

# TRIPLE ROCK BREWERY

## BREWERY MANUAL

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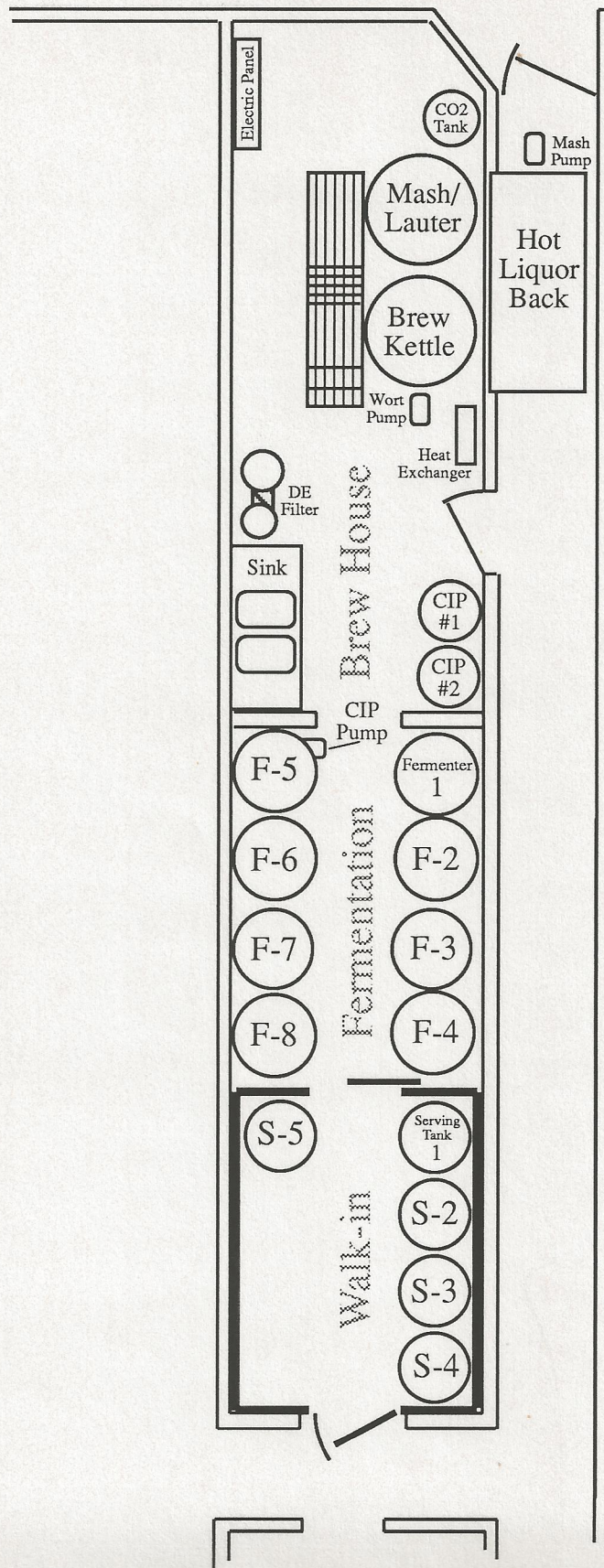


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# Triple Rock - Brewery Diagram





## **Daily Procedures**

### **Typical Brew Day**

A typical brew day lasts 7.0 to 8.0 hours. Two people work the whole day. Both a brew and a transfer are accomplished.

#### **1. Start up**

- a. Feel if kettle is warm. It should be boiling inside. (If it feels cold, something is wrong and you need to work on that first.)
- b. If grain was not milled the previous day, take empty white Brute buckets and go to warehouse to get grain. See Going to the Warehouse for Grain below.
- c. Take serving tank readings.
- d. Take fermenter gravity readings.      Cap Pale at 7 P or less.  
   Cap Red or Black at 8.5 P or less.  
   Cap stout at 10 P or less.
- e. Take fermenter pressure readings. If any tanks have dropped pressure from the previous day down to below 12 psi, check for leaks and top them off with CO2 from the brewery CO2 regulator.
- f. Disconnect CO2 from empty server. Open sample port to drain CO2.
- g. Start filling CIP2 with water. This will be used to sanitize the DE filter.
- h. Move DE Filter into filtering position.
- i. Turn on heat lamp at liquid CO2 tank (duer). Also, open Pressure Building valve.

#### **2. Sanitizing the server**

- a. Get all 3 grey hoses down.
- b. Connect medium grey hose from kettle pump to "in" on the CIP pump.



## Daily Procedures

### Typical Brew Day

- c. Connect short grey hose to bottom of server. Stick end in the drain.  
(If sanitizing server 1 or 5, stick end of short grey hose in brewery drain instead of walk-in cooler drain.)
- d. Connect 5/8" vinyl tubing to sample port with vise grips. Trail tubing outside walk-in door either into brewery, or into a white bucket. (This is to keep steam out of the walk-in cooler. See Special Rules at end of manual.)
- e. When server is empty of all CO<sub>2</sub>, connect long grey hose from "out" on CIP pump to CIP arm on server.
- f. Close valve leading up to hot liquor back. Open valve at bottom of kettle. Open valve to hose.
- g. Go ask kitchen if they need to get into the walk-in over the next few minutes. If yes, give them access until they don't need it. If no, tell them not to go into the walk-in for the next few minutes.
- h. Turn the kettle burner off.
- i. Pulse the pump on and off eight times: On for 5 counts, off for 5+ counts, and repeat eight times. (This is necessary to preheat the server. The pulsing is necessary to prevent the small grey hose from flying up out of the drain under pressure and spraying food and potentially people with boiling water and steam.)
- j. Go feel server. It ought to be *very* hot. If it isn't hot, pulse some more water through. If it is hot, close the valve on the bottom of the server.
- k. Run the hot water through the pump for one minute on the clock.
- l. Close the valve from the hose to the kettle pump, and the valve at the bottom of the kettle. (This is to stop back-pressure blowing steam and boiling water up through the kettle of boiling water.)
- m. Open the valve going up to the hot liquor back. (This relieves most of the back-pressure where it can't hurt anyone.)



## Daily Procedures

### Typical Brew Day

- n. Go tell the kitchen it is OK to go into the walk-in again. Tell them which tank (relative to the kitchen) will be **hot**.
- o. Kick out the medium hose at the "in" at the CIP pump. (This relieves more back-pressure safely.)
- p. Once the pressure has been relieved from the hose, connect the medium grey hose to the "in" at the CIP pump again.
- q. Disconnect the medium hose from the kettle pump, and connect it to the end of the short grey hose, to make an endless loop through the pump.
- r. Open the valve at the bottom of the server, and bleed the hot water through to the pump.
- s. Turn on the CIP pump and let the hot water recirculate for 10 minutes to heat sanitize.

### 3. Mash-in Preparation

- a. Add cold water to the kettle until it completely fills the inside of the kettle. (There will be no air space, except for the man-way door.)
- b. Stir the kettle water with the canoe paddle. Take the temperature and write it on the brew log.
- c. The temperature in the kettle should be;
  - 170 for a Pinnacle.
  - 175 for a Red or a Black.
  - 180 for a stout.
- d. If both brewers are there, pump the kettle water up to the hot liquor back. (If the second brewer is at the warehouse getting grain, wait till he/she is at the brewery unloading grain before pumping the water up.)
- e. While the water is being pumped up, you should be doing other things, ie:
- f. Bring the mash screens up to the mash tun, and lower them in, one at a time with the hoe. Put the back screen in first. Make sure it is all the way back, or the next screen will be a pain. Lower the second screen in slowly, keeping the right edge away from the back screen. If it doesn't quite go in, hit the right side of both edges straight down with the hoe.
- g. Connect the sparge arm to the bottom of the mash tun.



## Daily Procedures

### Typical Brew Day

- h. The temperature in the hot liquor back should be 165 for a Pinnacle.  
170 for a Red or a Black.  
175 for a Stout.
- i. If the temperature is low, but you think the water should be hot enough, turn on the flash heater, and set the temperature for 85 (lowest temp.) This will merely recirculate the water until it is of a uniform temperature.
- j. If the temperature is low, and you think it needs to be heated up, turn on the flash heater, and set the temperature for 220 (highest temp.) Turn the flash heater off when the temperature showing on the liquor back is 2 degrees lower than the target temperature. (The water continues to heat up by about 2 degrees.)

#### 4. Filtering Preparation

- a. Connect the short clear hose from the CIP2 tank to the "in" on the DE filter.
- b. Connect the long clear hose from the "out" on the DE filter, loop it back over fermenters 1 and 2, and stick the end into the top of CIP2.
- c. Add 2 cups measured of bleach to the water in CIP2.
- d. Open the valve on CIP2 and start filling the DE filter with bleach water. Let the bleach water run out of all the openings for a few seconds to clear them out. Make sure the vinyl tubing at the top of each lid is open to allow the escape of air while the DE filter fills.
- e. While DE filter is filling you can be doing other things, ie:
- f. Fill a white bucket with bleach water for the DE. (Use about 3 Tbsp.)
- g. Fill the right-hand sink with 6-8 inches of bleach water and immerse the filter cartridge holder, base and O-ring. (Use about 2 Tablespoons.)



## Daily Procedures

### Typical Brew Day

h. Get another white bucket and the hop pitcher. Spray the bottom valve/elbow of the tank you are going to transfer from with iodine. Pull off yeast into the hop pitcher. Dump it into the white bucket. When the white bucket is full, empty it gently into the left-hand sink. Turn the cold water on a little and run it over the back ledge of the left-hand sink. Continue to pull yeast until you are getting mostly beer.

i. When DE filter is full, set the valves to recirculate, and turn it on with the "out" closed.

j. When no more tiny bubbles can be seen in the front sight-glass, open the "out" and close the recirculate valve.

k. Recirculate the bleach water through the DE filter and both hoses for 20 minutes or more.

## 5. Pressurizing the Server

a. If the server has been sanitizing for 10 minutes, turn off the pump. Close the valve on the bottom of the server, and disconnect the small and medium grey hoses.

b. Grab a large brush dipped in bleach water, steel cap, tri-clover clamp, and O-ring.

c. Disconnect the large grey hose from the CIP arm of the server. Connect it to the CIP arm of the empty fermenter.

d. Drain the server. Brush off the CIP arm opening.

e. Make sure server is fully drained by stepping on the short grey hose at its highest point from the floor. (If this hose loops higher than the bottom of the tank, hot water will be trapped, and it will soon be under pressure - a dangerous situation!)

f. When drained, connect CO2 to top of serving tank.

g. Close the three openings on the server in this order:

1. Bottom of server.
2. Sample Port
3. CIP arm

h. Put server elbow in the bleach water in the right-hand sink.



## Daily Procedures

### Typical Brew Day

#### 6. Running the Mash water

- a. The pre mash-in water is run in three stages:
  1. Rinse Through.
  2. Preheat.
  3. Foundation.
- b. The rest of the water is run in two more stages:
  1. With Grain.
  2. Sparge.
- c. The water should be less than 1 inch below the top of the sight-glass, or about 5 inches above the top of the ruler. It should also be at the correct temperature (shown above under Mash-in Preparation.)
- d. Close the valve on the bottom of the mash tun.
- e. Run the 'Rinse Through' water down about 1 inch, or to 4 inches above the ruler.
- f. Open the valve on the bottom of the mash tun, and let the water rinse through the kettle and onto the floor. Use the hose and rinse any "chunks and bits" out of the kettle. Close the valve leading to the hot liquor back so "chunks and bits" don't go up the pipe. Use the pump to clear the kettle of water.
- g. Close the valve on the bottom of the mash tun and the bottom of the kettle.
- h. Run the 'Preheat' water down 3 inches, or to 1 inch above the ruler.
- i. Open the bottom mash tun valve and let the water run into the kettle. Add enough cold water to reach about 4-5 inches on the left side of the kettle. (The right side of the kettle is deeper because of the slope.)
- j. Turn the kettle burner on. This water will be used to caustic the fermenters later.
- k. Close the valve on the bottom of the mash tun.



## **Daily Procedures**

### **Typical Brew Day**

l. Run the 'Foundation' water down 10 inches, or to the 9-inch mark on the ruler. (Top of first tape.)

## **7. Mashing-in**

- a. Turn off the little fan. (The toggle switch is next to the auger chain.)
- b. Lower the auger onto the two blue milk crates. Slide the bottom support wire up to the "warning" label.
- c. Unplug the little fan above the auger motor, and plug the auger in.
- d. Use the small grain bucket to fill the auger up with grain before turning it on.
- e. "Top" person controls water and mashes-in with the canoe paddle. Run the water at full blast. You can always turn off the pump for a few seconds here and there if you need to let the grain catch up.
- f. "Bottom" person scoops and dumps grain into the auger as quickly as possible.
- g. Run 'With Grain' water down to 14 inches on the ruler for Pinnacle.  
15 inches (top of next tape) for Red or Black.  
17 inches on the ruler for a stout.
- h. If a stout, run 2 more inches of cold water into hot liquor back. (Up to top of second tape or 15 inches on the ruler.) Turn flash heater on - cold, to recirculate, or hot to warm up to 170 - sparge water temperature.
- i. Generally the mash temperature for the three regular beers is around 155. The Red can range 155-158, and the Black and stouts tend to be around 152.

## **8. After Mashing-in**

- a. "Bottom" person sets the brew clock to noon.



## **Daily Procedures**

### **Typical Brew Day**

- b. "Top" person unplugs auger and re-plugs in little fan, wipes spilled grain off top of mash tun, and lowers canoe paddle to lower level of steps. Also brings down a 1-micron filter cartridge, and the bag of DE.
- c. One person starts on the DE filter, and the other will clean the buckets and get the caustic going in the fermenter.

## **9. Pre-Filtering**

- a. If the DE filter has been circulating with bleach water for 20+ minutes, turn it off and start draining it.
- b. While it is draining you can be doing other things, ie:
- c. If all the yeast is not drained, pull some more from the bottom of the fermenter.
- d. Connect the umbilical cord between the fermenter and the sanitized server.
- e. Set the filter CO2 regulator for 30 PSI.
- f. Start CIP2 filling up with water again. This will be used to rinse the empty fermenter after you have causticed it.
- g. When the DE filter is drained, you can start pressurizing it. From this point forward it is imperative that nobody lean on the top lids of the DE Filter. The entire system is under pressure, and in case of an accident, we do not want your elbow embedded in the ceiling.
- h. Isolate the dosing tank before starting to pressurize.
- i. Pressurize the filter (screen) tank. Blow out the little sample port, the pump, and then the dosing tank, in that order.
- j. Re-isolate the dosing tank. After the pressure has blown out of it, close the "back door" valve.
- k. Put on a "Dust and Mist Respirator" mask.



## Daily Procedures

### Typical Brew Day

- l. Empty the bleach water from the white bucket, and dry bucket with a paper towel.
- m. Pour DE into bucket until 2/3 to 3/4 full.
- n. Put into dosing tank. Close dosing tank off.
- o. Hose down any DE that has gotten into the air. Take off mask.
- p. Pressurize dosing tank through left vertical valve. Close left vertical valve.
- q. Take the end of the long clear hose out of the top of CIP2, and drape it over fermenter 2.
- r. Assemble the filter cartridge, holder, base, and O-ring together.
- s. Disconnect the other end of the long clear hose and attach the filter cartridge to the filter "out" valve. Reattach the long clear hose to the filter "out" on the other side of the cartridge holder.
- t. Firehose the short clear hose (beer intake hose.)
- u. Spray racking arm valve on fermenter with iodine. Splash some bleach water in there as well.
- v. Connect the short clear hose to the fermenter racking arm. Tighten all the hose clamps on both clear hoses.
- w. Slowly open racking arm valve. Turn temperature control unit on fermenter off (to highest temperature.)
- x. If both tanks on DE filter are equalized in pressure, and that pressure reads about 1 bar or more, you can stop pressurizing the DE filter.
- y. Slowly fill the DE filter with beer. (I will not go into more detail on the DE filter here. It is something you cannot learn by reading about it.)



## **Daily Procedures**

### **Typical Brew Day**

#### **10. Filtering**

- a. Filter the beer.
- b. Take a small sample of the newly filtered beer to John Martin to taste, and take another sample for a gravity reading.
- c. Record the final gravity, alcohol level, and final serving tank quantity. (Approximate alcohol level can be determined by: (S.G. - F.G.) -- 2.
- d. Fill in all the appropriate paperwork.

#### **11. Cleaning up after Mashing-in**

- a. Vacuum out the auger. Raise it up out of the way. Hook the chain on the black link.
- b. Spray out all the Brute buckets, and the little grain bucket. Put them over by the outside windows tipped up to drain and dry. Keep them away from the kettle so they don't melt!
- c. Go up and check the Mash temperature. Mark it on the brewlog.

#### **12. Circulating Caustic in the Fermenter**

- a. Take all the parts off the top of the empty fermenter. Cap off the tri-clover fitting. Put wet towels over the other openings.
- b. Connect the short grey hose to the bottom of the fermenter. Close the bottom valve.
- c. Turn the racking arm upside-down, so that it points straight up. Attach a blow-off hose to it and open the racking arm valve.
- d. Close the sample port.
- e. By now the water in the kettle should be plenty hot (170 or more.) Turn off the burner.



## Daily Procedures

### Typical Brew Day

- f. Connect the medium grey hose from kettle pump to CIP1. Open both valves.
- g. Pump the hot water into CIP1. Close both valves.
- h. Add the caustic to CIP1 in this proportion:
  - If Clenescos "BSC22", add 3 scoops (2+ cups per scoop) of BSC22 and 1 scoop of TSP.
  - If Oxford Chemicals "KloroKlenz", add 2 scoops of KloroKlenz, that's it.
- i. Disconnect the medium hose from the kettle pump, and connect it to the "in" on the CIP pump.
- j. Pump the caustic solution into the fermenter. The pressure should be relieved through the racking arm. If the towels slide too much at the top and caustic shoots straight up to the ceiling, stop the pump and rearrange the towels.
- k. When all the caustic solution is in the fermenter, connect the end of the short grey hose to the end of the medium grey hose, to make an endless loop through the pump.
- l. Tighten all the hose clamps on all three grey hoses.
- m. Open the valve at the bottom of the fermenter. Bleed the caustic solution through the pump.
- n. Turn on the pump. Feel the long grey hose below the CIP arm for vibrations. If it is vibrating, it confirms that the caustic is circulating. If there are no vibrations, turn off the pump, and bleed out more air, then try again.
- o. Start filling CIP1 up with water. This will be used to rinse the other fermenter after filtering the beer into the server.
- p. If it is 11:00 or later, the person who started the caustic circulating may take a quick lunch. (In the brewery, there is no other kind of lunch.)



