

Small brewery, Big Quality



Cate Roscoe

QC Manager (aka Beer Perfectionist)

Grand Teton Brewing

Victor, Idaho

Small Brewery, Big Quality

- Grand Teton Brewery
 - 5,979 bbls in 2009
 - 7,223 bbls in 2010
- Full Time QC manager added in 2009
- New Owners, Lactobacillus recall
- New Philosophy
 - Cleaning
 - Beer must be cleared at every step
 - Tests throughout the life of the beer
- Budget
 - < \$1,500 in 2009
 - \$4,800 in 2010
 - \$4,000 projected budget in 2011

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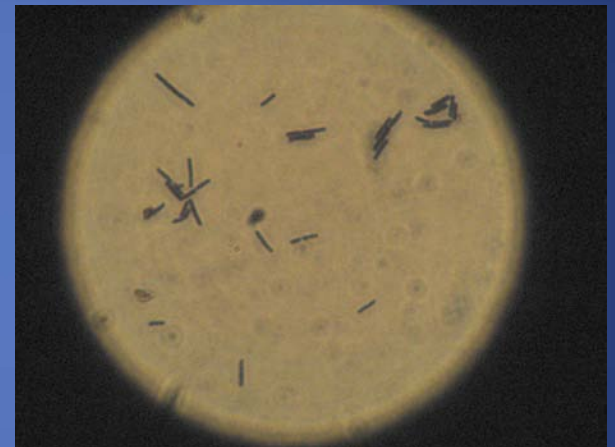
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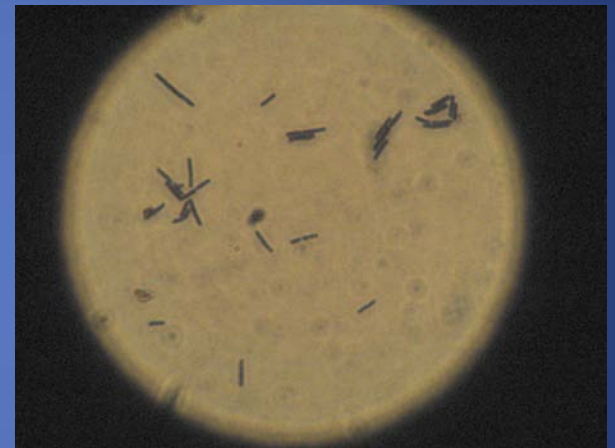
Lacto Recall

- Infection in October 2009
- Raw beer cost = \$19,909
- Distributor credit = \$10,360
- Bad product to consumer
- Causes – still unclear
 - Grain dust
 - Repeated transfer and back transfer
 - Old hoses
 - Spread through pitching



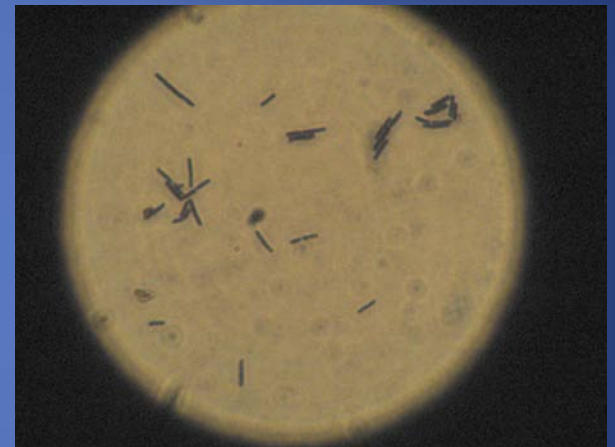
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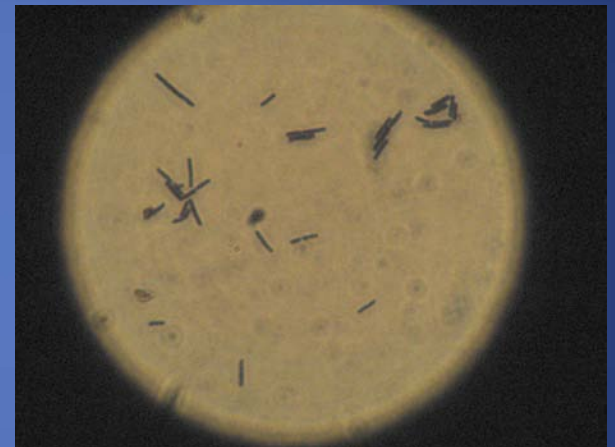
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Cleaning

