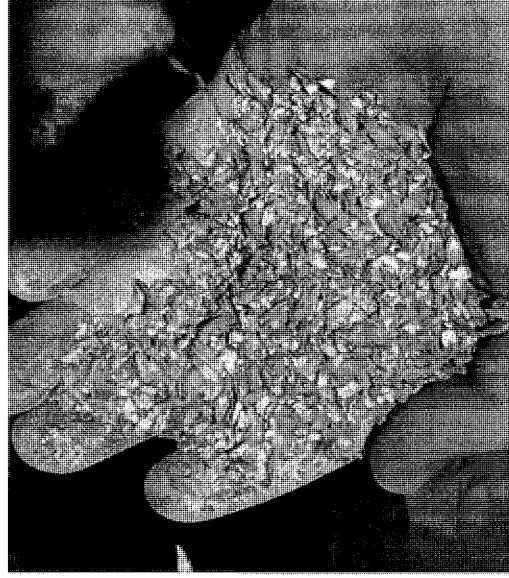
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Typical Brewing Process



- Malt barley is milled – water added (mashing)

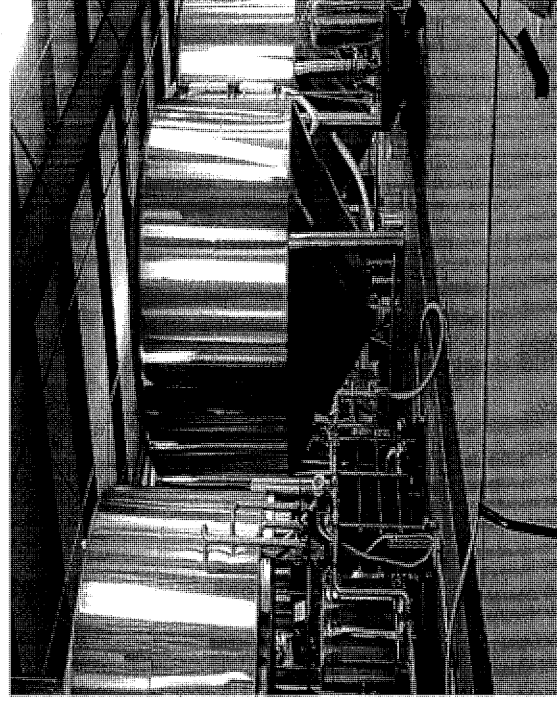
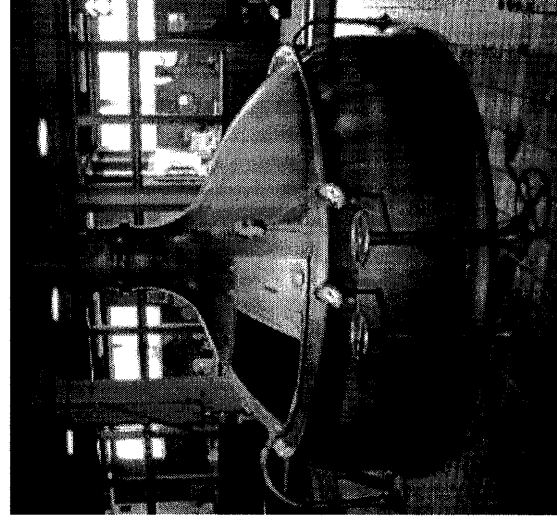
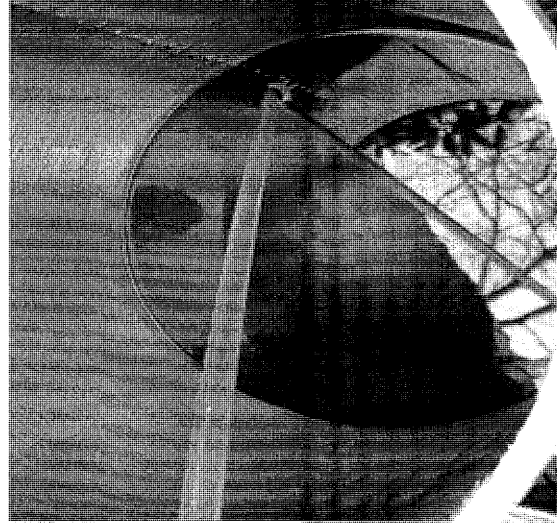




Typical Brewing Process

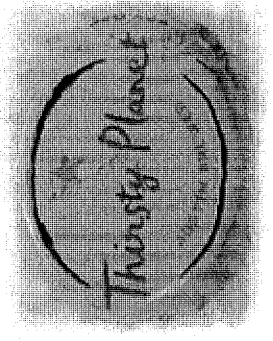


- Heat is added to break down the starches to simple sugars. Grain is screened and the liquid (wort) is sent to the kettle.