## Daily Procedures

### Typical Brew Day

#### 13. End of Filtering

- a. When air comes through the short clear hose (beer intake hose), put DE filter into recirculation. (The fermenter is empty.)
- b. "Drain" the dosing tank. Then put into recirculation again.
- c. Close racking arm valve. Close valve on bottom of server. NOTE height of beer in sight-glass. Height of beer is important because it gives you a clue whether you have to worry about overflowing the server, and pushing beer into the CO2 lines. (Very bad. You'll have to clean the CO2 lines then.)
- d. Height of beer is OK if you can see one inch of space above beer in servers 1-4, and six inches of space above beer in server 5. If there is less than this much space above the beer, you must be ready to prevent an overflow! See Avoiding an Overflow below.
- e. Connect filter CO2 to vinyl tubing on top of filter (screen) tank. Open CO2 regulator valve, but not valve on top of DE filter.
- f. Turn off DE filter. What is the pressure on the DE filter?
- g. If pressure is less than or equal to 1 bar, open CO2 valve on top of DE filter. If pressure is more than 1 bar, slowly bleed off some pressure by opening filter "out" valve. (At the filter cartridge.) This relieves pressure into the long clear hose.
- h. Close the filter "out" valve as soon as the pressure gets down to 1 bar. Immediately open the CO2 valve on top of the filter tank.
- i. Slowly open the filter "out" valve at the cartridge again.
- j. Close the back horizontal valve on the DE filter so that the beer does not back out through the filter cakes. When bubbles appear in the front sight glass, open the back horizontal valve.
- k. When gas appears in the long clear hose, walk the beer down to the server and close off the bottom valve.



## Daily Procedures

### Typical Brew Day

#### 14. Avoiding an Overflow

- a. If the server is susceptible to overflowing, as outlined above, you need to be on your guard. Cleaning CO2 lines is a big pain! Better to avoid it.
- b. As you are draining the filter (screen) tank with CO2, have the juice pitcher full of hot water in the walk-in with you so you can monitor the tank fill.
- c. When the weld seam on the top edge of the server starts to feel cold, immediately disconnect all CO2 lines and umbilicals from the server, then jump down and immediately close off the valve on the bottom of the server.
- d. Any beer left in the hose is wasted. That's just the way it is.

#### 15. Cleaning up after Filtering:

- a. Disconnect the umbilical cord from the server if you have not already.
- b. Open the sample port on the fermenter to drain the CO2.
- c. Close the CO2 valves at the top of the DE filter and disconnect the filter CO2 line.
- d. Open the valve at the bottom of the filter (screen) tank a little with your boot. Let all the liquid drain from the tank first - while it is still under pressure. (If you drain the CO2 before the liquid, you will collapse the bottom half of all your screens.)
- e. Then drain the CO2 out of both the top and the bottom of the DE filter.
- f. Close Pressure Building valve at the liquid CO2 tank (duer), and turn the heat lamp off.
- g. Set the filter CO2 regulator back down to zero.
- h. Get a garbage can from the janitor's closet and put a garbage can liner in it.



## Daily Procedures

### Typical Brew Day

- i. After all CO<sub>2</sub> is drained, disconnect the long clear hose from the filter cartridge.
- j. Disconnect the long clear hose from the bottom of the server.
- k. Take the level reading for the server. Shut the walk-in door.
- l. Disconnect the filter cartridge. Throw the cartridge away. Be careful not to throw the O-ring away by accident.
- m. Rinse the cartridge holder, base and O-ring well, and put them away. Be sure not to pinch the O-ring, or it won't fit the cartridge holder right again.
- n. Scrape each screen one at a time into the garbage can using the nylon scraper. Stack them in front of the pub window.
- o. When all screens are scraped, hose out the DE filter. Don't forget to rinse out the pump, *with the pump running*.
- p. When the DE filter is well rinsed, spray off each of the screens, one at a time, on both sides. Spray well along the edges where DE likes to hide.
- q. As you spray them off, you can replace the screens into the DE filter.
- r. Put the DE filter back together, and set it up to recirculate.
- s. Connect the small clear hose to CIP2, and rinse the beer in the hose out down the drain.
- t. Connect the other end of the small clear hose to the "in" on the DE filter.
- u. Measure 1/2 cup of TSP powder into the dosing tank.
- v. Fill the DE filter with water from CIP2, and set it to internally recirculate for about 20 minutes. (It is OK if the water contains some bleach residue.)
- w. Start filling CIP2 with water again. This will be used to rinse the fermenter that is circulating with caustic.



## **Daily Procedures**

### **Typical Brew Day**

x. If it is 11:00 am or later, the person who just finished filtering may take a quick lunch. (In the Brewery, there is no other kind of lunch.)

#### **16. Breaking Down the Fermenter:**

a. After the caustic has been circulating in the fermenter for 20+ minutes, turn off the pump, and drain the fermenter.

b. Connect the medium grey hose from CIP2 to the "in" on the CIP pump.

c. Rinse the newly causticed fermenter with the entire contents of CIP2. (It is OK if there is still some bleach in the water because this fermenter will be bleach sanitized next.)

d. When the newly-filtered fermenter is empty of all CO<sub>2</sub>, turn racking arm upside-down. Connect clear draining hose to bottom of fermenter, stick other end in the drain, and open the bottom valve. Connect the long grey hose to the CIP arm. Connect the medium grey hose to CIP1. Drain and rinse this fermenter with the entire contents of CIP1. (It is OK if there is some caustic residue in the water because this fermenter will be chastised tomorrow.)

e. While the second fermenter is rinsing, you can be doing other things, ie:

f. Empty the right-hand sink, and fill half-full with hot tap water.

g. Add about 1/2 cup measured of TSP to the hot water.

h. Take all the parts off of the newly causticed fermenter. The door can be hung on a "door hook" between the fermenters on the left side.

i. Use the Stainless "toothbrush" to remove any old teflon tape.

j. Immerse the round stainless basket in the TSP water.

k. Immerse all the fermenter parts in the TSP water except the Micromat and the Pressure Gauge. Put the small parts in the basket. Don't forget to immerse the rubber door gasket.



## Daily Procedures

### Typical Brew Day

- l. While all these parts are soaking, you can be doing other things, ie:
  - m. Take a small bucket of TSP water, a sponge, and all the brushes, and go up to the top of the fermenter. Take the wet towels off (you are done with them,) and brush out all the openings. Clean the top of the fermenter with the sponge.
  - n. Reach inside the fermenter man way door and wipe down all the "shadow" areas with a TSP sponge. Don't forget the underside of the thermometer.
  - o. Climb up inside the fermenter, wipe off the ceiling with a TSP sponge, take the spray ball off and wipe off the stem.
  - p. Take the spray ball down to the sink and rinse it in the TSP water. Climb back inside the fermenter and put the spray ball back on the stem.
  - q. Wipe off both sides of the fermenter door with a TSP sponge.
  - r. Start filling CIP2 with water again. This will be used to sanitize the fermenter.
  - s. Brush all the soaking parts in the sink out. Sponge the inside and outside of the rubber door gasket. Brush the micromat and pressure gauge.
  - t. Put the rubber gasket back on the fermenter door. The wide side of the gasket goes toward the door handle. It is on the side that will make contact with the fermenter.
  - u. Wrap several layers of teflon tape around each threaded part.
  - v. Put the fermenter back together. Close the sample port. Close the racking arm with the valve handle pointing left, so that it does not stick out.
  - w. Do not drain the TSP water in the right sink. Put a blow-off hose in it to soak. The blow-off hose stays there until the end of the boil.



## Daily Procedures

### Typical Brew Day

#### 17. Sanitizing the Fermenter

- a. Disconnect the long grey hose from the transfer fermenter, and connect it to the CIP arm of the fermenter you just put back together.
- b. Connect the short grey hose to the bottom of the fermenter, and stick the other end in the drain. The valve should be open.
- c. Connect the medium grey hose to CIP2 again.
- d. Add 2 cups measured of bleach to CIP2, when it is filled.
- e. Turn on the CIP pump, and run 1/3 of the bleach water in CIP2 through the fermenter and down the drain.
- f. Don't turn off the pump. Just go close the bottom valve on the fermenter.
- g. Run a second 1/3 of the bleach water into the fermenter. When CIP2 is only 1/3 full (the last 1/3), turn off the pump, but don't close the valve on the bottom of CIP2.
- h. The pressure that has been building in the fermenter should blow back. If nothing blows back into CIP2, check if the CIP2 valve is open, the bottom fermenter valve is closed, and everything else on the fermenter is closed. (This is used to verify that the fermenter is a "closed system.")
- i. Once the pressure has blown back, close the valve on CIP2, and disconnect the medium grey hose.
- j. Connect the end of the short grey hose to the end of the medium grey hose, to make an endless loop through the pump.
- k. Open the bottom valve on the fermenter. Bleed the bleach solution through to the pump.
- l. Turn on the CIP pump and recirculate the bleach water in the fermenter. You can let it recirculate until 4:15 on the brew clock. Do not be concerned that it is recirculating too long. It does need to recirculate for at least a half-hour.



## Daily Procedures

### Typical Brew Day

m. While it is recirculating, if you have not already eaten lunch, please do so.

### 18. Lautering and Sparging

a. At 1:00 on the brew clock, it is time to start "The Sparge." What we call the sparge is actually both lautering from the bottom of the mash tun, and running the sparge water into the top of the mash tun.

b. The flow into the kettle should not be too fast, nor too slow. You want the runoff to last about 1.5 to 2 hours.

c. The sparge flow into the mash tun should spray the top of the grain bed out to the edges, but without hitting the walls of the mash tun.

d. These two flows should be watched carefully at first, and then periodically thereafter.

e. If the runoff (lauter) is too fast, the kettle will be full and will thus come to a boil before you are done with the fermenter, and you probably won't get lunch. Also, you will have a poor sugar extraction, and will end up with a weak beer. The sparge will probably not keep up and the top of the grain bed will go dry.

f. If the runoff is too slow, the kettle will come to the boil during filling. This will probably cause a boil over. It will also cause extra caramelization on the walls of the kettle that will be hard to clean later. The sparge will probably fill up with several inches of water above the grain bed, which is OK.

g. If the sparge water is running too slow, the top of the grain bed will go dry. You will have a poorer sugar extraction, and could end up with a weak beer. It also causes the grain bed to cool off.

h. When the level of the runoff reaches the left hand floor to wall edge in the kettle, take 1/2 cup of runoff into a measuring cup. This is your First Wort.

i. At 1:30 on the brew clock, turn on the kettle burner.



## **Daily Procedures**

### **Typical Brew Day**

- j. Turn all the tipped brute buckets right-side up so the outside can dry.
- k. When you hear the liquor back pump cavitating, turn it off.
- l. When the water level in the mash tun is below the top of the grain bed, open the lid of the mash tun. This allows the grain bed to begin to cool off.
- m. When the level of the runoff in the kettle is at 35 inches on the dip stick, close the valve at the bottom of the mash tun.

### **19. Putting the Filter Away**

- a. Turn the DE filter off and drain it. (Open the valves on the lids.)
- b. Take the screens out and spray each one. Especially spray the bottom edge where the "salt and pepper" collects. Set aside to drain and dry overnight.
- c. Spray out the inside of the DE filter. Spray out the pump with the pump running.
- d. Move the DE filter back to its original position.
- e. Iodine the bottom edges of each screen, the inside bottom edge of the filter tank, and the pressure gauge hole in the side of the filter tank.

### **20. Spent Grain Removal**

- a. When the mash tun valve is closed at the end of the runoff, the sparge arm can be disconnected at the mash tun.
- b. Stack the white brute buckets and move them and their lids out of the way.
- c. Connect the clear draining hose to the bottom of the mash tun. Run it around the pole, and into the drain. Open the valve and drain the mash tun.
- d. Go up the steps to the mash tun. Lift up the right hand "floor" panel from in front of the mash tun man way door.



## Daily Procedures

### Typical Brew Day

- e. Get the two grain "chutes" out from the left side of the sink.
- f. Slide the grey chute through the opening in front of the mash tun.
- g. Get the two red and blue bungee cords from behind the brewery door.
- h. Hook the two bungee cords to the handle and top of the grey chute, they should be dangling down.
- i. Hang the blue chute below the grey chute by its handles with the bungee cords.
- j. Get a blue spent grain bucket, and place under the chutes with the wheels facing toward the restaurant.
- k. Go up the steps, open the man way door, sit next to the grey chute on the "floor" panel still there, and pull out spent grain with the hoe.
- l. Try not to overflow the blue bucket. The following number of blue buckets are normally used for grain removal:
 

Pale	- 3 buckets
Red	- 4 buckets
Black	- 5 buckets
Stout	- 6 buckets
- m. Put a lid on each one as you fill it, and pull it outside. Line them up outside in front of the brewery windows.
- n. The Pig Rancher who picks up the grain is Art Sims. He generally gets here about 2:30 pm, except when he works the early shift. Then he arrives about 12:30. Please try to have the grain all ready for him.
- o. If you will not be brewing tomorrow, let Art know, so that he doesn't have to stop in:
 

<u>Art Sims</u> work: 302-5892 home: 778-7131	<u>Roger Lau</u> Lazy R Ranch 408-897-3006
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Let their home phones ring 10 times so the answering machine picks up.
- p. He does not generally pick up on weekends, unless by special arrangement. If you brew on weekends, you will probably have to make a dump trip Monday.



## **Daily Procedures**

### **Typical Brew Day**

#### **21. Cleaning the Mash Tun**

- a. Keep your eye on the kettle and the brew clock while you clean the mash tun.
- b. Remove the two chutes and bungee cords.
- c. Spray out both chutes and put them away.
- d. Replace the right-hand "floor" panel in front of the mash tun door.
- e. Take the screens out first and spray them clean.
- f. Put them to the left of the steps overnight to dry. Put the "back" screen in front so they are ready to go in the morning.
- g. Take the hose and a sponge up to the mash tun with you.
- h. Spray and sponge out the auger funnel and chute until clean. Put funnel on the shelf behind you, out of the way next to the blue milk crates.
- h. Climb into the mash tun. Spray and sponge the spray ball, walls and floor of the mash tun until clean.
- i. Chase any stray grains down the drain with the hose.

#### **22. The Boil**

- a. The sparge usually ends between 2:30 and 3:00 on the brew clock.
- b. The kettle usually comes to a boil between 2:45 and 3:15 on the brew clock.
- c. Leave the kettle lid open until it comes to a boil. That way you can monitor the boil easier.
- d. If you see steam coming out of the kettle, it is about to come to a boil.



## **Daily Procedures**

### **Typical Brew Day**

- e. When it starts boiling, add the first hop addition gently. Do not splash (to avoid burns). Stir the hops in with the canoe paddle.
- f. Take the hose and spray down any foam. This will help prevent a boil over after you have added the hops.
- g. When kettle comes to a boil, set the brew clock for 3:00.
- h. Place two tri-clover clamps on the edges of the kettle, one on each side. This is to allow good air flow up the kettle stack.
- i. While the kettle is boiling (for the next 70 minutes while it is semi-unattended), someone can go to the warehouse and mill tomorrow's grain.

### **23. Going to the Warehouse for Grain**

- a. Get out of your rubber boots and into regular shoes.
- b. Take the keys to the white truck, hanging on the nail in the office.
- c. If it is Monday, get \$20.00 from the kitchen, and fill the truck up with gas and oil on the way to the warehouse. Save your receipt for the gas and oil, and turn it, and the change, back in to the kitchen when you come back.
- d. Pull the white grain buckets and blue lids outside. If you need more caustic or TSP, bring the white 5-gal. pails and lids too.
- e. Drive the truck around and pick up the buckets and pails.
- f. At the warehouse, back the truck into the parking spot to the right of the ramp.
- g. Pull the grain buckets inside, and set them out separately to dry further.

### **24. Milling Grain**

- a. Make sure all the "trap doors" on both mills and the weigh-hopper are closed.



## Daily Procedures

### Typical Brew Day

- b. Put a white grain bucket into each of the mill boxes.
- c. Auger the pale malt into the weigh-hopper, until it contains all the pale for the recipe.
- d. Open the trap door on the weigh-hopper.
- e. Turn on the green mill. If it hums or is jammed, turn it off and see Fixing a Jammed Mill below.
- f. Open the trap-door on the green mill to begin milling the pale malt.
- g. Empty any 50 lb sacks of specialty malt required into the red mill. When at least one sack is in the red mill hopper, you can start milling it:
- h. Plug in the red mill and turn it on.
- i. Pull out the trap door and put the little block of wood in it.
- j. The red mill is very noisy, so you won't be able to hear when the green mill is overflowing and jamming, so you will have to keep looking in to check it.
- k. Keep putting specialty malts into the red mill, all the while looking in and checking the level of the malt under the green mill and under the red mill.
- l. When one of the buckets is full, close the mill's trap door, but leave the rollers turning. Make sure all the grain is in the bucket, and not still up the chute on the green mill. Take out the filled grain bucket, and replace it with a dry empty one.
- m. As the buckets are filled, put a dry lid on them, and pull them back out to the truck.
- n. The red mill is much slower than the green mill. Pay close attention to the green mill because, when it fills up, the grain will back up into the chute and will jam the rollers.



## **Daily Procedures**

### **Typical Brew Day**

- o. When you are done putting specialty malts into the red mill, you have time to refill the white 5-gal. pail with caustic or TSP.
- p. When all the grain is milled into grain buckets, loaded on the truck, the TSP or caustic is filled and loaded, the lights and radio in the warehouse are off, and the doors locked up tight, go back to the brewery.

### **25. Fixing a Jammed Mill (the green mill)**

- a. First, turn off the green mill.
- b. Close the trap door on the green mill.
- c. Note the roller distance setting on the left side of the mill. It is probably around 1 3/8 inches. Memorize whatever it is set at.
- d. Unscrew the big black knob on the roller setting arm, and open and close the rollers several times. (ie: move the roller setting between 0 and 4 on the ruler several times.) For your information, the "ruler" for the roller setting is stuck on backwards, ie: 4 = closest together, 0 = farthest apart.
- e. When no more grain falls out of the chute inside the mill box, the mill is probably unjammed.
- f. Reset the rollers to whatever distance it was originally set for.
- g. Turn the green mill on. If it hums, it is still jammed. Quickly turn it off and repeat the above steps.
- h. If the mill doesn't hum, it is ready to go.
- i. Open the green mill trap door and start milling again.