- Brewhouse
 - Clean floors and drains daily
 - Clean filter after use
 - Clean all hoses in loop before and after use
 - Clean after every brew, include sanitizers/super hot water (200°)
 - Inspect/replace soft parts quarterly, hoses annually



Cleaning

- Cellar
 - Clean tanks after every brew, cleaning recorded
 - Clean all hoses in loop before and after use
 - Check/replace soft parts quarterly, hoses annually
 - Deep cleaning quarterly, and as needed, cleaning recorded



Cleaning

- Bright tanks
 - Clean all hoses in loop before and after use
 - Clean after every brew
 - Full open clean monthly
 - CO2 lines cleaned weekly
 - Deep clean tanks quarterly
 - Check/replace soft parts quarterly
 - Check/replace hoses and parts annually
 - All cleanings recorded



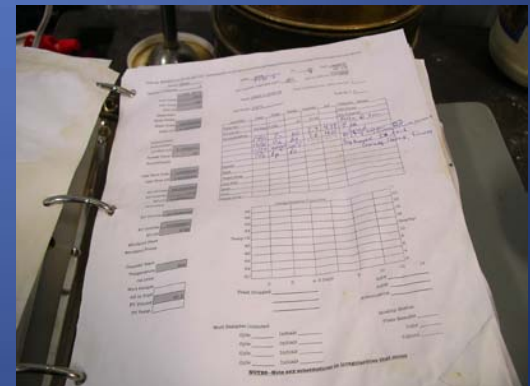
Cleaning

- Bottling line
 - Cleaned everyday after bottling
 - Sanitized every morning
 - Super hot water + PAA foaming



Brewer's Measurements

- Recipe
- Gravities
- pH and temp
- Dry hop procedure
- Used to determine any problem or source of difference in taste standard
- Statistical analysis coming



Wort Sampling

- Potential Problems
 - Introduction of microbes
 - Imbalance of brewing parameters



- Every mash sampled
- Samples stored for minimum of 3 days, analyzed for clarity, aroma, and gas production.

Sterile Sampling

- Alcohol and brush cleaning of sampling port
 - Repeated, total of 2 cleanings
- Ignite residual alcohol
- Turn on port while burning
- Open sterilized test tube cap down
- Flame lip of test tube
- Collect sample
- Flame lip of test tube
- Replace cap, facing down throughout process

Sterile Sampling



Fermenters

- Potential problems



- Yeast autolysis
- Introduction of microbes
- Imbalance of brewing parameters, particularly temperature
- Cell count and pitching viability

Fermenters

- Sampling
 - Brewers repeat most brewhouse measurements
 - Brewers conduct cell counts
 - Sterile sample taken after fermentation begins
 - Some testing done after dry-hop
 - Taste and visual tests done through out fermentation and prior to transfer