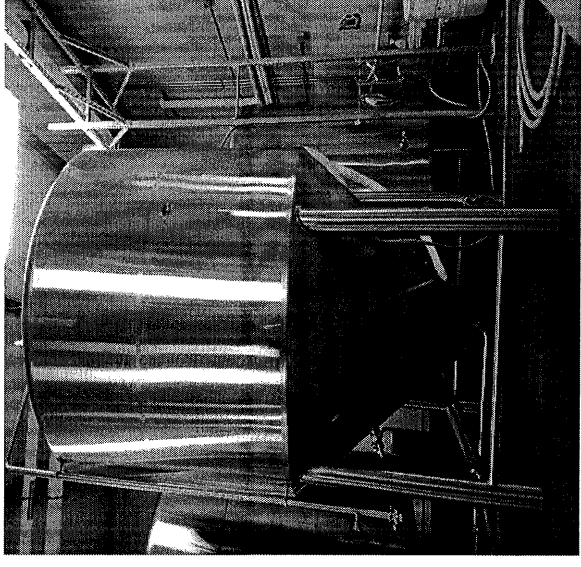
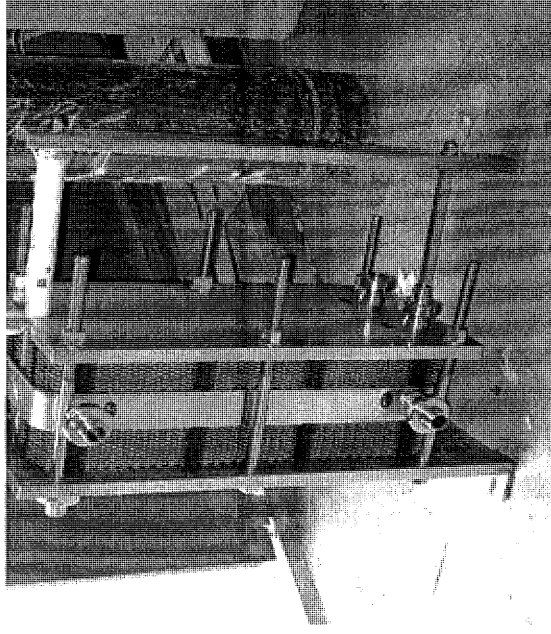


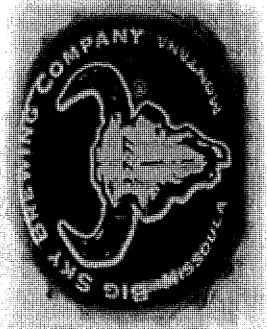


Typical Brewing Process



- Hops and any flavoring is added and heated. Liquid is whirlpooled for solids to settle in the middle. Liquid goes through heat exchanger on the way to fermentation tank.

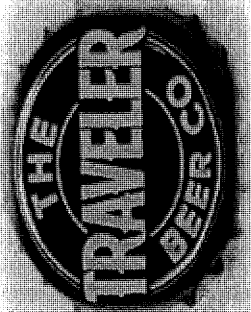




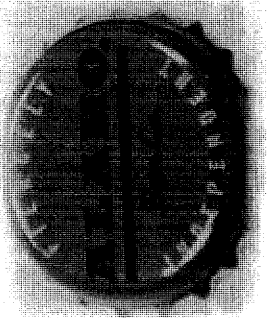
Typical Brewing Process



- Yeast is added (1 million cells/mL/degree Plato). Fermentation process can be 14 to 30 days. Tank is cooled to allow yeast to settle to the bottom.
- Liquid (Beer) is sent to chilling tank for packaging (kegs/bottles/cans). Yeast is saved and can be used again (up to 5 times).



Treatment Plant Loadings



- If everything is sent down the drain.

	<u>mg/L</u>	<u>Lbs.</u>
Ammonia- Nitrogen	20.2	0.8
cBOD	10,620.5	442.9
COD	16,790.0	700.1
Sulfate	55.2	2.3
TSS	817.0	34.1