### **26. Unloading the Grain**

- a. Park in the yellow loading zone if possible. Turn on your emergency flashers.



## **Daily Procedures**

### **Typical Brew Day**

- b. If you double-park, look out for the Meter Maids, they will give you a ticket.
- c. Unload the buckets and bring them into the brewery hallway with the handtruck.
- d. When you are done unloading the truck, park it in its spot in the lot behind Triple Rock.
- e. Return the keys to their nail in the downstairs office.

### **27. Back-flushing the Heat Exchanger**

- a. When the brew clock reads 4:10, add the second hop addition.
- b. At 4:15 on the brew clock, set up to back-flush the heat exchange:
- c. Connect the short clear hose to the hard-piping out of the heat exchanger. Drape it over the CIP1 lid handle and into a 5-gal pail.
- d. Turn off the CIP pump which has been circulating bleach water through the fermenter.
- e. Disconnect the long grey hose from the CIP arm, and connect it to the hard-piping in the fermentation room.
- f. Drain the fermenter.
- g. Connect the medium grey hose from CIP2 to the "in" on the CIP pump.
- h. Brush out the Aerating Stone and Thermometer connections in the hard-piping above the heat exchanger with TSP water from the right-hand sink.
- i. Open the valve on the bottom of CIP2.
- j. Turn on the CIP pump, and pump the 1/3 tank of bleach water remaining in CIP2 back through the heat-exchange and into the 5-gal. bucket. Let the bucket overflow.



## **Daily Procedures**

### **Typical Brew Day**

- k. When CIP2 is empty, turn off the pump.
- l. Disconnect the long grey hose from the hard-piping in the fermentation room.
- m. Connect the short clear hose to the hard-piping in the fermentation room.
- n. Leave the bleach water in the short clear hose. Drape the other end of the short clear hose over one of the fermenters.
- o. Loosen the two clamps on the kettle pump setup (on the top and bottom of the short hard-pipe.) Twist the short hard-pipe around until the free valve can be connected to the hard-piping out of the heat exchanger. (Where the clear hose was just disconnected from.)
- p. With your eye, follow where the wort will go to be sure that everything is set up: Out of the bottom of the kettle (valve still closed there), through the kettle pump, up the short hard-pipe, through the open valve to the heat exchanger. (The valve going up to the liquor back should be closed.) Then out of the heat exchanger, past the aerating stone and thermometer, through the hard-piping to the short clear hose, which is hanging over a fermenter.

## **28. Transfer of the Wort**

- a. Open the water valve into the top of CIP1 and close the water valve into CIP2.
- b. At 4:30 on the brew clock, add the last hop addition, measure the level of the wort in the kettle (usually around 33 inches), and stir rapidly clockwise to whirlpool the hops and trub.
- c. Open the bottom valve on the kettle, and start the pump. The bleach water will begin to be pushed out.
- d. Go disconnect the short grey hose from the bottom of the fermenter.
- e. Turn on the city water (yellow valve) about half-way.



## Daily Procedures

### Typical Brew Day

- f. When more beer than water is being pushed out of the clear hose, turn off the pump.
- g. Connect the clear hose to the bottom of the fermenter.
- h. Start the kettle pump again.
- i. Go turn both valves on the oxygen regulator (both on/off and flow) up all the way.
- j. Watch the thermometer on the hard-piping below the sight-glass. When the temperature gets below 90 , open the green oxygen valve.
- k. Watch the thermometer for a while. The temperature should settle at about 70-75 . If it doesn't, adjust the water flow *slightly*.
- l. When the temperature is at 70-75 , adjust the oxygen flow regulator at the tank down to 4 liters per minute. (The floating ball is at 4.)
- m. Continue to monitor the temperature for the entire transfer, which takes about 45 minutes.

## 29. During Wort Transfer

- a. Set the temperature control unit on the fermenter to 70 .
- b. Take the blow-off hose out of the right-hand sink. Put it into the 5-gal. pail used for back-flushing. Bring both down to the fermenter. They will be connected after transfer as the blow-off bucket or air-lock.
- c. Drain TSP water and rinse the right-hand sink.
- d. Fill the right-hand sink with bleach water.
- e. Soak the stainless yeast-pitching pot, lid, and blue funnel in the bleach water. Also immerse the elbow from the bottom of the fermenter that you plan to take the yeast from. See Yeast Pitching below.



## Daily Procedures

### Typical Brew Day

- f. Disconnect the sparge arm from the kettle. Stick one end in the central brewery drain.
- g. Connect the small grey hose to the other end of the sparge arm. Loop the other end of grey hose under steps toward kettle pump.
- h. Disconnect the mash tun draining hose. Leave end in drain, and slide other end under the steps toward kettle pump.
- i. The valves at the bottom of CIP1 and CIP2 should both be closed.
- j. If you have not yet taken fermenter pressure and gravity readings today, please do so now.
- k. Disconnect the medium grey hose from CIP2 and connect it to CIP1.
- l. Add caustic to CIP1 in this proportion:
  - If Clenescio "BSC22", add 3 scoops (2 c. @) of BSC22 and 1 scoop of TSP.
  - If Oxford Chemicals "KloroKlenz", add 2 scoops of KloroKlenz, that's it.
- m. When CIP1 is full (but hopefully before it overflows), open the water valve into CIP2, and close the water valve into CIP1.
- n. Turn off the green oxygen valve at the aerating stone.
- o. Open the flow regulator valve at the oxygen tank all the way. The oxygen should now be all the way on and all the way up.
- p. You are now about half-done with the transfer. You can pitch the yeast now, or during After Transfer Back Flushing below.

## 30. Yeast Pitching

- a. Yeast should be pitched from a beer that was brewed about 4 days ago. The generation number listed for the yeast you are going to use should not be greater than 5. (Then today's batch will be generation 6 or less.) In general, do not use yeasts from specialty beers. (They can be too high in alcohol or may contain large quantities of wheat or black and roasted malts, all of which change the flavor of the yeast too much.)



## **Daily Procedures**

### **Typical Brew Day**

- b. If you use a 3 day old yeast, it may be too runny. If it is quite runny, pitch twice.
- c. If no suitable yeasts are available for repitching, get a half-kilo brick from the lab refrigerator in the upstairs office.

### **31. Standard Pitching Procedure**

- a. Brush off the valve at the bottom of the fermenter with bleach water.
- b. Attach the elbow that has been soaking in the sink.
- c. Slowly pull off the trub (cold break) into the juice pitcher. If this is the first time this tank is being used for yeast, pull off about a whole pitcher full of trub/yeast. Dump the trub in the left-hand sink. Rinse down the drain.
- d. Tip the stainless pot under the elbow and fill as full as possible without spilling. Put the lid on the pot.
- e. Get a measuring cup part-full of bleach water, and put the blue funnel in it.
- f. Set the ladder against the fermenter you are pitching into.
- g. Take cup and funnel in one hand, and the yeast pot in the other. Balance carefully while you go up the ladder.
- h. Balance the yeast pot between two fermenters on top, and find a secure place to balance the cup and funnel.
- i. Take off the tri-clover clamp, and balance the micromat or CO2 arm.
- j. Put the O-ring into the bleach water in the measuring cup.
- k. Put the funnel in the opening, and pour the yeast into it. Lift the funnel up a little to allow air to escape around it. (This prevents the yeast from "burping" air and splattering.)



## **Daily Procedures**

### **Typical Brew Day**

- l. After pitching, put the funnel into the pot.
- m. Pour the bleach water around the opening and the top of the fermenter to wash off any spilled yeast.
- n. Replace the O-ring and micromat or CO2 arm, so that the tank is resealed.
- o. Climb down carefully and put the dirty pot, funnel, and cup into the left-hand sink.
- p. Rinse them off, dip them into the bleach water in the right-hand sink, and put them away.

### **32. New Culture Pitching Procedure**

- a. Take the half-kilo brick of yeast, and float the unopened package in the bleach water.
- b. If you haven't immersed the blue funnel, don't. It will be easier to use dry. It was rinsed and dipped yesterday, so it should not be contaminated.
- c. During the second half of the transfer, dry off the wet yeast package with a paper towel.
- d. Bring the yeast, the funnel, a measuring cup of bleach water, and a razor or other sharp object for opening the package with you.
- e. Set the ladder against the fermenter you are pitching into. Climb carefully.
- f. Find a secure place to balance the measuring cup and yeast.
- g. Take off the tri-clover clamp, and balance the micromat or CO2 arm.
- h. Put the O-ring into the bleach water in the measuring cup.
- i. Put the funnel in the opening, and pour the yeast into it slowly.



## **Daily Procedures**

### **Typical Brew Day**

- j. Pour the bleach water around the opening and the top of the fermenter to wash off any spilled yeast.
- k. Replace the O-ring and micromat or CO<sub>2</sub>, so that the tank is resealed.
- l. Climb down carefully and put the funnel, and measuring cup into the left-hand sink.
- m. Rinse them off, dip them into the bleach water in the right-hand sink, and put them away.

### **33. End of Wort Transfer**

- a. When the level of the wort in the bottom of the kettle is low enough that you can see the whirlpooled trub, it is called "hitting Hop Island."
- b. When most of the wort has been transferred, and Hop Island is just beginning to break up, turn off the kettle pump.
- c. Close the valve at the bottom of the kettle, and the one leading from the short hard-pipe to the heat exchanger.
- d. Open the green oxygen valve at the aerating stone. This will push the beer left in the hard-piping and clear hose into the fermenter with oxygen.
- e. When you can see the oxygen in the small clear hose, "walk" the beer over to the fermenter, and close the valve at the bottom of the tank.
- f. Close the green oxygen valve at the aerating stone, and close off both valves on the oxygen regulator over at the oxygen tank.
- g. Connect the blow-off hose to the fermenter CIP arm. Put the other end into the 5-gal. blow-off bucket.

### **34. After Transfer Back Flushing**

- a. Disconnect the tri-clover clamp at the "in" to the kettle pump. Leave the elbow attached to the kettle. Be careful, there will be hot wort in there.



## Daily Procedures

### Typical Brew Day

- b. Disconnect the tri-clover clamp half-way up the short hard-pipe where it connects to the heat exchange arm. Leave the closed valve connected to the heat exchange arm.
- c. Disconnect the tri-clover clamp at the top of the short hard-pipe. Keep the valve that goes up to the liquor back attached to the short hard-pipe.
- d. Put the short hard-pipe and top valve into the left-hand sink.
- e. Pull the pump completely away and to the right of its normal position.
- f. Spray into the top ("out") of the pump until it creates a "fan" pattern out the "in" connection. When you stop the spray, the water should "fountain" back out of the top of the pump.
- g. Connect the clear draining hose to the elbow at the bottom of the kettle. You will have to loosen the tri-clover to swing the elbow around. You may want to spray the elbow with the hose first to cool it off!
- h. Open the valve at the bottom of the kettle. The kettle will begin to drain.
- i. Connect the short grey hose/sparge arm to the heat exchange arm valve.
- j. Open the heat exchange arm valve. The heat exchange will be back flushed again through this to the drain.
- k. Disconnect the short clear hose from the hard-piping in the fermentation room. (It will make a popping noise because of the oxygen pressure being released.)
- l. Connect the long grey hose to the hard-piping by the wall. You should now be ready to back-flush caustic through the heat exchange and down the drain.
- m. Open the valve at the bottom of CIP1.
- n. Turn on the CIP pump. Bleed the pump if necessary.
- o. Verify that the caustic is running by looking at the hard-piping sight-glass above the aerating stone, and by looking at the runoff down the drain.



## **Daily Procedures**

### **Typical Brew Day**

- p. If the yeast has not been pitched yet, now is a good time. See Yeast Pitching above.
- q. Run the caustic in CIP1 until 1/3 of the tank is left.
- r. Turn off the CIP pump, and close CIP1 valve.
- s. Disconnect the medium grey hose from CIP1 and connect it to CIP2.
- t. Open the valve at the bottom of CIP2.
- u. Turn on the CIP pump.
- v. Run the plain hot water in CIP2 until 1/3 of the tank is left.
- w. Turn off the CIP pump, and close CIP2 valve.
- x. All 3 grey hoses can now be put away. (They are hung over the big power box to the left of the outside windows. The long one gets looped over the electric meter.)

## **35. Cleaning the Kettle**

- a. The kettle can be cleaned while the caustic and hot water are back-flushing:
- b. Use the hose to chase Hop Island down the drain.
- c. Spray the entire inside of the kettle. Do not forget the whirlpool connection in the right wall of the kettle, the inside ceiling, and walls of the kettle. Also spray up inside the kettle stack until no more trub falls down.
- d. Take a brush, and brush out the sparge arm connection on the top left-side of the kettle. Brush all the way through twice - so that you can see the brush inside the kettle. Spray it out well.
- e. Sponge off the inside of the man way door, and the top of the kettle.



## Daily Procedures

### Typical Brew Day

- f. Climb into the kettle with the sponge and hose.
- g. Sponge the inside ceiling first.
- h. Spray and sponge the walls of the kettle. If you use lots of water, you will stay cooler, as it is still pretty hot in there.
- i. Spray and sponge the floor of the kettle. Be careful not to slip. Climb out when the inside is clean.
- j. Spray and sponge the outside of the kettle everywhere until it is clean. This is especially important if you had a boil over because it will be dirty!
- k. Spray and sponge the brewery wall behind the kettle. This is important if you had a boil over. Be careful not to get the electrical things wet.
- l. Once you have the kettle clean inside and outside, look down at the valve at the bottom of the kettle. Check the little O-ring connecting the top elbow to the kettle above the valve. If the O-ring needs replacing or is not seated properly, fix it.
- m. Start filling the kettle with water for the next day's brew. Don't forget to close the valve on the bottom of the kettle.
- n. Disconnect the clear draining hose, spray it off, and hang it on one of the right-hand fermenters.

## 36. Finishing Up

- a. Take the short hard-pipe in the left-hand sink apart and brush out all the parts.
- b. Dip the parts in the bleach water in the right-hand sink, and put them back together.
- c. Drain the right-hand sink.
- d. If the kettle pump has been sprayed out, connect the short hard-pipe again.



## Daily Procedures

### Typical Brew Day

- e. Disconnect the valve from the heat exchange arm, and reconnect it to the short hard-pipe.
- f. Connect the two clear hoses together.
- g. Connect one end of the clear hoses to CIP1, and stick the other end in the fermenter room drain.
- h. Open the valve on CIP1 and drain the caustic down the drain through the clear hoses.
- i. When CIP1 is empty, connect the clear hoses to CIP2, and drain the hot water in CIP2 down the drain through the clear hoses.
- j. You can use part of the CIP2 hot water for flooding the floor. Don't use too much or you will create a lot of steam which will cause mildew to grow on the tanks and walls.
- k. When CIP2 is empty, disconnect the two clear hoses.
- l. Hang and loop the long clear hose over the two closest fermenters on your left. (Fermenters 1 and 2.)
- m. Hang and loop the short clear hose over Fermenter 3 on your left.
- n. Listen for the kettle filling up.
- o. Clean the floors with the spray hose.
- p. Put the drain covers back over the drains.
- q. Push in the block of wood to lock the walk-in door.
- r. Set the kettle for tomorrow, if brewing tomorrow.
- s. Pull the buckets of grain into the brewery, away from the kettle.
- t. Shut the windows, turn off the fans, turn off the overhead lights, and turn on the colored night lights.



**Daily Procedures**  
Typical Brew Day

- u. When the kettle is full, shut off the water.
- v. Write your hours into the green Daily Time Sheet. Check off the tasks done, and note any unusual tasks done under "other."
- w. Lock the brewery door and go home.



## Daily Procedures

### Non-brew Days

Non-brew Days include weekends, and other non-brew days during the week. Usually one person (the head brewer) works on non-brew days, depending on what needs to be done. Be sure to let Art know in advance that there will not be any spent grain to pick up. Some of the tasks done on non-brew days include the following:

1. Server and fermenter tank readings. (Level, pressure and gravity.)
2. Filtering a beer.
3. Filling kegs or cleaning kegs.
4. Cleaning the jockeybox before a tasting or after a tasting.
5. Going to a beer tasting.
6. Picking up Briess specialty malt at Western Way in San Leandro.
7. Acid-washing the heat exchange, mash tun, mash screens, or any fermenters or servers.
8. Taking garbage to the dump in the truck.
9. Taking the truck in for maintenance.
10. Cleaning the outsides of the fermenters, DE filter, walls, and floors.
11. Cleaning the outsides of the servers and the walk-in floor.
12. Taking inventory.
13. Doing labwork.
14. Fixing broken things. (ie: electrical outlets and glycol solenoids)

The scope of what can be done is only limited by the hours available, the manpower available, and what tasks need to be accomplished. Try to schedule the assistants on the brew days so that you have work to do on the non-brew days.



## Weekly Procedures

### Labwork

One person does labwork once a week, usually on a brew-only day where two people are working, or a non-brew day. The labwork is usually done in the middle of the brew, or wherever some time can be freed up. Labwork usually takes about two hours, but the work is not continuous.

The objective of doing labwork weekly is to test the beer for lactic acid creating bacteria (specifically lactobacillus and pediococcus), and for generic aerobic bacteria.

You want to test for these bacteria to determine if yeast should be repitched into another brew. Yeast is expensive, about \$33-\$46 a kilo, depending on the quantity purchased. You want to find out if there is anything besides yeast growing in the beers before you reuse that yeast. You need to test at least two days before you plan to repitch a yeast.

Hopefully none of the beers have any off-flavors, but if they do, you would like to know if the off-flavor was caused by bacteria. Not all off-flavors stem from bacteria, but if the beer has a sour taste to it, chances are it is caused by a bacterial infection. Lab culturing would show whether that is the cause or not. If results for bacteria are negative, the off-flavor could be caused by wild yeast, or unwanted esters due to unfavorable fermentation conditions.

You may find bacteria growing in a decent tasting beer. A very small amount will probably not affect flavor, however, you shouldn't repitch the yeast from that beer, otherwise you are simply propagating that bacteria, and it could grow to tasting threshold in the next brew.

You will be culturing bacteria in HLP (Hsu's Lactobacillus-Pediococcus Medium, invented by Dr. Hsu of the Siebel Institute of Technology and J. E. Siebel Sons' Co in Chicago. It is an agar or medium which supports the growth of the specific bacterium, Lactobacillus and Pediococcus. HLP contains Actidione which suppresses the growth of yeast (it actually kills the yeast). With HLP no microscope is needed! The individual cultures of each bacteria grow large enough to see and identify with the naked eye.