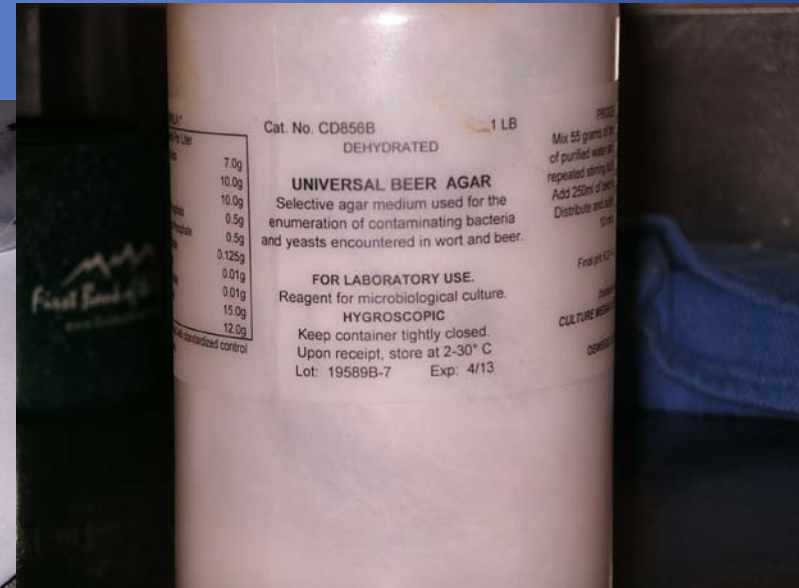
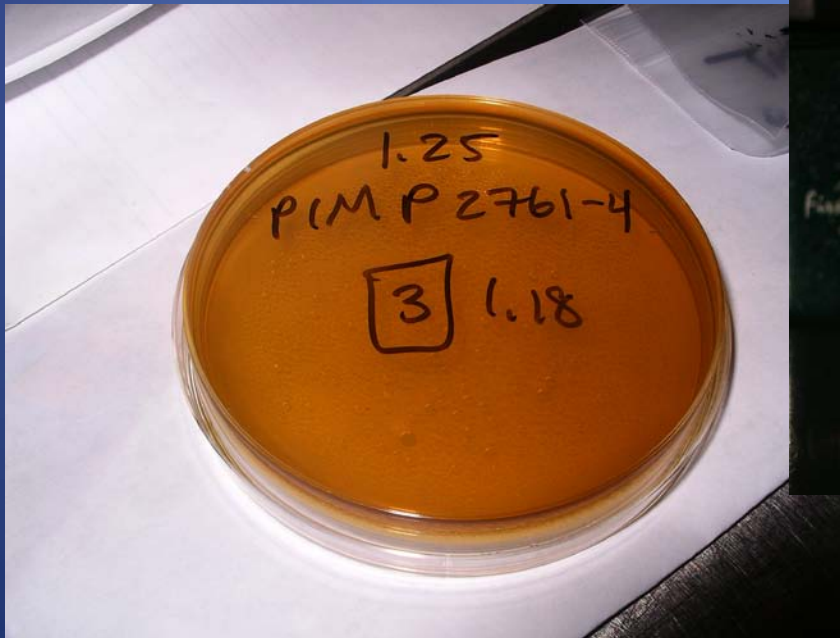
Fermenters

- Plating of sterile samples
 - Detection of anaerobic and aerobic bacteria
 - Detection of wild yeast
 - Use of various media
 - 3 day minimum for results



