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, Lactobacillius 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
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, Lactobacillius 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
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, Lactobacillius 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
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
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
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
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
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
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
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 throughout 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
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
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
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