## **Weekly Procedures**

### **Labwork**

#### **Technique**

Take a clean 500 ml Erlenmeyer flask which has been hanging upside-down on a dowel. That way it is not dusty or dirty and does not need to be sanitized with bleach, nor rinsed with city water. Measure 200 ml of distilled water into it and put it aside.

Take an aluminum weighing dish, and weigh out 14 grams of HLP on the gram scale. Pour the HLP powder into the flask, and throw the weighing dish away. Put a sterile cotton ball gently into the opening of the flask, and put it on the 750 watt laboratory hot plate.

Turn the hot plate to high and bring to a boil. Turn off the little lights in the lab, the wall fan, the light to the back of the brewery (fermentation room), and the overhead office light downstairs if possible. Turning off these lights is necessary because the hot plate often blows the circuit breaker. Boil the HLP solution for (+) or (-) 2.5 minutes. Turn off the hot plate, and with a hot pad, remove the Erlenmeyer flask and place it on another hot pad to cool.

While it is cooling, take a clipboard and go down to the brewery. Write down on the "Microbiological Tests Results" sheet, information about each of the different beers that will be tested: Beer type, Brew number, Date brewed, Tank number, Brew yeast came from if not first generation, Yeast generation number, and sample size (always .5 ml.) Hang clip board back on the lab pegboard, you are done with it until tomorrow.

Take 18 test tubes out of their plastic wrap and put them in the large white test tube rack. By now the HLP solution is probably cool enough to handle. Take the cotton ball out of the flask. Pick up a test tube in your left hand. Hold with your three smallest fingers. Take the cap off with your right hand. Place that cap between your left thumb and index finger. Now slowly pour the HLP into the test tube until you can just see the level above your fingers. Test tube should be about 1/2 to 2/3 full. Put down the Erlenmeyer flask. Take the test tube cap in your right hand, and reseal the test tube. Place in the white test tube rack, and go on to the next one. After all test tubes are full, allow them to cool in the rack some more. Meanwhile, go to the brewery to collect beer samples.



## Weekly Procedures

### Labwork

#### Technique-continued

Collect beer samples in test tubes from the sample ports in the side of the tanks. Sanitize the stainless steel sample port with an iodine solution, and then flash it with a propane torch for a few seconds. Don't over do it or you will ruin the valve seals. Mark the cap of each beer sample with the grease pencil to identify the tank it came from. After collecting all the samples in a small test tube rack, the HLP tubes have probably cooled down to about 104 F (40 C). Then you can inoculate the HLP culture tubes with the beer samples.

First, prepare your lab area:

1. Close the lab door.
2. Turn off the oscillating fan under Reid's desk.
3. Turn on the wall fan.
4. Wipe off work space counter with the iodine solution in the sprayer.
5. Light up flame "hood" with flint lighter. (The mapp or propane gas with the two-legged stand and goose-neck torch.)
6. Continue to work near flame. Then air is hopefully bacteria free.

To inoculate the first sample; mark an HLP tube with the beer tank number, turn a pipette so the cotton plug end is up. Take the wrapper off the pipette. Discard wrapper. Hold pipette with right thumb and index finger. Be aware of the other end of the pipette so that you don't touch it to anything. Open the beer sample tube and throw the cap away. Put the pipette into the beer.

Pick up an HLP tube with your left hand. Wrap your right pinky around the cap, and twist tube with your left hand to get the cap off. Pipette .5 ml of the beer into the HLP tube. Assuming you do not know how to pipette a liquid, following is a description of mouth pipetting the beer into the HLP solution:

Put both the plug-end of the pipette, and your right index finger into your mouth. Suck the beer up slowly to the zero (0) ml level, and then put your finger over the end of the pipette so the beer doesn't slip out. The beer should stay put until you barely remove your finger to release the beer into the HLP tube. As long as you suck and don't blow, The cotton plug should protect the beer sample from your germs.



## Weekly Procedures

### Labwork

#### Technique-continued

Before releasing the beer, check the level of the beer on the pipette graduations, beneath the foam level. If this 1 ml pipette was exactly full, it would read 0. If it was nearly 3/4 full, it would read .3. (The test tube graduations seem upside-down to me.) If you add .5 to the beer level reading, the answer is the level the beer should be at after you release exactly .5 ml. The best way to not let the beer get away from you, is to watch the ending beer level reading for the approach of the beer. It is much harder to watch the beer itself because it is a moving target.

Discard the pipette and the beer test tube in the sink. Reseal the HLP test tube. Tip the test tube upside-down twice to mix. Mark test tube cap with the grease pencil to identify the beer sample, and put the test tube back in the rack. Go on to the next sample.

After all the HLP test tubes have been marked and inoculated and tipped twice, place the test tubes into the small test tube rack and place in the incubator. On each of the next four days you will come back to check the results.

If there are any unused HLP tubes, store them in the refrigerator. They can be reheated and used later. To reheat, slightly unscrew caps on the test tubes. Put them in a large beaker of water on the hot plate. Bring water to boiling and remove from the heat. Take test tubes out and tighten caps. Replace in test tube rack.

On the following pages are listed the various results possible. Check each test tube on each of the successive four days, and record your results in the proper column of the "Microbiological Test Results" sheet.

The results should be marked in this format: A/B, where

A = Y or N (yes or no) to denote the presence or absence of aerobic bacteria, and

B = the total colony count of both lactobacillus and pediococcus.

On Day 1 the results for all tests will most likely be N/0. On Day 2 you will see bacteria. This is the most important day to check! In case of bacterial infection in a fermenter, you need to write "NO" next to "Repitch?" on the brewlog. Do not repitch a contaminated yeast!



## Weekly Procedures

### Labwork

### Analyzing Lab Results

1. **Totally Clear:** Looks just like it did when you inoculated it.

(Nebulous floating cloudiness is usually dead yeast.) Probably means the beer contains no Lactic acid or aerobic bacteria. Might also mean that you inoculated the test tubes while the HLP solution was too hot, and you destroyed any bacteria present. In effect, you sterilized your bacteria with heat. The HLP tubes should be allowed to cool to 104 °F before inoculation. At the bottom of the next page are drawings of possible results.

2. **Lactobacillus:** One or more white tornado-shaped colonies.

Colonies will be suspended in the medium. Each tornado is one colony, each of which grew from a single bacteria cell. Lactobacillus colonies can also look like small white ghosts, or like bumpy roundish shapes, each with a point on the bottom. (Like a bumpy radish.) It is the total number of colonies, that is important. If you have only one or two colonies, they will appear quite large. If you have many colonies, they will appear quite small. It doesn't matter what size they are since each grew from a single cell. The size is limited by the amount of nutrient in the medium, consequently if you only have one or two colonies, there is more nutrient per colony, and they can grow to a larger size. Just count and record total number of colonies.

The more colonies you see, the more bacteria present, the more likely you will taste it! (Lactic acid tastes like lemon juice or sour milk, and can cause cloudiness.) Also, Lactobacillus is a Diacetyl producer. (Diacetyl smells and tastes like butterscotch.) Just a few colonies will not affect the taste of the beer very much, but do not repitch the yeast from that beer and propagate the bacteria! The taste threshold will be different for each person's taste buds. You could definitely taste it at 30 colonies, and perhaps not at all at 1-10 colonies.

Lactobacillus is anaerobic (does not like oxygen), so it will affect the wort and beer before it is filtered. It grows best in a non-oxygen environment, such as the wort after it cools to 140 °F (60 °C) or less. That is why it is so important to cool the wort fast and to pitch the yeast as soon as possible, and why good sanitation is important.

## Weekly Procedures

### Labwork

### Analyzing Results-continued

If your culture tubes sit in the incubator for a few extra days, the colonies will tend to spread out and will not be as recognizable. At the bottom of the page is an example of what some old lactobacillus colonies might look like.



**3. Pediococcus:** One or more white swollen football-shaped colonies.

Colonies will be suspended in the medium. Each football represents a colony which has grown from a single cell. The total number of colonies is important and should be recorded. The size of each individual colony is not important. Sometimes the colony can be surrounded by a white swirl that looks like cigarette smoke, and sometimes the colony can appear flat instead of three-dimensional. Could also be described as rugby ball-shaped.

Pediococcus is a Lactic acid producer, as well as an even more prolific producer of Diacetyl. It is also anaerobic. If the beer has this bacteria, please do not repitch the yeast.

**4. Generic aerobic bacteria:** Cloudiness at the top of the medium.

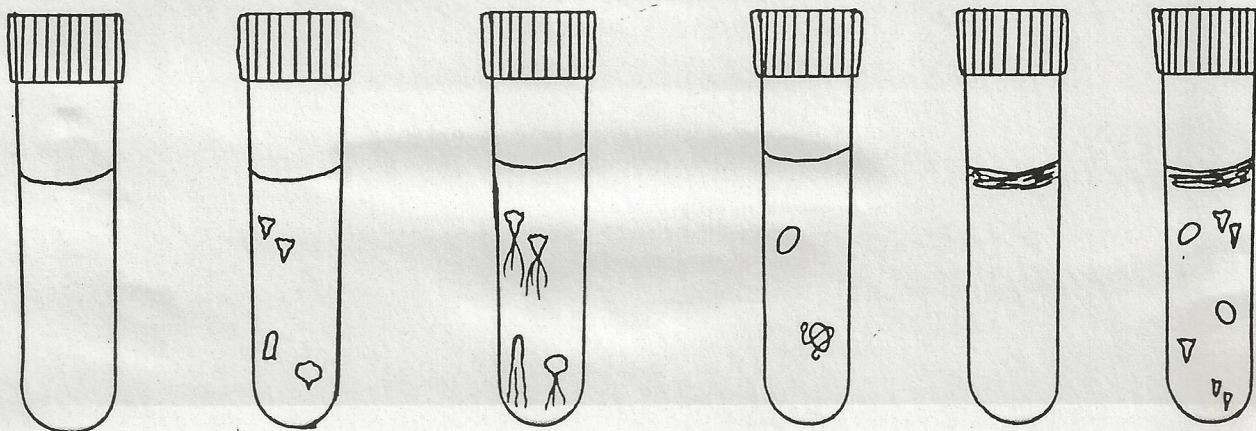
Any cloudiness appearing in the top half-inch of the medium in the test tube indicates some sort of aerobic, or oxygen-loving bacteria. It is probably an acetic acid bacteria which tastes like vinegar. It grows best in an oxygen-rich environment, such as the beer after aerating it, by accident, during filtering or kegging. That is why it is so important to counter pressure the DE filter and the kegs with CO<sub>2</sub>.

**5. Any combination:** of 2, 3, and 4 above is entirely possible.

Any combination of lactobacillus, pediococcus, and aerobic bacterial infection is entirely possible.

Clear    Lactobacillus    Old Lacto Colonies    Pediococcus    Aerobic    All

Clear    Lactobacillus    Old Lacto Colonies    Pediococcus    Aerobic    All





## Weekly Procedures

### Brew Schedule

The brew schedule shows which beers will be brewed and transferred (filtered) during the course of the week. It also shows any other tasks needed to be done, such as filling kegs on Fridays, and Beer tastings, etc.

The brew schedule is usually made out by the head brewer on Friday or Sunday, depending when he/she can most accurately predict the next week.

An Example Brew Schedule:

MON:	RED /BLACK (brew/filter)	Harry
TUE:	BLACK/RED	Harry
WED:	(pick up grain, CO2 delivery, order hops, regulators, dump trip)	
THUR:	PALE/SPECIAL ALE	Mary
FRI:	RED/PALE    fill 2 QB (red, black), 1 HB (pale)	Mary
SAT:	(11:00 tasting, 10:00 clean jockeybox)	Harry & Mary
SUN:	/RED    (concert)	

In the above example, the first beer listed is the beer brewed (RED/), the second beer listed is the beer transferred (/BLACK). The names listed on the far right are the assistants that will be working that day. If no assistant's name is shown, then only the head brewer will be working. Any "unusual" tasks or events are listed, ie: non-brew day tasks, beer tasting, concert, etc.

When scheduling, keep in mind the following points:

1. Amount of beer left in each of the serving tanks.
2. Daily beer sales variations.
3. Seasonal beer sales variations.
4. Concerts, Cal football games, beer tastings, or keg requests.
5. Types of beers already in the fermenters.
6. Type of specialty beer on tap.



## Weekly Procedures

### Brew Schedule

#### How to schedule for the above points:

1. If one of the beers in the serving tanks is running low and will run out soon (today or tomorrow), you will have to transfer a replacement beer of the same type into the empty serving tank. If none of the serving tanks is empty, but you know you will run out of that beer, empty the lowest tank into kegs. Transfer the new beer into the empty serving tank and tap the kegs to the bar until they run out. When the kegs run out, switch to the new tank.

**Never ever** actually "run out" of any of the three regular beers at the taps. It gets the bartenders, and especially the owners very upset!!! If you run out of the specialty beer for a day or two, it is no big deal. Try to have a specialty on tap every weekend so the bartenders have more taps to pour from.

2. If you pay attention to the daily trends in beer consumption, you will see that Friday is the busiest day, followed by Saturday, Thursday, Wednesday, Tuesday, and then Sunday and Monday are about tied. By becoming familiar with your customers' drinking patterns, you should be able to predict about how much beer you will go through on each of the days of the week. By doing this, you should be able to guess when you will be running out of a particular beer, and when you will need to have one transferred. If you don't want to work all weekend, make sure all the servers are full going into a Friday!

3. The busiest time of the year is August. The weather is hot, and it is when the students come back to school (U.C. Berkeley). Although school doesn't start until late August, many students come back early to spend money and look for housing. We stay somewhat busy through Halloween, then it drops off for about a week (the customers are recovering), and then picks up a little again through the New Year. Business is slow January through St. Patrick's Day, when it picks up a little. It continues to pick up steam through the 4th of July, which is a big bash. Then it drops off for one week, (the customers are recovering again) and then continues to pick up more steam all the way through August.

Plan on brewing and transferring 5 days a week in August, and 3 days a week Jan.-Feb. Other than that, plan on brewing and transferring 4 days a week. Two people work full-time hours for most of the summer. One person is full-time in the winter, and the second person gets about 20-30 hour/week. If you don't want to work every weekend in August, be sure to keep at least seven fermenters full all the time!



## **Weekly Procedures**

### **Brew Schedule**

4. Concerts, especially those here in Berkeley, and especially those at the Greek Theater really affect our sales! Any Grateful Dead or Jerry Garcia Band concert anywhere in the east bay will affect us. Grateful Dead/Garcia fans like the Pinnacle and lighter specialty beers. If you don't have a full server of Pinnacle four hours before the concert starts, plan on coming in to transfer one. Other concerts seem to effect all the beers equally. If you are getting low on any beer and it is a concert weekend, plan to come in to transfer one.

Football games are not as devastating as concerts. But, if it is a U.C. Berkeley-Stanford game played in Berkeley, consider it a major concert!

Beer tastings and keg requests can sneak up on you. You think you have enough beer going into a weekend, and then you fill all the kegs - walah! You're out of beer already! Seasonal keg requests you can count on include: the KQED Beer Festival - July, the Celebrator Oktoberfest - September, the Small Brewer's Festival in Mountain View - October, and Adam Osbourne's Halloween Party - October. Refuse all other keg requests the weekend of the Small Brewer's Festival!

Write all upcoming events and keg requests (when known) on the brewery calendar taped to the wall under the brewlog clipboard. If you need extra calendar pages, ask Cynthia to print them out on the computer.

Fill all weekend keg requests on Friday. When you take server readings on Friday morning, mentally subtract all the kegs you are going to fill that day, and then subtract the amount you expect to go through on a busy Friday night. That will give you an estimate of what to expect Saturday morning, and will tell you if you have to do a transfer then.



## **Weekly Procedures**

### **Brew Schedule**

**5.** The types of beers already in the fermenters will affect the brew schedule. At all times there must be in the fermenters; 1 Pale, 1 Black Rock, 3-4 Reds, and 1-2 Specialties. Normally only 7 fermenters are filled at any one time. You are cleaning one tank for today's brew, while you are filtering and emptying another tank, which will be cleaned tomorrow for tomorrow's brew, etc.

**Pale:** If you transfer a Pale today, you need to brew a pale either yesterday, today, or at the latest tomorrow. If not, you won't have one ready to go when this one runs out. Pales are usually 5-7+ days old when they go on tap.

**Red:** Reds are brewed about twice a week. When you transfer a Red, you will immediately go and chill the next Red down. Reds are about 7-14 days old when they go on tap.

**Black:** If you transfer a Black today, you need to brew a black either yesterday, today or tomorrow. Blacks last about 10-14 days on tap, and that is the right amount of time to ferment and age this beer.

**Specials:** If there is no special on tap for a day or two, it is no big deal. Try to have a Special on tap every weekend at least. Stouts need to be aged 3-4 weeks, so if you have a stout in a fermenter, make a lighter gravity beer or two to go on tap just before the stout. That way you move those specials through the tanks faster, and you don't have to tie up any more than two fermenters on specials.

**6.** The type of Specialty beer on tap will affect the consumption of the three regular beers. The most important aspect of having any specialty beer on tap, is that you won't go through the three regular beers as fast. If you have a stout on tap, the Black consumption rate will go down, and if you have an IPA or other pale special on, the Pinnacle consumption rate will go down. Figure this into your daily consumption estimates for the next week.



## **Semi-monthly Procedures**

### **Cleaning Beer Lines and Taps**

#### **Why**

The beer lines and taps must be cleaned periodically to remove the scum that grows in them. If the beer lines and taps are dirty, they will ruin the taste of the beer flowing through them. It will also look gross to the customer because scum will be visible under the tap spouts, and eventually the dirty beer lines will cause beer chunks to flow into the glasses.

#### **When**

The beer lines must be cleaned every 2-3 weeks. The taps should be cleaned every 2-3 weeks too, but if you are pressed for time, at least clean the lines now, and do the taps next time.

Clean the lines and taps first thing in the morning. It takes more than an hour, and you have to have everything back together with beer flowing by 11:00 when we open.