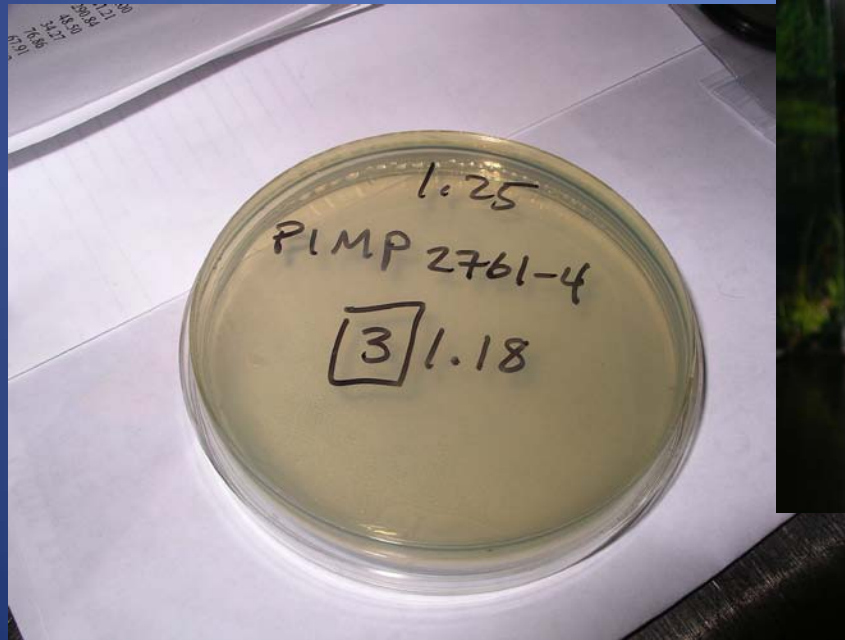
Plating

- Universal Beer Agar (UBA) : detection of aerobic bacteria and some yeast



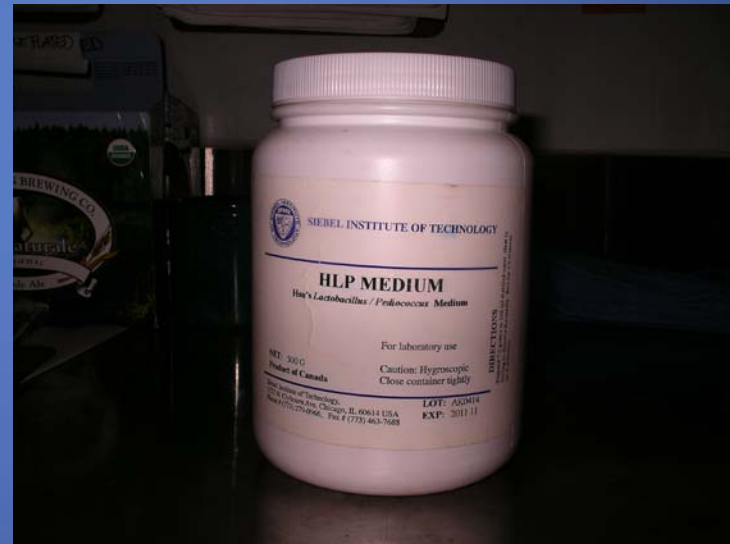
Plating

- Lynn's Cupric Sulfate Media (LCSM) : detection of wild yeast and some aerobic bacteria



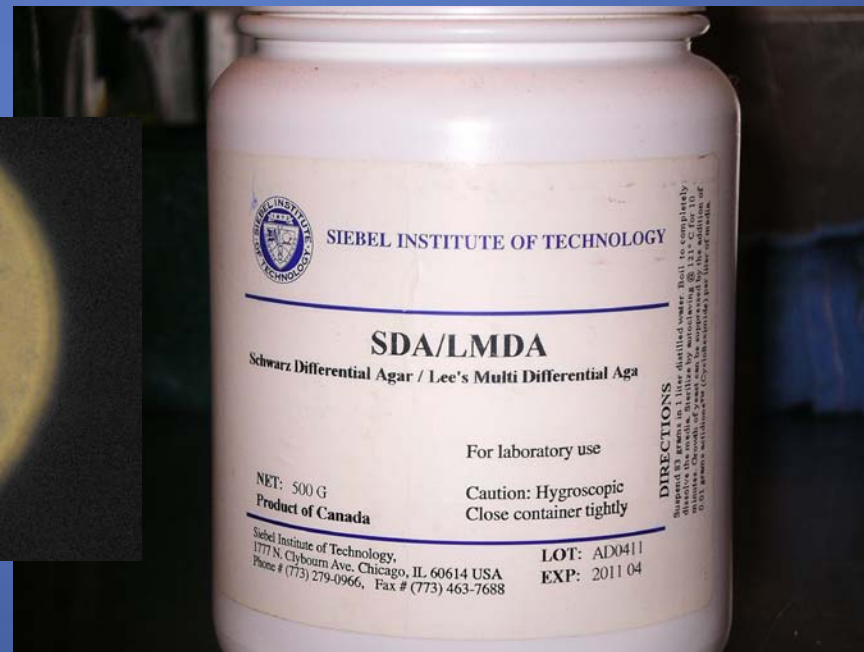
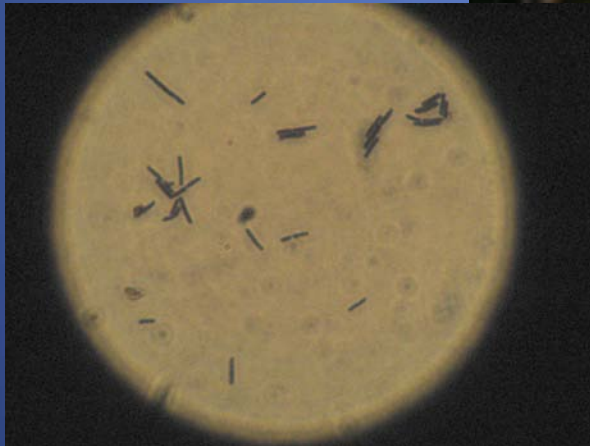
Plating

- Hsu's Lactobacillus/Pediococcus Media (HLP) : detection of Lactobacillus and Pediococcus



Plating

- Schwarz Differential Agar (SDA) : detection of anaerobic bacteria, allows for slide prep and ID



Fermenters

- Tagging System
 - Red Tag : do not transfer or pitch
 - Yellow Tag : plated, lab results pending, do not use
 - Green Tag : all clear



Fermenters

- Time table
 - Beer plated and yellow tagged end of week
 - 3 day for results, replate if not clear
 - Results, new tag, Monday following brew completion
 - Replate results Tuesday or Friday following brew completion