*Million Gallons/Day = 0.005

Treatment Plant Influent Loadings

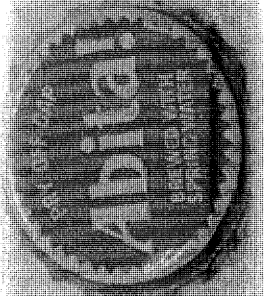
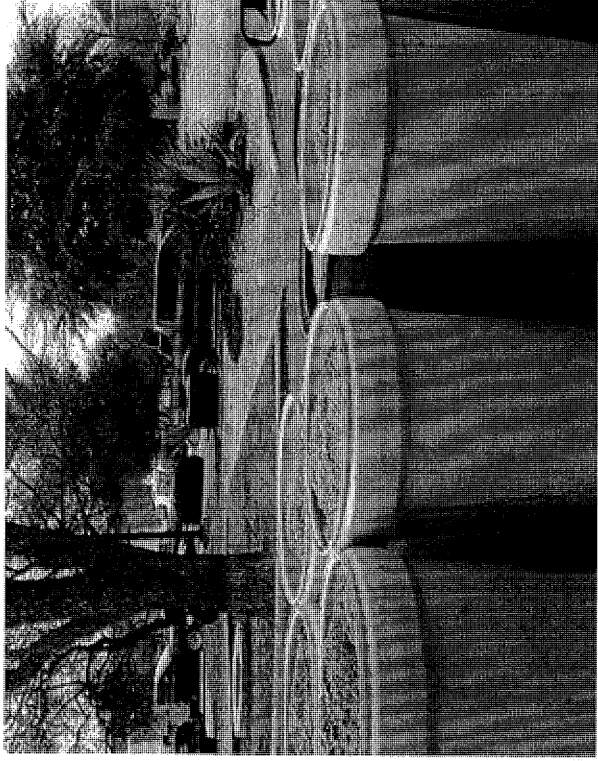
	<u>mg/L</u>	<u>Lbs.</u>
Ammonia- Nitrogen	36.5	71.3
cBOD	207.5	405.3
COD**	NA	NA
Sulfate	92.2	180.1
TSS	224.5	438.5

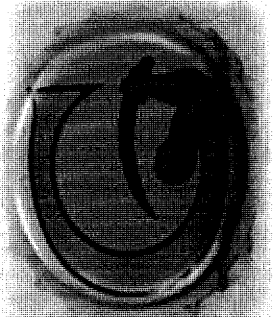
*Million Gallons/Day = 0.2342

** Larger WWTP COD = 386 mg/L

Pollution Prevention

- Milled Barley is collected and picked up by farmers to supplement feed.
- Spent yeast is collected and used by farmers.





Treatment Plant Loadings After Pollution Prevention

	<u>mg/L</u>	<u>Lbs.</u>
Ammonia- Nitrogen	13.8	0.6
cBOD	2,473.7	103.2
COD	3,700.0	154.3
Sulfate	49.0	2.0
TSS	357.0	14.9

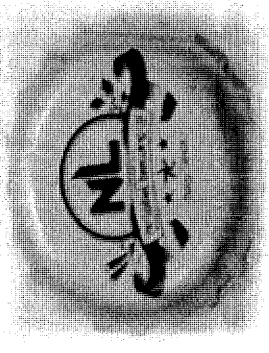
*Million Gallons/Day = 0.005

Percentage of Influent Loadings

	<u>Before P2</u>	<u>After P2</u>
Ammonia- Nitrogen	1.1 %	0.8 %
cBOD	109.3 %	25.5 %
COD	NA	NA
Sulfate	1.3 %	1.8%
TSS	7.8%	3.4 %



Future Pollution Prevention



- Hops and flavoring needs to be collected instead of going down the drain.
- Can rinse waters be used for heat exchanger, boiler and chill line make up water.
- Spent beer needs to be collected and not poured down the drain.

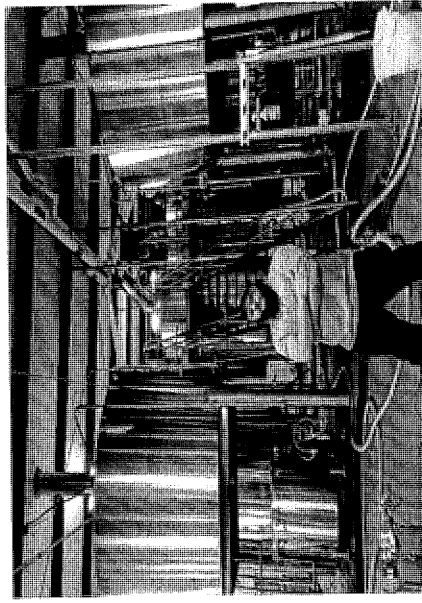


Microbrewery Concerns



- Removal of organic waste for reuse without causing a nuisance.
- Wastewater billing established by water consumption when 75 – 80% of water does not go down the drain.
- Concerns of miss application of regulations.

Special Thanks to (512) Brewery and Independence Brewery



Brannon Radicke



Kevin Brand

Questions