#### **Cleaning the Lines**

1. First, find the beer lines running out of the bottom of each of the servers to the bar. Close the toggle switches leading from each tank. If you close the toggle switches on every server first, and leave them closed until the end, there is no way you can screw up and get cleaning solution into the beers.
2. Get down a 5-gal. cornelius tank. Run the hot water until quite hot. Get a 2-ounce salad dressing cup from the kitchen. Measure 2 of these dressing cups full of BLC (Beer Line Cleaner) into the cornelius. Then pour 5 juice pitchers full of hot water into the cornelius. The cornelius should be over half-full. Put the lid on the cornelius.
3. Take the cornelius over to the liquid CO2 tank (duer). Find the cornelius gas line. Quick connect it to the port marked "IN" on the cornelius. Pressurize the cornelius with CO2. Get the cornelius steel braided hose down from the blue milk crate. Take a small rubber washer out of the blue parts box above the sink. Put it in your pocket in case you need it. Get a 5-gal. pail. Pick up the iodine sprayer, and bring everything with you into the walk-in cooler.



## **Semi-monthly Procedures**

### **Cleaning Beer Lines and Taps**

4. Spray the beer line connection under the server with iodine. Connect the braided hose to the beer line. Use the rubber washer if needed. Open the toggle switch leading from the braided hose into the beer line. DO NOT open the toggle switch leading into the server! Connect the other end of the braided hose to the "OUT" on the cornelius. Take the 5-gal. pail out to the bar. Be sure to close all the walk-in cooler doors to keep the heat out.
5. Put the pail under the tap spout of the server beer line that the cornelius is connected to. Open the tap and let the BLC flow through. When the fluid coming out feels hot to the touch and looks fairly clear, close the tap. Empty the pail in the bar sink. Go back to the walk-in.
6. Close the toggle switch leading from the braided hose. Disconnect the braided hose from the cornelius. Disconnect the other end of the braided hose from the beer line. Spray the beer line connection with iodine again to clean it out. Go on to the next server. Repeat steps 4-6 until all beer lines have BLC soaking inside them. If you are not cleaning the taps today, go to Rinsing the Lines below.

### **Cleaning the Taps**

1. Fill a small bucket half-full of TSP water. Take the small bucket and all the small brushes, the tap wrench, sponge and rubber gloves to the bar.
2. Put the 5-gal. pail under the taps and pull any remaining BLC water out.
3. Disassemble all the taps as far as you can, and put the pieces in the TSP water.
4. Use the small brushes and sponge to clean out the tap collars on the tap stands. Then clean all the parts soaking in TSP water.
5. Reassemble the taps. Make sure they are tight. Be sure the taps are closed so the rinse water does not come shooting out.



## **Semi-monthly Procedures**

### **Cleaning Beer Lines and Taps**

#### **Rinsing the Lines**

1. The beer lines still have BLC in them. Take the cornelius to the brewery. Bleed off any pressure that is left in it. Take the lid off and rinse out the BLC residue. Fill 2/3 full with cold water. Take the juice pitcher to the bar and fill with ice. Dump the ice into the cornelius too. Put the lid back on the cornelius and pressurize it with CO2 again. Bring the cornelius back into the walk-in cooler.
2. Rinse the beer lines in the same order that you cleaned them with BLC: Spray the beer line connection under the server with iodine. Connect the braided hose to the beer line. Use the rubber washer if needed. Open the toggle switch leading from the braided hose into the beer line. DO NOT open the toggle switch leading into the server! Connect the other end of the braided hose to the "OUT" on the cornelius. Go out to the bar. Be sure to close all the walk-in cooler doors to keep the heat out.
3. Put the pail under the tap spout of the server beer line that the cornelius is connected to. Open the tap and let the cold water flow through. When the fluid coming out feels cold to the touch, stops bubbling, and looks clear, close the tap. Empty the pail in the bar sink. Go back to the walk-in.
4. Close the toggle switch leading from the braided hose. Disconnect the braided hose from the cornelius. Disconnect the other end of the braided hose from the beer line. Go on to the next server. Repeat steps 2-4 until all beer lines have cold water soaking inside them.
5. After all the beer lines have cold water in them, take the cornelius to the brewery. Bleed off any pressure that is left in it. Take the lid off and put it away. Also, put the braided cornelius hose back in the blue milk crate.
6. Look for the beer lines running out of the bottom of each of the servers again. Open the toggle switches leading from each tank to the bar. The beer is ready to flow to the taps again.
7. Put the pail under each of the tap spouts. Open the taps and let the cold water flow through. When beer is flowing without bubbling, close the tap. Empty the pail in the bar sink. The lines are now clean. Bring the pail back to the brewery. You are done.



## **Monthly Procedures**

### **Inventory**

Inventory is done for accounting purposes on the first of each month. It is usually done by the head brewer. An actual counting of all raw materials takes place. If you would like to get a head start on the inventory, ask Cynthia for the inventory sheet a few days early. This is also a good time to ask for a new calendar page for the brewery. The inventory sheet is your final copy, so only use a pencil. Do not get it wet or dirty. Use a scratch pad if you wish.

Inventory takes place at that mythical time between months - after the end of the day on the 31st, and before the beginning of the day on the 1st. Always keep that fact in mind.

### **At the Brewery:**

#### Hops

Take all the hop buckets out of the walk-in cooler. Use the pound scale in the orange box above the sink in the brewery. One at a time, spray the buckets off and weigh them. Write down the weights for each type on a separate piece of paper. Then weigh the hop buckets up on the shelf in the walk-in. Add in 44 lb for each carton up on the shelf. Add up all the buckets and cartons for each type of hop, and mark your final answers on the inventory sheet.

Before putting your hop buckets away, give the kitchen a little time to do walk-in inventory and clean the walk-in floor under their food. Meanwhile, wipe down the plastic strips at the brewery end of the walk-in, and clean the floor where the buckets are going to go. Then stack the buckets so they are as out of the way of the kitchen as possible.

#### Yeast

Count bricks of yeast in the little refrigerator up in the lab and divide your answer by 2. Each brick weighs only half a kilo, and your answer on the inventory sheet must be in full kilos.

#### Beer in Brewery

Count full fermenters on the morning of the 1st, multiply number of fermenters by 7 to get barrels of beer in fermenters.

#### Beer in Serving Tanks

Add up the beginning quantity for each server for the 1st. That is the total number of gallons in the servers. Divide answer by 31 to get barrels of beer.



## Monthly Procedures

### Inventory

#### At the Warehouse:

##### Specialty Malt

Count bags of each type of specialty malt. Mark the bag count in pencil on the inventory sheet. Later you will be multiplying that out to find pounds of each type of malt. Remember, Briess bags are 50 lb each, but Baird bags are 55 lb each. If a brew was milled on the 31st, but won't be brewed until the 1st, add those malts in. Only count whole bags. Don't bother with the malt in the 10-gallon buckets.

##### Pale Malt

Measure the grain in the silo. Take a tape measure and a flashlight with you. Climb up the ladder and look into the silo. Count the number of bolts down each side. Notice the depth of the vortex in the middle. With your mind's eye, smooth out the level of the grain in the silo. Count how many bolts down the grain level would be, if it were indeed levelled flat. Climb onto the ladder. Use the tape measure to measure the inches down the grain is, ie: the distance from the lip of the cylinder (where the dome is attached), to the bolt you thought the grain would be at, if it was levelled flat.

*If the level of the grain is into the cone, estimate it as follows:*

The cone holds approximately 3730 pounds. If the cone is  $\frac{2}{3}$  full, figure you have about 2000 lb left. If the cone is half-full, you probably have about 1000 lb left. It is too difficult and complicated to be any more exact than this. (Go ahead and try if you want.) When the grain level gets into the cone, you should estimate how many brew days you have left until you have to have another shipment. For example, the cone is  $\frac{3}{4}$  full, so you estimate 3000 lb left. Dividing 3000 by 400 lb per average brew batch gives you 7.5 brew days. Now is the perfect time to order your next shipment!

Use the worksheet on the bottom of the inventory sheet to figure pounds of malt. Don't forget to add in any pale malt already milled on the 31st, but not brewed until the 1st.

##### Diatomaceous Earth

Count number of bags of DE at the warehouse only. Do not include any already brought to the brewery. Multiply bag count by 50 lbs per bag.

##### DE Filter Cartridges

Count number of cases of cartridges at the warehouse. Do not include any at the brewery. Multiply case count by 30 - the number of cartridges per case.



## **Monthly Procedures**

### **Inventory**

#### **Final Copy**

The inventory sheet you got from Cynthia is your final copy. Make sure all your answers are in the correct column (COUNT column), and that they are in the units shown under COST/QTY (ie: lbs). Erase any bag counts or other numbers, and make sure the whole thing is neat and easy to read. If a number looks messy, erase it and rewrite it.



## **Semi-Annual Procedures**

### **Acid-Washing the Fermenters**

First thing in the morning, sanitize the server as usual, and then use more of the boiling water to get your fermenter circulating caustic right away. You will acid-wash the fermenter during the time when you would normally circulate with caustic.

The steps for acid-washing a fermenter are as follows:

1. Rinse (You did it when you filtered the beer.)
2. Caustic (Do it first thing in the morning.)
3. Rinse
4. Acid (Do it when you would have normally run caustic.)
5. Rinse
6. Sanitize

When you are ready to rinse the fermenter after you are done circulating the caustic, drain the caustic. Then rinse CIP1 thoroughly with the spray hose. Take the old canoe paddle out of CIP1 as it is impregnated with caustic. Fill CIP1 with clear water. Use this to rinse the fermenter. (You must use CIP1 instead of CIP2 to rinse before and after the acid step because CIP2 contains bleach residue. See the Special Rules section on Stainless Tanks for more information.)

To mix the acid: Connect the medium grey hose from the kettle pump to CIP1, and fill CIP1 1/3 full with hot water. Take a 5-gal. pail, some goggles, and rubber gloves, and fill the pail 1/2 full of acid. Carefully pour this acid into CIP1. Take the parts off the top of the fermenter like you would before circulating caustic, and cover with wet towels as usual. Circulate the hot acid solution through the fermenter for 20-30 minutes. Then drain the acid.

Rinse CIP1 thoroughly with the spray hose again. Fill it with clear water. Use this to rinse the fermenter. Take the fermenter apart for cleaning, as usual. Then sanitize as usual.

Enter the date acid-washed for each fermenter on the 6-mo. blue Brewery Cleaning Log sheet located on the clip board under the Server Reading sheets.



## **Semi-Annual Procedures**

### **Acid-Washing the Heat Exchange**

The heat exchanger is disassembled and acid-washed by hand twice a year. First, disconnect the pump and move it out of the way. Then disconnect the hard-piping from the water supply to the heat exchange. Disconnect the heat exchange arm, and any other hard-piping connections. Move the heat exchange out toward the middle of the brewery. It is heavy! One at a time, loosen the bolts a little. You will need two wrenches as they will begin to spin. Keep rotating which bolts you are loosening. Do each one only a little at a time. Once the bolts are loosened, be careful that the whole thing doesn't just collapse and fall apart.

The important thing to remember is that each of the individual plates need to be kept in the exact same order that they are right now! As you are cleaning them, you cannot switch them around or get them out of order, or the heat exchanger will not work (it will probably dead-end), and will leak.

Put on goggles and rubber gloves, and fill an 5-gal. bucket 1/4 full of hot water in the sink. Fill with another 1/4 of acid, so the bucket is 1/2 full of a hot dilute acid solution.

Lean the heat exchange plates up against the wall in the same order that you found them. Clean them one at a time with a scrubbing sponge, or green pad from the kitchen. Keep them in this order.

You will notice that one end of the heat exchange is dirtier than the other. This is the end the hot wort enters, and some of the sugars have carmelized on the plates. Do this end first. The job will get easier as you go along.

Take some of the acid solution in a small bucket. Scrub the plates in the sink, using the acid solution in the little bucket. Be sure to keep your goggles and gloves on. As each plate is cleaned, rinse it well, and stack it against the wall in the original order. Clean the two blue end plates with acid as well. Clean anything else on the heat exchange that needs cleaning. Be sure to rinse everything well.

When everything is cleaned, put the heat exchange back together. Tighten each bolt gradually, rotating your effort so the pressure keeping the heat exchange together is even. Put the heat exchanger back in its original location, and connect all the hard-piping and the city water piping.

Connect the extra valve to the end where the heat exchange arm would normally go. Close the valve, and turn on the city water. The heat exchanger should not be leaking. If everything is too wet to tell if it is leaking, go home.

The next morning check for water drips on the dry floor. If you see a leak, empty the water through the valve, and tighten the heat exchange up. Close the valve, and fill with water again. Check for leaks again. If the heat exchange does not leak, empty the water through the valve, and connect the heat exchange arm.



Enter the date acid-washed on the 6-mo. blue Brewery Cleaning Log sheet located on the clip board under the Server Reading sheets.



## **Annual Procedures**

### **Acid Washing the Servers**

It is best to acid wash a server on a non-brew day, a transfer-only day, or a double transfer day. There just isn't time within a normal brew day to do this.

The steps for acid-washing a server are as follows:

1. Rinse
2. Acid
3. Rinse
4. Heat Sanitize

If you are acid-washing one of servers 1-4, take the frangible disk holder off the top. If you are acid-washing server 5, take the tri-clover cap off. Connect the long clear draining hose to this connection, and bungee cord tie it out the walk-in door. If on the kitchen side, point hose into the 5-gal. bucket. You need to do this to allow for the escape of steam and pressure. Do not take any other parts off of the servers at this time. (You can't take all the parts off like you can on the fermenters, because the food and kitchen staff might be sprayed with acid.)

Rinse CIP1 thoroughly with the spray hose. Take the old canoe paddle out of CIP1 as it is impregnated with caustic. Fill CIP1 with clear water. Use this to rinse the server. (You must use CIP1 instead of CIP2 to rinse before and after the acid step because CIP2 contains bleach residue. See the Special Rules section on Stainless Tanks for more information.)

To mix the acid: Connect the medium grey hose from the kettle pump to CIP1, and fill CIP1 1/3 full with hot (170 or more) water. Take a 5-gal. pail, some goggles, and rubber gloves, and fill the pail 1/2 full of acid. Carefully pour this acid into CIP1. Circulate this hot acid solution through the server for 15-20 minutes, no more. If you circulate for more than 20 minutes, you will destroy the sight-glass. When done drain the acid.

Rinse CIP1 thoroughly with the spray hose again. Fill it with clear water. Use this to rinse the server. Take the parts off the server for cleaning in TSP water. After you have put the server back together, heat sanitize it as usual.

Enter the date acid-washed for each server on the 6-mo. blue Brewery Cleaning Log sheet located on the clip board under the Server Reading sheets.



**Annual Procedures****End-of-Calendar Year File Clean Out**

At the beginning of January each year, you will find all of the files in the file cabinet to the right of Cynthia's desk suddenly disappear. Everything has been moved to some obscure place called, "The Basement of Mr. Martin's Office," where nothing is ever seen again. If you have some files you want to hang on to, ie: 'Malt Suppliers' and 'Hop Suppliers,' you must file them within the green file dividers in the second drawer of the file cabinet. These are the permanent files and do not get cleaned out or removed.

**Annual Procedures****End-of-Fiscal Year Inventory**

The end of Triple Rock's fiscal year is May 1st. It is most important that the inventory be more than accurate. If you can somehow schedule to run out of pale malt in the silo on April 29, or 30, you have got it made. Then the very accurate inventory on pale malt would be ZERO! Good Luck.



## **Other Procedures**

### **Grain Delivery**

Our warehouse is not the easiest delivery situation for any trucker. Always ask that the trucker bring a double trailer truck, and one with power steering. For Bulk Grain, we always need at least 40 extra feet of hose. It is very tricky for any driver to back in up 54th Street, and into the warehouse parking lot from there, without hitting any parked cars.

When ordering, make sure the truck driver knows to call within 24 hours before the delivery so that someone can be down at the warehouse when he/she arrives. When the trucker calls, verify he/she has directions, and the extra grain hose.

Early on the morning of the delivery, it is best to go to the warehouse and put old pallets in the empty parking spots in the street. This is to prevent cars from parking there later in the day. It is very difficult for the truckers to maneuver around parked cars.

### **Specialty Malt Delivery**

Briess Malt is not generally delivered as we pick it up in San Leandro. If you order 5000 lb or more, it will be cheaper to have it delivered from Chilton, Wisconsin. In that case, ask for the type of truck outlined above.

Baird Malt is imported by Great Western Malting and comes from their Vancouver, Washington plant. When you order, ask Great Western if their shipper can bring it down in a double trailer truck as outlined above. It is delivered in 55 lb plastic jute sacks that slide all over the inside of the truck. You will probably have to go through the whole truck bag-by-bag to dig out your order.

Lauhoff Flaked Maize is delivered to the brewery, not the warehouse. This is because only 500 lb are ordered at a time. You can unload the ten 50 lb sacks directly into the white truck. Later in the day when you have time you can bring them to the warehouse.



## **Other Procedures**

### **Grain Delivery**

#### **Bulk Grain Delivery**

Pale Malt is delivered from the Los Angeles plant of Great Western Malting by their shipper, FXI (Food Express, Inc.) FXI does not have any double trailer trucks, so it is imperative that they bring a truck with power steering. Don't forget to ask for the extra 40 feet of hose. You will probably need it.

#### Cleaning Out the Silo

The ideal situation is if the silo is empty. It is best to clean out the silo before every delivery (every 2 months.) Clean it out early the morning of the delivery, or even the day before the delivery. If the silo is nearly empty, you might be able to empty it completely by milling the next brew's grain a day or two early. You could then run the last little bit into the weigh hopper. Look at this last amount carefully. If it is more chaff than good grain, throw it away, and mark it on the inventory sheet accordingly.

To clean the silo, bring a second person with you. Rod Rewoldt has done this before and he has the climbing equipment I feel is necessary. Bring extra ropes, and a couple "dust and mist respirator" masks.

Unplug the auger. Detach the small covering at the bottom of the auger. Empty the auger. Use the dry vac to clean it out. Leave the covering off. Put a 5-gal. pail under the opening to catch the chaff you sweep out. Hook up the ropes needed for belaying the cleaner. Get into a climbing harness and climb up the ladder with the dust masks and a broom. A fire escape ladder is stored in the crawl space next to the top of the silo. Hook the fire escape ladder over the silo opening edge and carefully lower it into the silo. The bottom person should take a piece of rope and tie off the fire escape ladder at the bottom to stabilize it.

Put on the mask, and slowly lower yourself into the silo with the broom. Let the belayer do most of the work. The fire escape ladder is used mostly to stabilize the cleaner so they don't swing around too much. Start sweeping the underside of the dome, and work your way down to the bottom. Yell to the belayer how much to raise or lower you. When the inside is clean, sweep the outside of the dome. (Top of the silo.)