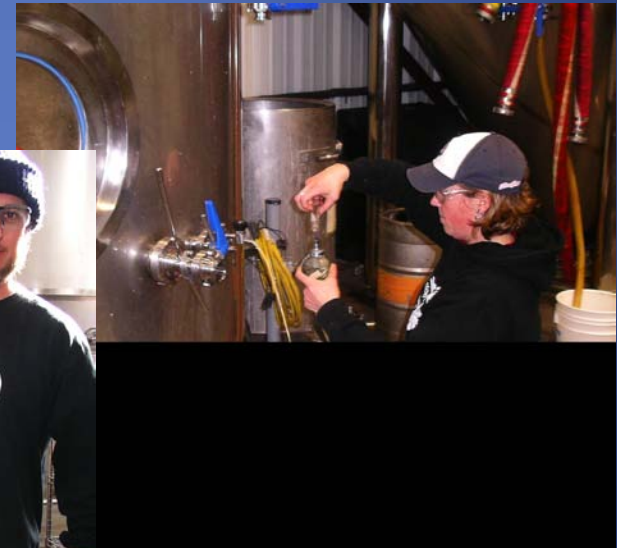
Bright Tanks

- Potential problems
 - Introduction of microbes
 - Imbalance of taste standard
 - Early transfer
 - Carbonation of beer and completion of sampling



Bright Tanks

- Sampling
 - Sterile lab sample for plating
 - Taste and visual
 - CO2 testing
 - Recorded



Bright Tanks

- Plating of Sterile Sample – Friday following packaging
 - UBA, LCSM, HLP
- 3 Day incubation – results every Monday
 - Replate if needed
 - Only test for Kegs
 - Hold beer until tests are clear

Bright Tanks

- Record Keeping
 - Each tank has a packaging sheet:
 - Priming record
 - CO2 approval
 - Sampling checklist
 - Completed before packaging
 - Packager signs off



Bottling

- Checklist to start bottling
 - Signed off, Jetter temp/level, crowns, rinsers, driers, labels, dates, packaging and tape



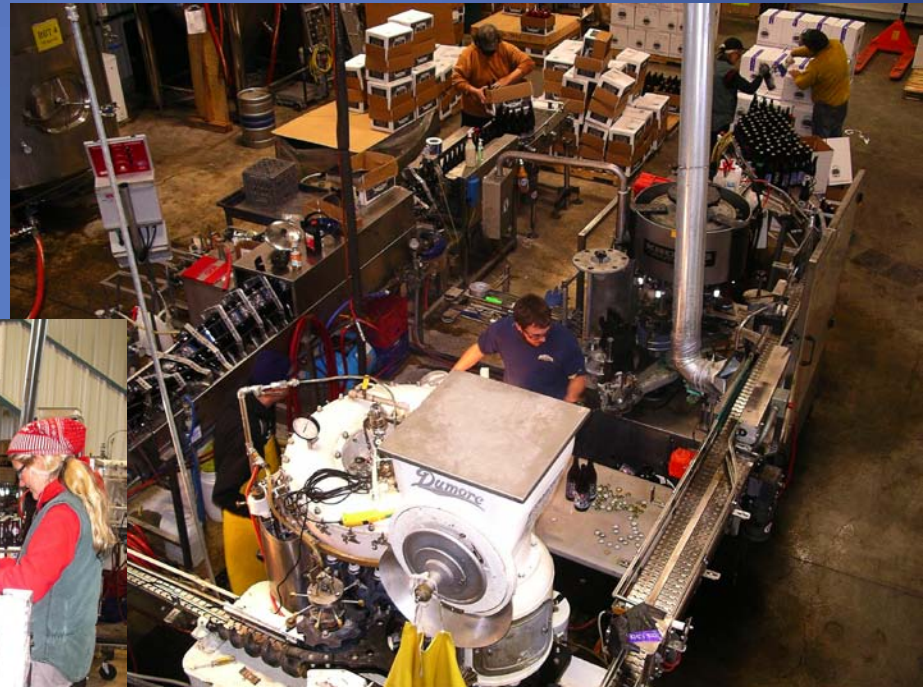
Bottling

- Monitor gas levels
 - Zham and Nagel
 - Air level bellow 0.5ml
 - adjust jetter
 - Record CO2 measurements