When the silo is clean, put the fire escape ladder away, untie the belaying ropes, and climb down the ladder. Inspect the 5-gal. pail for signs of insect infestation. Vacuum out the bottom of the auger if anything is there. Put the covering plate back on. Now you are ready for the malt delivery.



## **Other Procedures**

### **Grain Delivery**

#### **Delivery Day**

Be there before the trucker arrives. Take the master lock key hanging on the nail on the orange steps where the green truck keys are kept. Open the side gate to the parking lot. Be sure to lock it up again later.

Open the overhead door to the warehouse, and if needed, move the green truck out across the parking lot. Make room where necessary in the warehouse. Move any old pallets out to the street to "reserve" any parking spots you can. Take the duct tape off the bottom of the grain filling tube on the silo. Take the opportunity to clean up the warehouse if the truck isn't there yet. Sweep the dust off the walls and hopper, scale, etc.

When the truck arrives, it will pull up on 54th Street. You will have to go stop traffic on Shattuck Avenue so he/she can turn around. It will take about 5-10 minutes and cars will honk at you, but that's the way it is.

Help direct the truck back through the gates without rolling over parked cars. Get as close to the warehouse as possible. If it is a bagged grain delivery and you can't get close, you will have to carry all those bags that distance. (You could also shuttle them to the warehouse in the white truck.)

If this is a bulk grain delivery, help the trucker connect the pneumatic grain hoses. Tell him/her you would like the grain delivered at a speed of 5 psi. Any faster will damage the grain too much and you will get husk-flavored beers. The bulk grain delivery will take about two hours. We will be billed for the trucker's extra delivery time, but it is worth it to have the grain in good shape. In the meantime you can be spraying for insects and checking the rodent poison.



## **Other Procedures**

### **Grain Delivery**

#### Insects (Indian Grain Moth)

Behind the warehouse door is a sprayer in a box, as well as a small plastic bottle of Diazanon and a Insect Spray Log on a piece of paper. The directions are also on the piece of paper. Take the sprayer and Diazanon to the back of the warehouse where the hot water tank is. Measure 1/2 capful of Diazanon into the sprayer. If you get any Diazanon on your hands, immediately rinse them off. Find the one-gallon mark on the sprayer and fill the sprayer with a half-gallon of water. (To half-way up to the mark.) Replace the sprayer lid.

**DO NOT SPRAY ON ANY GRAIN BAGS OR OTHER FOOD.** Spray along the floor-wall edges and any floor cracks inside the warehouse. Spray around the edges and inside the grating along the entrance to the warehouse. Spray inside the window frames and anywhere else grain particles and dust collect. After you have finished the inside of the warehouse, spray outside around the edges of the building. Use the entire half-gallon of insect spray. Take the empty sprayer to the back of the warehouse. Rinse it out with water. Do not attach the sprayer lid, so it can air out. Put sprayer away in the box behind the door. Fill in the date on the log, and put the Diazanon and piece of paper (log) back in the box.

#### Rodents (field mice)

Under the orange steps and under some of the pallets you will find small green pellets. These are rat poison. Check if they still look "good." If they look old and disintegrating, vacuum them up and sprinkle around a little more. The rat poison is kept in a small white bucket with lid on the shelves. The pellets are in little packets. Only open as many packets as you need.

#### **End of Delivery**

During grain delivery you can get an estimate of how full the silo is by knocking on the silo. Where it is full it sounds like concrete. When the grain level seems to be about 1-2 ft below the lip of the dome, it is nearly full. (Remember, the grain bed is hump-shaped during filling.) When husks start to drift down from the top of the silo, tell the trucker to shut it off. Help the trucker to put the hoses away. Lock the gate after he/she drives away. Tape up the bottom of the grain filling tube on the silo with duct tape. Close and lock the overhead door, turn off the lights and radio, lock everything up tight and go back to the brewery.



## Other Procedures

### Ordering Supplies

It is important to keep a handle on supply inventories so that you do not run out of anything. On the Suppliers List, is listed the companys' name, address, and phone number, who the contact person is, what we order from them, how much, and how often.

#### Ordering tips:

Bulk Malt - order 15,000 lb from Pat at Great Western in L.A. Ask for a truck with power steering and also 60 extra feet of hose. Tell her we need a phone call from the driver telling us when to be at the warehouse.

Baird Malt - order 2000 lb from LeeAnn at Great Western in Vancouver. Ask for a double trailer truck with power steering if possible. Tell her we need a phone call from the driver telling us when to be at the warehouse. Complain about the plastic jute sacks because they slide around too much.

Briess Malt - order 1200 to 1500 lb from Laurie in Chilton. We don't order 2000 lb anymore because then we have to make two trips in the white truck and it wastes gas and time. Tell her you will not be taking the pallet, so she should not charge you for it. You will pick grain up in San Leandro.

Lauhoff Flaked Maize - order 500 lb from Dean Modglin in Danville, IL. Tell him to tack it on to any other shipment coming out this way. Tell him you are not in a big hurry and can wait for it. Have it delivered to the brewery instead of the warehouse. Cynthia will have to send them a check for the total amount including shipping before they will ship to us.

Hops - order what you can from Hop Union because their prices and quality are the best. If they don't have what you need, order from Haas or Steiner. Order 44 lb pellet cartons. Ship regular UPS. Generally try to keep an extra carton of Chinook and Cascade available because we go through them so quickly.

Siebel Yeast - order 10 kilos from Maureen. The price is \$33/kilo if ordered in a 10 kilo lot and \$46/kilo if ordered in a smaller quantity. If you think the yeast will hang around too long, have Reid bring some up to Ed in Seattle, or give some to John to bring over to 20 Tank. Ship regular UPS.



## Other Procedures

### Ordering Supplies

Wyeast Yeast - order 1 liter from Dave. Have him mail it on Monday not Wednesday (their usual ship day). You should receive it on Wednesday so you can brew with it on Thursday and Friday.

Cleaning Chemicals - order in 400 or 500 lb drums and 55 gallon drums. Tell them we need a phone call from the driver telling us when to be at the warehouse. Order 2 or more drums at a time to save on shipping charges. Have driver help you move acid drum from delivery truck to white truck. Tie acid drum standing up in white truck. At brewery, tip on its side to get it off the white truck. Move carefully into the brewery.

Diatomaceous Earth - order 2000 lb from Harcros Chemicals in Emeryville. You will be picking it up in the white truck. If you need to order DE in a lot smaller than 2000 lb, order it from Scott Labs instead. Either drive to Petaluma to pick it up, or ship it regular UPS. For only a bag or two, it is better to borrow one from Lind Brewing or Marin Brewing Co.

Gas - order one liquid CO2 tank (duer) about every three weeks. Keep your eye on the sight-glass so you know when it is close. When the pressure starts to decay, move the regulator to one of the 30 lb tanks. We own one 5 lb tank, one 20 lb tank, and two 30 lb tanks. We just do exchanges on these tanks. The 30 lb tanks are used when the big tank is empty and will last about 1 day each under normal conditions. The 20 lb tank is used for beer tastings, and the 5 lb tank is used as a back-up for tastings, and for cornelius events.

Do not order any gas from Airco or Amerigas - we don't like them. We currently do not have any of their tanks, so if Cynthia gets a bill, have her tell them we do not have any tanks.

Brute Buckets - ask for Triple Rock price, which should be their best price.

### Directions to the Warehouse

5427 Telegraph Ave., Oakland  
Hwy 880 **N** to Hwy 580 **W** to Hwy 24 **E** to  
51st St. exit **R** to Shattuck Ave. **L** to 54th St. **R**  
Brick warehouse on left with billboard.

Rod Rewoldt and John Myers were working on a Brewery Checklist System as I type this in August, 1990.



## Special Rules

### Walk-in Cooler

#### The Brewers are Responsible for the Temperature of the Walk-in Cooler.

This means we monitor it, we control it, we fix it, and if it gets too hot and food spoils, we get in big trouble. Because of this it is imperative that the brewers follow these rules:

1. Always keep the brewery walk-in door either closed, or as far closed as is possible.
2. If the kitchen mentions the walk-in is turning into a tropical rain forest, listen to them, and fix the problem before it gets any worse.
3. Whenever possible, have any hose which will have hot water or steam going through it, go outside of the walk-in.

#### To Identify an Over-Heated walk-in cooler:

1. The condenser over the kitchen-side door is raining and dripping.
2. The condenser is iced over and you can see some ice.
3. The walk-in feels warmer than usual.
4. The thermometers on the beer tanks read more than 42.
5. The walk-in thermostat clicks at a temperature higher than 42.

#### Causes of an Over-Heated walk-in cooler:

1. The door to the brewery was left open.
2. The kitchen-side door was left open.
3. One or more little doors to the bar or kitchen are broken and hanging open.
4. You sanitized more than one server today.
5. You acid-washed a server today.
6. It has been a long time since the coils were cleaned and they are clogged.
7. The condenser drain into the janitor's room sink is clogged.

#### To Fix an Over-Heated walk-in cooler:

1. Tell the kitchen you are aware of the problem and are now going to fix it.
2. Get a screw-driver. Take off the thermostat cover. Turn the thermostat up with the screw-driver.
3. Listen to where the thermostat clicks. That is the current temperature.
4. Turn the thermostat up 10 degrees past where it clicks. (This will cause the ice on the condensers - whether you see it or not - to melt.)
5. After the condenser stops dripping, turn the thermostat back down to 42.

How Does it Work: The steam freezes on the condensers, and they think the place is cold - they can't feel the real temperature so they switch off.



## **Special Rules**

### **White Truck**

#### The Brewers are Responsible for the Well-Being of the White Truck.

This means we put gas and oil in it, get it maintained regularly, buy parts for it when parts break, and keep all records. Others also have use of the truck, specifically Lisa in the kitchen, and the owners, but we have the responsibility. We also are responsible for the Green Truck.

#### Know Where the Truck is.

When Lisa, John and Reid plan to use the truck, they are supposed to clear it with us, as we have first priority *within reason*. (We must be flexible to their needs.) If you notice the truck keys are gone from their hook - ask where the truck is.

If you need the truck at what would be considered an unusual time (ie: grain or supplies pick-up, dump trip, milling grain on the weekend,) you should clear it with all three of them to be sure it is free. *Nobody around here likes surprises!*

Other employees do not have the use of the truck for work. Once in awhile one will borrow it for personal reasons, but they must have the permission of the owners before they clear it with us.

#### Keep all Records.

Gas, oil, oil changes and other maintenance should all be recorded in the "White Truck Maintenance Log" located in the truck's glove compartment. Check the oil level every time you buy gas. Mark the mileage, gallons of gas, and amount of oil. If maintenance was done, also mark the date.

If you take the truck in for maintenance, the receipt from the garage must go to Cynthia for bookkeeping, but, tell her you need the receipt back when she is done with it. All maintenance and parts receipts get filed in the file cabinet to the right of Cynthia's desk. Look in the second drawer in the green file dividers under "White Truck."

#### Communication about the Trucks.

If something is wrong with either of the trucks, no matter how small, let the owners or the head brewer know right away.

#### The Green Truck.

Order parts through Cynthia. If driving the green truck to a tasting, wash it first. If you don't know how to drive it, have someone show you.



## **Special Rules**

### **Brewery**

#### **CIP Tanks**

CIP1: is the CIP tank on the left. It only receives cold water, hot caustic, and hot acid. The tank is rinsed well with the hose both before and after being used for hot acid. During hot acid use, the old canoe paddle inside is removed, as it is impregnated with caustic. This canoe paddle breaks the whirlpool formed when draining the tank.

CIP2: is the CIP tank on the right. It only receives cold water, or cold bleach water. No caustic, or acid. The only time it sees hot water is at the end of the day when the heat exchange is being used. The two bungs floating inside are supposed to break the whirlpool, although they do a poor job.

#### **Kegs**

Kegs are for owners, and employees only. The ability to get a keg is a privilege and should not be abused by an employee. All keg requests must be filled out on a Keg Form, and initialed by one of the owners before they are given to the brewers. Some of the owner's kegs are business trades (barter.)

The brewer has final veto power over any keg. We try to accommodate everyone, but if you feel you will run out of beer because of any kegs, feel free to substitute another beer type, or totally refuse to fill the keg. Please let the requester know as soon as possible in case: 1. The beer substitution is unacceptable to them, and 2. They have to go elsewhere for a keg. If they have to go elsewhere, suggest Lind Brewing Co.

#### **Jockeybox**

Employees and customers do not generally have the opportunity to use the jockeybox. Normally the jockeybox is only used for beer tastings. It is only when an owner personally requests it does someone other than a brewer use it. In this case a Jockeybox Form must be filled out.

To use the Jockeybox, the person must follow the rules completely or they will not be able to use it again. The person who signed the Jockeybox Form will be held responsible for the Jockeybox, hoses, and CO2 cylinder.

The Jockeybox and hoses must be sanitized and rinsed before use, and cleaned, sanitized and rinsed after use. Always be sure everything is drained and in tip-top shape before putting away.



## Special Rules

### Stainless Tanks

As you could imagine, the care of our stainless steel tanks is very important. These tanks are very expensive: about \$6000 for a server for example. For this reason they should not only be kept in good working order, be kept shiny and bright-looking, but also their safety is important.

#### Chemical Reactions with Stainless Steel:

*Chlorine:* Bleach is the most common steel-killer we use in the brewery. Never let bleach water, or especially straight bleach, touch stainless overnight. This means the fermenters, servers, CIP tanks, jockeybox coils, or any other stainless vessel.

Chlorine causes tiny pits to burrow into the stainless walls. Eventually a big strong tank will just crumble. Not only are the pits bad for the structural integrity of the tank, they will also make your tank impossible to sanitize properly. Holes will bore all the way through the jockeybox coils and will turn the jockeybox into a beer sprinkler.

*Caustic and TSP:* Both contain chlorine and so should be treated like bleach.

*Acid:* When acid touches chlorine, it exasperates the effect. The little pits will develop almost instantly. Also, potentially poisonous gas will form.

This problem is relevant when ever it is time to acid clean a fermenter or server. The acid-washing procedure is always Rinse, Caustic, Rinse, Acid, Rinse, Bleach. As you can see, the potential for damage is there both before and after the acid step. It is imperative that the water used for the Rinse steps in the above procedure does not contain any caustic, TSP or bleach residue. It has to be fresh, clean water.

Also, keep your CIP tank in mind. The CIP tank has to be rinsed out thoroughly both before and after the acid is mixed in it.

#### Effect of Pressure in a Tank:

1. A hot tank which is cooling will lose pressure rapidly. It will quickly have a negative pressure reading. If there isn't an opening for the intake of air (or CO<sub>2</sub>), the tank will implode.
2. When emptying a tank, allow for CO<sub>2</sub> or another gas to take the place of the receding liquid.
3. When filling a tank, allow for the escape of gas or air to avoid building pressure suddenly and exploding a tank.



## **Special Rules**

### **Circuit Breakers**

The Brewers are responsible for the circuit breakers in the breaker box.

#### Misc. Brewery Outlet Circuit Breaker

All the wall outlets in the entire brewery, in fact, the entire restaurant, are connected to one circuit breaker! Anytime water gets into one of the wall outlets, the circuit breaker pops. For this reason it is a good idea to play the radio in the brewery. If the radio suddenly goes off, it means the outlet circuit breaker just popped.

If the outlet circuit breaker pops, it affects these two very important things: the time clock, and the brew clock. First, note the time when the circuit breaker blew. Try to reset the circuit breaker. If it doesn't reset right away, write Cynthia a note telling her what time the time clock stopped. Keep trying to reset the circuit breaker. Usually you can get it to reset within 5 minutes.

When it is reset, note the time. Write Cynthia a note telling her when the time clock went off, and when it went back on. Next, reset your brew clock. Hopefully you have an idea of what the approximate time on the brew clock was before the circuit breaker blew. Be sure to add in the extra minutes.

Sometimes you can't get the circuit breaker reset. This is usually caused by a very wet wall outlet. If the outlet was splashed in the brewery, try "blowing" out the outlet by connecting the dry vac hose to the other hose port. If the kitchen did it, just have patience and keep trying. If the kitchen is defrosting the upright freezer upstairs, it will take about a day for their wall outlet to dry out. It usually gets soaked with the freezer runoff.

#### Brewery Lights Circuit Breaker

This circuit breaker is connected to the ceiling light in the fermentation room, some of the kitchen's lights, the ceiling light in the downstairs office, the two swing-lights in the upstairs office, the lab wall fan, and the lab hot plate wall outlet.

This circuit breaker will sometimes blow while you are using the hot plate in the lab. The best preventative maintenance is to turn off all the unnecessary lights connected to that circuit breaker while you are using the hot plate. Once you are done with the hot plate, go and turn all the extra lights back on. If this circuit breaker pops, turn off all the extra lights, and reset the circuit breaker.



## Special Rules

### Beer Tastings

You should bring the following things with you to a beer tasting:

Jockeybox  
20 lb CO2 tank  
Blue milk crate full of hoses  
3 kegs of beer  
Hand truck  
Blue drip tray  
2 Medium crescent wrenches  
Tap wrench  
Pinch hose clamps  
Red-handled pinch clamp pliers  
Extra rubber gaskets  
Triple Rock banner  
Rope  
Duct tape  
Double-stick foam tape  
Masking tape  
1 bag of coasters  
Some postcards for decoration  
3 beer pitchers  
Ball point pen  
Permanent marker

Beer Nut Wrench  
Worm Screw Clamps  
Worm Screw driver  
5-gallon bucket

#### Optional Decorations:

3 beer signs  
3 Triple Rock glasses  
T-shirts to hang  
Hangers for T-shirts



## Special Rules

### Brewer's Library

The Brewer's Library is located on the bookshelf in the upstairs office. These books belong to Triple Rock, but are available to check-out and use. In order to have control over the books, they need to be checked out through Reid, John, or the head brewer, and checked back in again.

The Brewer's Library Card Catalog is located above the books. It is a blue 3X5 card file. There is a card for each book. The checkout procedures are listed at the front of the file, but are repeated here:

#### Brewer's Library Procedures

1. Find the card for the book. Cards are arranged alphabetically by title.
2. Write down your name, the date, and have Reid, or John initial the card.
3. File card under OUT .
4. Please return the book within one month as others might like to read it.
5. Have Reid, or John initial the card that you have returned the book.
6. Re-file the card alphabetically by title. Thanks!

#### List of Books as of 8/14/90

AHA Beer Judge Study Guide, AHA  
 Beer Deposits - Lab Guide, J.E. Siebel Co.  
 Brewing All-grain Beers, Alan Tobey  
 Brewing Beer Like Those You Buy, Dave Line  
 Complete Joy of Homebrewing, Charlie Papazian  
 Dictionary of Beer and Brewing, Carl Forget  
 Essentials of Beer Style, Fred Eckhardt  
 Great Western Malting Booklet  
 Malting and Brewing Science-Vol.1, Briggs, Hough, Stevens, Young  
 Malting and Brewing Science-Vol.2, Briggs, Hough, Stevens, Young  
 Microbrewer's Resource Directory  
 New World Guide to Beer, Michael Jackson  
 Pale Ale, Terry Foster  
 Practical Brewer, Master Brewer's Association  
 Principles of Brewing Science, George Fix  
 Simon and Schuster Pocket Guide to Beer, Michael Jackson  
 Transcripts - 1984, AHA Homebrewer's and Microbrewer's Conf.  
 Transcripts - 1985, AHA Homebrewer's Conf.  
 Transcripts - 1985, AHA Microbrewer's Conf.  
 Triple Rock's BJCP Study Guide, T. Fahrendorf  
 World Guide to Beer, Michael Jackson



## **Special Rules**

### **Bartender's Descriptions**

#### Specialty Brews

When a new specialty beer is put on tap, a note should be made out to the Bar Manager detailing the following:

1. Name of the specialty.
2. Whether it has been made before, or if it is a brand new recipe.
3. Malts and hops used. (Including approximate percentages if you know them.)
4. Flavor descriptions, ie: malty, sweet, hoppy, dry, bitter, full-bodied, light-bodied, etc.
5. Alcohol percentage.
6. Time you think the old specialty might run out. (Tonight, tomorrow, etc.)

If the specialty will be tapped at the bar right away, before the bar manager comes in, you must tell the day bartender the above information, as well as write your note.

#### Experimental Brews

When you are experimenting with the recipes of the regular brews, you must notify the owners, and the bar manager. This is especially important if the experimental brew tastes significantly different than the normal recipe. Leave a note for the bartender detailing the differences between the experimental brew and the regular brew. (New yeast, different malt, new hopping rate, etc.)



## Appendix A

### Beer Descriptions-1

### Beer Descriptions Triple Rock Brewing Co. Berkeley, California.

The three major beers, from lightest to darkest are: Pinnacle Pale Ale, Red Rock Ale, and Black Rock Porter. These three beers are always on tap. We also usually have a fourth beer tapped, which is a "Brewer's Choice" tap. We call it our Specialty Beer. This is where the brewers can be "Beer Chefs," and are allowed to experiment, within reason, and can brew what they want.

The present (August, 1990) formulations for the three regular beers are:

#### Pinnacle Pale Ale

94% Klages 2-Row  
6% Munich 10 L  
<1% Roasted Barley

#### 25 IBU hops:

Bittering - Chinook  
Varietal - Mt. Hood  
Aromatic - Chinook

#### Red Rock Ale

83% Klages 2-Row  
10% Caramel 60 L  
5% Dextrin Malt  
<1% Chocolate Malt  
<1% Roasted Barley

#### 35 IBU hops:

Bittering - Chinook  
Varietal - Centennial  
Aromatic - Cascade

#### Black Rock Porter

67% Klages 2-Row  
18% Caramel 60 L  
9% Chocolate Malt  
4% Dextrin Malt  
2% Wheat Malt  
<1% Roasted Barley

#### 45 IBU hops:

Bittering - Galena  
Varietal - Galena  
Aromatic - Willamette

Pinnacle Pale Ale has a pronounced floral aroma. It is dark straw in color, and has a dry sweetness achieved through the use of a small amount of munich malt. A tiny amount of roasted barley is used to adjust the PH of the mash. Pinnacle has a crisp, dry aftertaste due to the chinook hops used in the finish.

Red Rock Ale is our best-selling beer. It is a darker amber than that of most microbreweries and brewpubs. Because of the name, we wanted to strive for a red rather than a copper color. This red color is achieved through the use of specialty malts. We use 60 lovibond caramel malt in our Red Rock. It gives the beer a more European flavor than the 40 lovibond caramel used by many other breweries. It also enhances the redness of the color. This caramel malt is not enough to cause the deep red color of the beer. A small amount of chocolate malt is also used for color. The beer has a slight roasty flavor not found in other amber beers. That flavor comes from the chocolate malt just mentioned, and also from a tiny amount of roasted barley. Dextrin or carapils malt is also used. This malt does not change the color, it just increases the body and mouth-fullness.

Black Rock Porter is a favorite of the "Regulars." It has a dark, almost opaque russet-brown color and a creamy brown head. The roasted coffee-toffee flavors and aromas stem mainly from the use of large quantities of caramel and chocolate malts. This beer is smooth and drinkable despite its being very full-bodied. A small quantity of wheat malt helps this beer keep its head.



## **Appendix A**

### **Beer Descriptions-2**

We find our customers prefer a big beer that is robust in flavor, fuller-bodied, and hoppy. If a beer sells out quickly, we know they liked it. If it sits in the tanks for a couple of weeks, then the recipe could be improved upon. The bartenders also tell the brewers what Specialty Beers the customers have been asking for.

Sometimes a particular Specialty Beer is so popular, that we have to repeat it every 3-6 months to keep the customers happy. Very popular beers include: Nehru's Nectar India Pale Ale, Agate Ale, Seismic Stout, Tombstone Ale, and Titanium Ale. Some Specialty Beers are purely seasonal, and are only repeated once a year. Seasonal beers include: Reindeer Ale for Christmas, Resolution Ale for New Years, Blarney Stone for St. Patrick's Day, and Oktoberfest in the fall. We also have a special we repeat every 100th brew batch, which we call Century Ale. We had our 900th brew Century a few months ago, and will be brewing our first Milenium Ale in another month or so. We have been quite creative with the Specialty Beers. This year we had Ginger Rock, with fresh ginger root thrown into the boil. We also had Berried Alive, a brown ale made with Oregon blackberries. New specialty beers are being created all the time. Come in to the brewpub and be pleasantly surprised!



## Appendix B Suppliers List-1

### Malt

#### Great Western Malting Co.

5945 S. Malt Avenue  
Los Angeles, CA 90040-3591  
213-685-6161

Contact: Pat or Lloyd  
Freight: FXI 209-858-2142 (Disp: Joe)  
Order: Bulk Klages, 15,000 lb, 2 months

P.O. Box 1529  
Vancouver, WA 98668-1529  
206-693-3661  
503-285-7711

Contact: LeeAnn  
Order: Baird Specialty Malt, 2000 lb

#### Briess Malting Co.

Chilton, Wisconsin  
414-849-7711

Contact: Laurie  
Freight: Western Way Warehousing  
415-352-6413 (San Leandro)  
Order: Specialty Malt, 1500 lb, 1-2 mo.

#### Froedert Malting Co.

P.O. Box 712  
Milwaukee, WI 53201  
414-671-1166

Contact: Debbie  
Order: 60 L Caramel (not used now)

### Flaked Maize

#### Lauhoff Grain Co.

P.O. Box 571  
Danville, IL 61834  
217-442-1800

Contact: Dean Modglin  
Freight: Yellow Freight 415-783-7010  
Order: Tiny Flakes, 500 lb, every 6 mo.

#### Fabtique au Canada

par J.R. Short Canadian Mills Ltd.  
Toronto, Ontario  
416-421-3463

### Flaked Barley

#### Charnwood Milling Co. Ltd.

Framlingham N. Woodbridge  
Suffolk I P 13 9PT  
011-44-728-723435 (STD 0728)



## **Appendix B**

### **Suppliers List-2**

#### **Hops**

##### Hop Union

P.O. Box 9697  
203 Division Street  
Yakima, WA 98909  
509-457-3200

Contact: Ralph Olson  
Order: Pellets, 44 lb cartons, 1-2 mo.

##### John I Haas, Inc.

P.O. Box 1441  
Yakima, WA 98907  
202-223-0005  
509-575-5411  
509-248-4188

##### S.S. Steiner, Inc.

655 Madison Avenue  
New York, NY 10021-8078  
212-838-8900

#### **Brewing Salts**

##### Crosby & Baker

P.O. Box 3409  
999 Main Road  
Westport, MA 02790  
800-992-0141

Order:  $\text{CaSO}_4$ ,  $\text{MgSO}_4$ ,  $\text{CaCO}_3$   
Order: Cask Pellets

#### **Yeast**

##### J.E. Siebel Sons' Co.

4055 W. Peterson Avenue  
Chicago, IL 60646  
312-463-3400

Contact: Maureen  
Order: HLP, 490 grams, every 6 month  
Order: Whitbread Dry Yeast, 10 kilos

##### Wyeast

P.O. Box 425 (mail)  
4588 Woodworth Dr. (UPS)  
Mt. Hood, OR 97041  
503-352-7844

Contact: Dave  
Order: Yeast slurry, 1 liter (2 pints)



## Appendix B Suppliers List-3

### Cleaning Products

#### Clenesco

1-800-543-7042

Order: BSC22, 400 lb, every 2 months  
Order: TSP Cleaner, 400 lb, 3-4 mo.  
Order: Britesurf 99 (acid), 55 gal. drum

#### Oxford Chemicals, Inc.

P.O. Box 80202

Atlanta, GA 30366

800-451-6996

Contact: ~~Bob Mann~~ 415-769-6615  
Order: KloroKlenz, 500 lb, every 3 mo.  
Order: MR-56 (acid), 55 gal., 6 months  
Order: Envirox-G (spray cleaner), 4 gal.  
Order: Formula C (spray sanitizer), 4 g.

#### Great Western Chemical Co.

860 Wharf Street

Richmond, CA 94804

415-235-5163

Contact: Don Jaykins

#### Zep Manufacturing Co.

P.O. Box 418

Santa Clara, CA 95052

408-739-3656

Contacts: Robby Ricks or Ken Franklin

BOB MANN

### Diatomaceous Earth

#### Harcros Chemicals

5801 Christie Ave, Suite 590

Emeryville, CA 94608

415-658-8333

Contact: Richard Cooper  
Order: Manville Hi-Flow Super Cell DE,  
2000 lb, every 6 months

#### Scott Labs

2220 Pine View Way

P.O. Box 750249

Petaluma, CA 94975-0249

707-765-6666

Contacts: Mike (parts)  
Tom Anders (sales manager)  
(Also DE Filter machine)  
Order: Manville Hi-Flow Super Cell DE

### D.E. Cartridge Filters

#### Montgomery Brothers, Inc.

1831 Bayshore Hwy

Burlingame, CA 94010

415-697-6500

Order: 1 micron: M39R10A, case/2 mo.  
Order: 10 micron: M19R10A, case/1 yr.



## Appendix B Suppliers List-4

### O-Rings and Hose Barbs

Process Engineers, Inc.  
3205 Baumberg Avenue  
Hayward, CA 94545  
415-732-5122

Contact: Marilyn  
Order: 1.5 in. standard clamp, Buna-N,  
#0-40MP-U, 100 every 6 mo.

### Frangible Disks

Frangible Disks, Inc.  
Penn Grove, New Jersey  
609-299-1201

Order: 1.5 in. stainless, 40 PSIG @ 72,  
buy 21 every 4 months.

### Hose

Bay Rubber Company  
404 Pendleton Way  
Oakland, California  
415-635-9151

Order: Cannaflex (same as Genline),  
100 ft per year.

### Glycol Solenoids

Penn Valve  
Mt. View, California  
415-965-4197

Contact: Glenn  
Order: Richdel Solenoids, 115 Volt,  
AC, 4 per year.

### Gas

South Bay Welding Co.  
1200 High Street  
Oakland, CA 94601  
415-533-5844

Hayward Location  
415-489-7050

Salesman: Les Dare  
Order: Liquid CO2 (duer), 3 weeks  
Order: Large Medical Oxygen, 1/mo.  
Order: 30lb CO2 we own (trade in.)  
Dispatcher: Rick (order from Rick)  
Engineer: Dan Batteate (Betty-Eddy)

Airco-Amerigas  
931 66th Avenue  
Oakland, CA 94621  
800-336-4004

Salesman: Kevin Casiopo 352-5623  
Orders: Mike or Greg (see above)  
Engineer: John Tannawitz 297-5000



**Appendix B**  
**Suppliers List-5****Auger**

Mayrath Co.  
913-632-3133

**Stainless Welding**

Eppco  
1618 6th Street  
Berkeley, CA 94710  
415-525-9426

Contact: Joe Petti  
(will trade for Beer Bucks)

**Rubbermaid Products**

Huntington Labs  
700 Kevin Court  
Oakland, CA 94621  
800-448-6522  
415-430-2800

Salesman: Karen Blumenthal  
Orders: Peter  
Order: 32 gal. and 10 gal. Brutes

**Stainless One-way Valves**

Oakland Valve & Fitting Co.  
2250 Galaxy Court - Unit G  
Concord, CA 94520  
415-676-4100

Contact: Kurt Kaimer

**Kettle Air Duct and Draft Diverter**

Atlas Heating and Air Conditioning Co.  
1451 32nd Street  
Oakland, CA 94608  
415-893-1343

Contact: John Frisbie

**Small Steel Brushes and Golden Gate Elbows**

Irv Bacci  
950 Detroit Ave #15  
Concord, CA  
415-676-3235



## **Appendix B**

### **Suppliers List-6**

#### **Cornelius Kegs**

##### Cornelius Corp.

800-626-7636 (distributor)  
415-351-0961 (manufacturer)

Order: 3 gal. and 5 gal. Cornelius

#### **Fruit**

##### Kozlowski Farms

5566 Gravenstein Hwy N. (Hwy 116)  
Forestville, CA 95436  
707-887-1587

Order: Seedless Blackberry Puree

##### American Fruit Processor Paicoma, California

##### California Brands Flavors

411 Pendleton Way  
Oakland, CA 94621  
415-562-2371

Contacts: Murray Jaye or Jan Lorien  
Type: Natural Flavors, not fruit

#### **Pig Rancher (spent grain pickup)**

##### Art Sims

work: 302-5892  
home: 778-7131

##### Roger Lau

Lazy R Ranch  
408-897-3006

(Let their home phones ring 10 times so the answering machine picks up.)

#### **Big Time Brewery & Alehouse**

##### Ed Tringali - brewer

4133 University Way N.E.  
Seattle, WA 98105  
206-545-4509  
206-547-1932 (office)

#### **Lab Equipment**

##### Fisher Scientific

1-800-672-3550

Triple Rock account no.: 836-767-01  
Order: Test tubes and Pipettes



## **Appendix B**

### **Suppliers List-7**

#### **Tank Parts - System Manufacturer**

##### J.V. Northwest

28120 S.W. Boberg Rd.  
Wilsonville, OR 97070  
503-682-2596

Technician: Dan Carey  
Salesman: Phil Loen

#### **U.C. Davis Contacts**

##### Mary Miranda

916-752-6945

##### Dr. Michael Lewis

916-752-1239

#### **Homebrew Supply Shop**

##### Oak Barrel

1443 San Pablo Avenue  
Berkeley, California  
415-849-0400

Contacts: Homer or George  
Order: Hydrometers, Whole leaf hops

#### **Golden Gate Valve Wrench and Key**

##### Save-a-Barrel

419-382-1435

\*note: had a fire end of July '90

Contact: Bob Sullier

Need: Golden Gate Key and Wrench

#### **Sight Glasses**

##### Tap Plastics

3011 Alvarado  
San Leandro, California  
415-357-3755

Order: 1/2 in. OD X 33.5 in. Acrylic  
sight glass for liquor back.

#### **Old Triple Rock Brewer**

##### Teri Fahrendorf

3835 Watkins Lane  
Eugene, OR 97405  
503-345-7159

##### Steelhead Brewing Company

East 5th Avenue  
Eugene, Oregon  
503-



**Appendix B**  
**Suppliers List-8****DE Filter Plug and Plug Boot**State Electric Supply, Inc.241 10th Street  
Oakland, CA 94607

415-836-1717

Contact: Jeff

Order: Hubbell 20 amp plug #2421  
Order: Hubbell plug boot #6035**Refractometer**Eagle Instruments, Inc.323 Geary Street, Suite 705  
San Francisco, CA 94102

415-291-0755

Order: #SR-32

**Wooden Kegs**Candar, Inc.

Ontario, Canada

519-886-2880



## Appendix C

## Bittering Units

The formula we use to figure out the approximate International Bittering Units for our beers is:

$$\frac{\text{IBU} \times 7.04}{\alpha} = \text{oz. of hops - to use as one 2/5ths addition}$$

$\alpha$  = alpha acid percentage of the hops

Use 2/5 of the hops for Bittering

Use 2/5 of the hops for Varietal flavor

Use 1/5 of the hops for Aromatics

(For the Aromatics divide the formula amount by 2 -  
Except in the case of highly aromatic beers such as  
IPAs)

This formula is not absolute - it should be tempered by the brewers intuition and the style of beer that is being brewed.



## Appendix D

# Carbonating a Flat Beer

To carbonate a beer that ends up in a serving tank either flat or low on carbonation we use the same scintered stainless tube that we use to aerate the wort.

1. Unscrew oxygen supply from the aerator.
2. Release tri-clamp and remove the tube from the aerator assembly.
3. Unscrew the tube and end cap from the rest of the fittings.
4. Connect a "L" fitting, check valve, and male quick connect to the tube inlet.
5. Tri-clamp the 8" long straight 1 1/2" piece of stainless pipe to the tube.
6. Put this whole assembly in some bleach water to sanitize it.
7. Take the elbow off the bottom of the serving tank which contains the flat beer.  
(Be sure that you don't accidentally take the valve off with it or you are going to have a major beer flood.)
8. Brush the valve with sanitizing solution.
9. Tri-clamp the carbonating unit to the bottom of the valve.
10. Attach the brewery CO2 supply to the unit.
11. Make sure that the serving tank is at about 20lbs pressure.
12. Turn the carbonator pressure to about 5 lbs more than the serving tank pressure.
13. Open the valve on the bottom of the server.
14. Listen to the carbonator's regulator you should be able to hear the CO2 slowly going through the regulator. We want just enough gas going through so that the tube creates very small bubbles that are absorbed as they float up into the beer. If too much gas is going through then the bubbles will join together into big ones that will just bubble all the way to the top.
  - a. If you can't hear the CO2 going through - turn the pressure up slightly.
  - b. If you hear a lot of gas going through - turn the pressure down.
15. Leave the carbonator connected until the beer is sufficiently carbonated that it has a decent head and pours well at the bar. Depending on the



starting carbonation level in the beer this could be anywhere from a couple hours to overnight. **BE SURE NOT TO OVER-CARBONATE THE BEER.** Over-carbonation is even a bigger problem than under-carbonation because it makes the beer almost impossible to pour.