Bottling

- Final quality – hand packed, lots of eyes
 - Crown
 - Fill level
 - Labels
 - Date



Bottling

- Fill levels (tax issue)
 - Visual estimate in range
 - Pay taxes on highest fill allowed



After Packaging

- Potential Problems
 - Contamination during packaging
 - Incomplete or failed conditioning
 - Oxidation
 - Other imperfections



After Packaging

- Sampling
 - Bright tank sterile sample
 - Bottle sample for plating
 - (1) 6-pack to Hot Box for forced aging
 - (3) 6-packs to warm room if primed, (2) 6-packs to cold room if not primed
 - (1) 6-pack to reference library



After Packaging

- Plating
 - Bright tank sterile sample and bottle sample plated Friday after packaging
 - Results Monday, re-plate bottle sample if needed



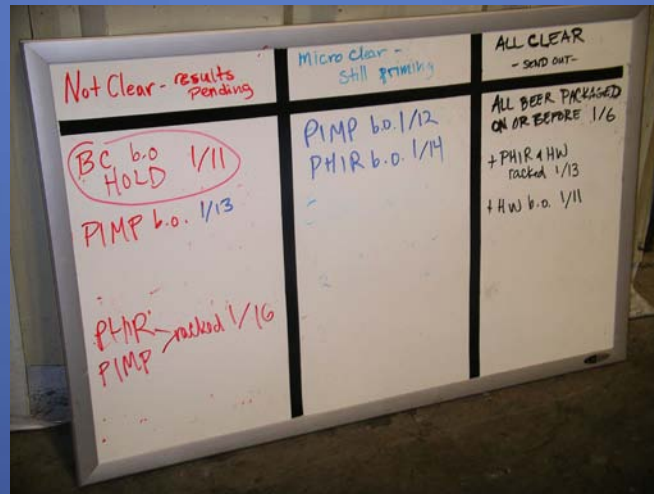
After Packaging

- Conditioning
 - Primed beers held in 80° warm room for 8 days
 - CO2 testing using Zham and Nagel to check for proper conditioning



After Packaging

- Time Table
 - 3 days minimum for microbial testing
 - 7 days minimum for conditioning
 - All beers packaged shown on a board in 1 of 3 categories



Taste Testing – After Packaging



Taste Testing – After Packaging

- Blind Differentials, 2 vs 1, Red Cups
 - Batch to batch
 - 1 or 2 glasses contain most recent batch bottled, remaining glass(es) contain previous batch
 - Forced age
 - 1 or 2 glasses contain beer kept in Hot Box, remaining glass(es) contain identical beer kept in cold room
 - 2 and 4 week tests

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Taste Testing

- Preferential and Objective Tastings
 - Clear glass
 - Often done when considering a new style
 - Objective used to monitor beer at each step
 - Often done to train palate and descriptive skills

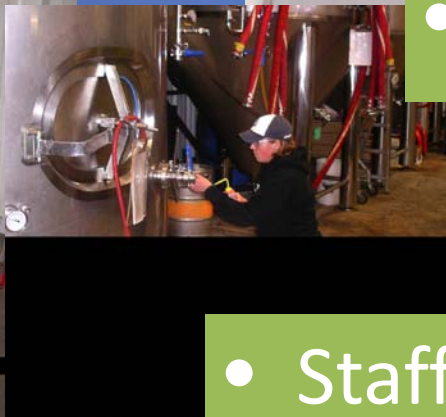


Cost

- Initial investment



- Materials



- Staff

Pay Off

- Recalls avoided
 - 2 Infections detected Spring/Summer '10
 - Additional cost savings when detected in fermenter
 - 1 batch “out of flavor specs” blended
 - Explanation published for batch with “floaties”
- Problems prevented
 - Unknown number of recalls avoided through improved process

Pay Off

- Sales increased 30%, and still growing!
- Draft Magazine Top 25 for 2010
- Weekly Magazine Top 3 for 2010
- Lots of medals
- Draft Magazine Beer of the Month
- Compliments on consistency and reliability

Pay Off

- Satisfaction in a job well done!
- Beer Pride!
- Happy drinkers!



Cheers!

- Kristen Waatti
- Rob Mullin, the Furbachers, and the office
- Line staff and engineers
- Warehouse
- Brewers
 - Marks Lanham, Reid Stratton, James Smith, and Cody Beach