#### **Appendix D**

##### **Carbonating a Flat Beer**

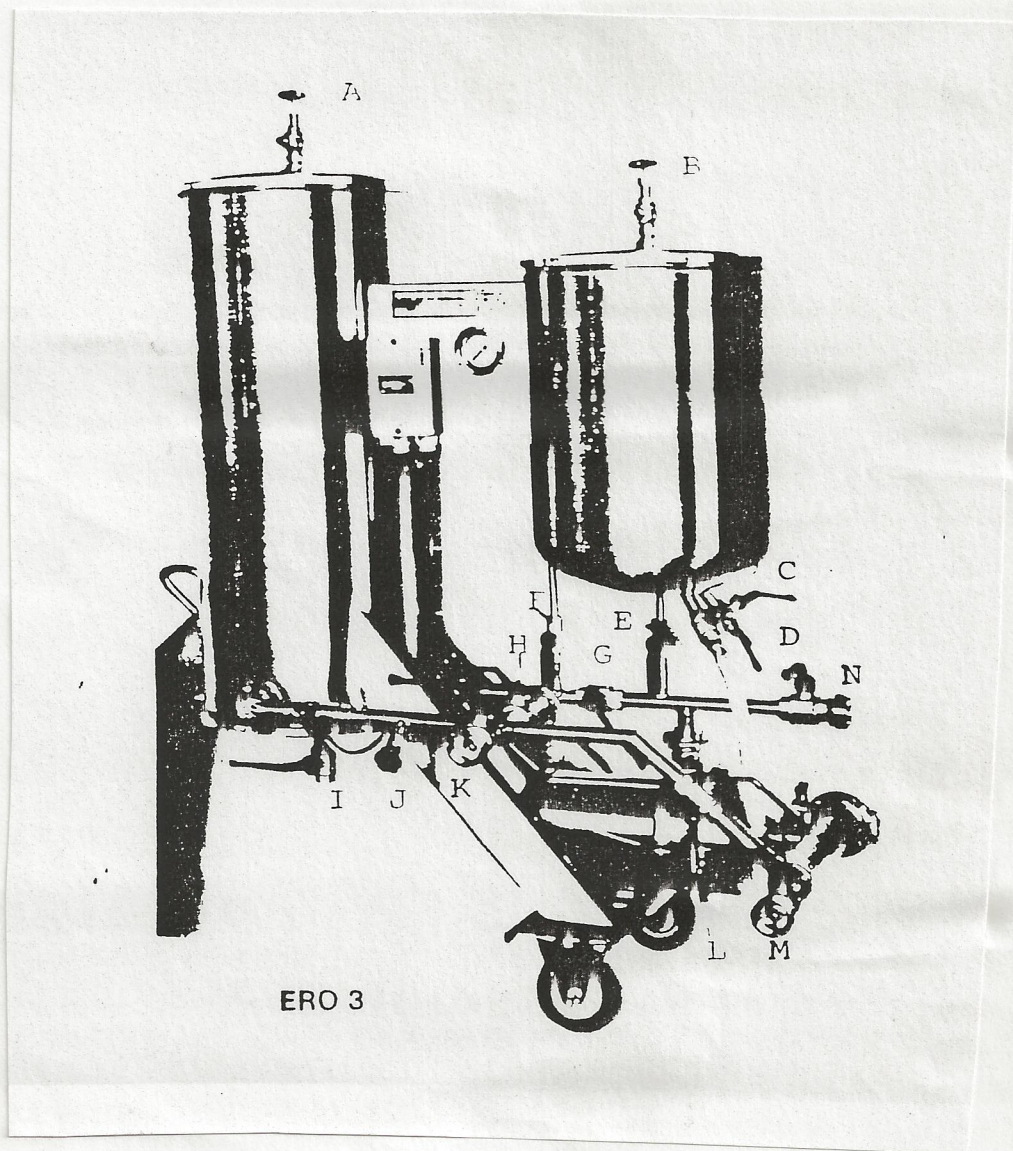
#### **When the beer is carbonated:**

16. Slowly close the valve on the bottom of the serving tank.
17. Disconnect the CO2 quick release.
18. Slowly release the triclamp holding the carbonator to the valve, allowing any built up pressure to escape.
19. Remove the carbonator, clean and sanitize it.
20. Reassemble and reconnect the aerator.



Appendix E  
Filter Manual

## FILTER DIAGRAM





Appendix E  
Filter Manual

## TRIPLE ROCK BREWERY

Instructions for Filtering with  
Velo Ero 3 D.E. Filter:

**NOTE:** When you are brewing and filtering on the same day the timing of the filtering process is determined by the timing of the brew. See the Typical Brew Day manual for a complete schedule.

**REMEMBER:**

*Everything the beer touches must be as clean and sanitary as possible at all times.*

1. Make sure you have an empty serving tank to transfer the beer to.
2. Clean the serving tank with caustic if necessary.
3. **Sanitize Serving Tank:** Preferably by recirculating very hot water through the tank (at least 190 degrees) for at least 5 minutes. If you can't use hot water use a 40 ppm sanitizing solution (Mix ratio: 16 oz bleach in a full 150 gal CIP tank) and recirculate for at least 10 minutes.
4. **Pressurize Serving Tank:** Once the serving tank is cleaned and sanitized, seal the tank (be sure all fittings are cleaned and sanitized) and pressurize the tank to at least the pressure in the fermenter you are transferring from and preferably not more than 15 lbs/sq.in.
5. For more efficiency and to keep yourself busy, once you are familiar with the filter, you will probably want to be cleaning and sanitizing the serving tank (steps 2-4) at the same time as you are sanitizing the filter (step 6).
6. **Sanitize Filter;**
  - a. Fill CIP tank #2 (closest to fermentation room) at least 1/2 full of water.
  - b. Mix 40 ppm sanitizing solution by adding 8 ozs. bleach per 1/2 tank of water (75 gal).
  - c. Connect the shorter of the two long clear brewery hoses to the outlet of the CIP tank and to the filter inlet (M on diagram).
  - d. Make sure that the lids are tightly clamped on the filter tanks and the valves on the lids (A & B) are open.
  - e. Open the valve on the CIP tank outlet and then at the filter inlet. Leave all valves on filter open for long enough to flush out any water that was standing in the filter, then shut all outlet and drain valves and let the filter start filling with sanitizer.



## Appendix E

### Filter Manual

- f. You can speed up the filling process by making sure that the valves are set so that the filter recirculates (E, G & L open and D, F & H closed). Then turn on the pump. As the tanks fill air will blow out of the tubes on valves A & B, hold the tubes so that you don't get sprayed when water starts coming out. When water does come out shut off the valve that goes to that tube. To speed up the filling of the dosing tank you may partially close valve G so that more water is forced through valve E into the dosing tank.
  - g. When both tanks on the filter are full, open valve F so that water can recirculate through the dosing tank.
  - h. Connect the inlet side (see arrow on top of housing) of the cartridge filter (with a 1 micron cartridge installed) to the filter outlet (K).
  - i. Connect the longer clear brewery hose to the cartridge filter outlet, open valve K and partially close valve L so that water is pumped through the hose. After several gallons of water have run through the hose put the free end into the CIP tank so water can recirculate through everything.
7. **Connect Counterpressure Hose:** While the Sanitizing water is recirculating through the filter and hoses connect the counterpressure hose from the top of the fermenter you are transferring from to the top of the serving tank you are going to. Be sure the end with the T is at the serving tank and that the CO2 line is also connected. Be sure to open the valves on the top of both tanks.
8. **Drain Filter:** Drain the water out of the filter back into the CIP tank by using the brewery CO2 hose and the tubes 1st on valve B to empty the dosing tank (be sure to shut off valves D, E & F when the dosing tank is empty) and then on valve A to force rest of the water out. When most of the water is out of the filter shut off valve M and disconnect the brewery hose from the CIP tank. Be sure to be careful that the end of the hose stays sanitary and doesn't touch anything. Use CO2 pressure to force as much water as possible out of the filter and hoses by letting the pressure in the filter build a little and then opening the various valves so the water is blown out. When as much water as possible is out of the filter you are ready to start setting it up for filtering

### FILTER SETUP:

9. **Add Diatomaceous Earth;**
- \*\* (For maximum efficiency, you can be pressurizing the filter (step 10) at the same time as you are adding the DE.)
- a. Be sure that the dosing tank is isolated from the rest of the filter (valves D, E & F closed) and there is no pressure in it (valve A open).
  - b. Take the lid off the dosing tank, if there is any water left in the tank let it drain out valve C and then be sure valve C is also closed.



- c. Put 1/2 to 3/4 of a 5 gal plastic bucket of DE (Hi-Flow Super-Cel) into the dosing tank. (Wear a dust mask when working with dry DE.)
- d. Put the lid back on the dosing tank and close valve B.



## Appendix E

### Filter Manual

#### 10. Pressurize Filter;

- a. Attach brewery CO2 supply to tube on valve A.
- b. Open valve F into dosing tank.
- c. Pressurize filter to slightly less than the pressure in the fermenter - 1 atmosphere on the filter pressure gauge is equal to 15 psi on the fermenter.
- d. Shut off the CO2 supply, close valve A, and close valve F.

#### 11. Connect filter inlet to racking arm on fermenter. Be sure that the racking arm is turned up.

#### 12. Filling the Filter;

- a. Slowly open the valve on the fermentation tank.
- b. Be sure the recirculation valve (L) is closed and slowly open the inlet valve (M) on the filter. Make sure that the beer is flowing into the filter, if it is flowing backwards back into the fermenter you need to release some pressure through valves A & B.
- c. Open valves E & D so that beer can flow into the dosing tank.
- d. Open valves A & B slightly so that the pressure in the filter stays slightly less than the pressure in the fermenter and beer continues to flow into the filter. (If you open the valves too far the beer will tend to foam up and cause problems.)
- e. After about 10 minutes the filter tanks should be full. You will know this when beer and foam start coming out of valves A & B. Be sure to shut off these valves when this starts to happen. This is especially important with valve B since the DE can clog the valve up if it gets into it.
- f. Once the filter is full shut off valve D to the dosing tank.

#### 13. Pre-Coating the Screens;

- a. Before turning pump on be sure that the recirculation loop is open - valves L & G open and valve H closed.
- b. Turn on the pump to start the beer recirculating. **Once the pump is on never turn it back off until you are completely done filtering!**
- c. Open valves E & F all the way and halfway close valve G (handle pointing at 4:30) to force beer through the dosing tank.
- d. Stir up the beer/DE mixture in the dosing tank by turning the crank on the tank. You will want to do this fairly often throughout the filtering process to break up any lumps and keep an even amount of material flowing through the filter.
- e. It should take about 5 minutes for the DE to build up a sufficient pre-coat on the screens and for the beer to get bright. If the beer doesn't get bright then something is wrong.

#### 14. Filtering the Beer;



- a. Once the filter has been recirculating with the D.E. flowing for a couple minutes and the beer in the filter is crystal clear you are ready to filter the rest of the beer.
- b. Be sure that the filter outlet valve (K) is open then simultaneously open the filter inlet valve (M) as you are closing the recirculation valve (L). This will start the beer flowing from the fermenter through the filter and into the serving tank.



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- c. Be sure that the dosing tank is stirred up and you can see the D.E. flowing through the rear sight glass.
  - d. Dump any yeast remaining in the bottom of the fermenter by connecting one of the short clear brewery hoses to the bottom of the cone and slowly (so the yeast has time to flow to the bottom of the cone) pour the yeast out into a bucket. When the yeast starts coming out very liquidy (mostly beer) that should be enough.
  - e. Rotate the racking arm so that it points straight down. Then check the rear sight glass to make sure you are not sucking a lot of yeast through the filter - the filter can handle a fair amount of yeast but you must be sure that lots of D.E. is flowing out of the dosing tank.
  - f. If everything is running smoothly at this point you can close the dosing tank inlet (valve E) about halfway to conserve DE.
  - g. The filter will filter the beer in the fermenter quite quickly. The rate of flow depends on the relationship of how far open the dosing tank diverter valve (G) is and how much pressure has built up in the filter tank. The pressure will naturally go up slowly as you filter the beer but it should really not go over 4 or 5 bars (preferably 3) by the end of the filter run unless you are doing something wrong such as sending gobs of yeast through the filter or not stirring up the dosing tank. If the pressure gets up to 6 bars the filter is clogged and you have wasted any beer remaining in the tank and filter. If the pressure in the filter tank seems to be going up fairly rapidly you should divert more beer through the dosing tank by closing valve G further and/or opening valve E further to make sure that lots of D.E. is flowing through the filter. If the pressure is staying quite low you can open valve G further and speed up the filtering rate.
  - h. As the serving tank gets up to around 180 gallons start watching the inlet hose from the fermenter and as soon as the beer runs out and bubbles start flowing into the filter - simultaneously close the inlet valve (M) and open the recirculation valve (L).
- 15. Drain the Dosing Tank;**
- a. Close valves E & F and open valve G all the way so that the dosing tank is isolated from the rest of the filter.
  - b. Halfway close valve L so there will be suction on the dosing tank outlet (valve D).
  - c. Open valve D on the dosing tank while simultaneously closing valve L all the way so that beer flows out of the dosing tank through the filter and into the serving tank.
  - d. Quickly open valve B on top of the dosing tank so that air can get in as the beer is pumped out. \*\*\* (Make sure that the valve is not clogged by either listening to the end of the tube so you hear air being sucked in or covering the end with your finger so you can feel the suction. If you think the tube may be clogged connect the brewery CO2 supply to it to blow anything out of the line/valve.)



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- e. When you are absolutely sure there is no pressure left in the dosing tank take the lid off and watch the dosing tank drain. **NEVER PUT YOUR FACE NEAR THE TANK LID WHILE YOU ARE UNDOING THE LID CLAMP!** If for some reason there was pressure in the tank it could blow your head off and smear it all over the ceiling.
  - f. When the beer reaches the bottom of the dosing tank and before much air gets sucked into the filter simultaneously close valve D (dosing tank outlet) as you are opening valve L (recirculation valve).
16. **Draining the remaining beer into the serving tank;**
- a. Allow the beer to recirculate for a minute or two.
  - b. Without closing any of the valves in the recirculation loop turn off the filter pump.
  - c. Connect the brewery CO2 supply to the tube on the top of the filter tank.
  - d. Simultaneously open the valve on the CO2 supply and the valve on the top of the filter tank (A).
  - e. The pressure of the CO2 will now slowly force the remaining beer through the cartridge filter and into the serving tank.
  - f. When bubbles start coming through the cartridge filter walk the beer in the hose into the serving tank and then shut off the serving tank valve.
  - g. Turn off the CO2 supply hose, shut the valve on the top of the filter tank (A), and remove the CO2 supply from the tube on the filter tank.
  - h. Open the valve on the top of the filter tank (A) slightly so that the pressure in the filter is slowly released.
17. **Cleaning the Filter;**
- a. Slowly open the drain valve on the bottom of the filter tank (valve I) then open valve A on the top of the tank so that it can drain.
  - b. Disconnect the CO2 counterpressure line from the top of the serving tank and reconnect the CO2 supply line to the top of the tank. Be sure that the CO2 inlet valve on top of the serving tank is open so that the tank will stay pressurized. Open the sample valve on the fermenter so the tank can depressurize.
  - c. Slowly open valves M and N to relieve the pressure in the brewery hoses and then disconnect the hoses from the serving tank, fermenter, and the filter.
  - d. Take the lid off the filter tank and remove the crossbar which holds the filter screens in place.
  - e. Take the screens out one by one and with the nylon scraper scrape the D.E. off them into a garbage can. As you scrape them off set them aside, **do not** rest them on their outlet tubes.
  - f. When the screens are all out thoroughly rinse out the filter with the hose. Be sure to get all the beer out of the filter's pump by filling the dosing tank with about 5 gallons of water, turning on the pump and letting the water flow out valve D and through the pump.



- g. Then thoroughly rinse off the screens one by one and put them back in the filter tank. Do not spray water backwards into the filter screens or set the screens down on the outlet tubes. As you clean each screen put it back into the filter tank in the same order that you took them out.



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- h. When all the screens are back in the tank carefully put the crossbar back in on top of them.
  - i. Put 1/2 cup of TSP in the filter tank and fill the entire filter with water from CIP tank #2 as you did in step 6.
  - j. Recirculate this solution through the entire filter (including dosing tank) for at least 10 minutes.
  - k. Drain the filter, remove the screens and rinse all TSP residue off everything. Be sure to run rinse water through the pump.
  - l. Set the screens aside to drain and dry overnight (do not rest them on their outlet tubes).
  - m. Roll the filter back to its storage position next to the sink.
  - n. Spray the bottom edges of the screens, the inside bottom edge of the filter tank and the pressure gauge hole in the side of the filter tank with iodine solution.
  - o. Be sure to rinse the beer out of the long clear brewery hose.
18. **Rinse out the Fermenter;**
- a. By now all the pressure should be out of the fermenter.
  - b. Connect the grey brewery hoses to the CIP pump, to the CIP tank with the sanitized water and to the CIP inlet on the fermenter.
  - c. Connect one of the short pieces of brewery hose to the bottom of the fermenter and put the other end down the floor drain.
  - e. Open the valve on the bottom of the fermenter and the valve on the racking arm.
  - f. Rinse the fermenter. You will get the best results by turning the pump on and off several times and letting the fermenter completely drain between times.
  - g. Since the water you rinsed the fermenter with had chlorine (bleach) in it and chlorine can be corrosive to stainless steel, once the CIP tank is empty put about 25 gallons of fresh water in the tank and finish rinsing the fermenter with this water.
  - h. Disconnect and put away all brewery hoses.
  - i. Clean up any other mess you may have left around.
  - j. Hose down the floors in all three rooms. Also be sure to hose out the elbow on the bottom of the serving tank.
19. **Take a level reading** in the serving tank and write down all pertinent data on the appropriate brew-log sheet. Since the beer level should be above the top of the sight glass you will have to pour some hot water on the outside of the tank and determine the beer level by where the tank gets cold again.