Log Book
Campaign 17

**2015-06-22**

07:55 Steam turned ON
08:00 Start Process, Potable, and UV Water
08:10 Start Chiller
08:12 Start Waste Water Pump
08:14 Start UV Rinse for tanks and lines
08:19 Start Cooling Water Pump
Waste Water pH=5.21
Added from Caustic Tank for 10 minutes
pH=7.2; Cond=7.75 mS/cm
09:10 Turned ON Prep Tank Pump (rinsing line and tank)
Waste Water Pump has been cleaned
09:23 Start pumping Waste Water out
09:50 Added to Acid Mix Tank. Filled the line and then rinsed it. Conductivity was raised from 16.9 mS/cm to 18.4 mS/cm. Weight from 5891 lbs, then rinsed line with water up to 5963 lbs
10:08 Completed UV Rinse of 2B and 2A
13:21 Rinse of 3B completed
13:30 Start Sterilization of 2A and 2B along with transfer lines to 3A and 3B and the Prep Tank.
15:45 Sterilization of 2A/B and lines and Prep Tank completed.
16:04 Preparing Hydrolyzate solution for Prop 2A and 2B
354.5lbs Hz (42.5 gallons)
335.7lbs $H_2O$ (40.25 gallons)
Started with 354lbs Hz, then added water to complete to 691lbs
pH=3.50, adjust to 8.0 in 2B
664lbs = 317lbs = 347lbs left over in Prep Tank
38 gallons should be ~ 42% Level in Prop 2B
342lbs – 317lbs = 25lbs should be left over in Prep Tank
pH=3.46, adjust to 8.0 in 2A

*Shift Change*

19:59 Opened Base Valves for Prop 2A/B for ten seconds to remove excess pressure/base left in lines during pH adjustment.
BBP#4&5 were both run at 95% and never slowed down as pH=8.0 was approached in either tank. Thus, was worried about significantly over-basing the Propagators.
20:40 UV Rinsing Prop 3A/B knuckle→pHAT
20:52 UV Rinse→Liq Tank lines
20:59 PAMP#1 OFF (was left running from popping acid lines into Propagators during day shift)
21:07 UV Rinse from LT→DFT and →pHAT
21:13 UV Rinse of pHAT through sprayball for 25 minutes
21:35 pHAT SV→50% and CLOSED
21:37 Finished UV Rinse of pHAT
21:47 Anti-foam now added to Prop 2A/B
What effect would there be if anti-foam was added in the initial mixing in the Prep Tank? Is there a method for doing so?
21:56 Began UV Rinse of Liq Tank through Sprayball#1 for 25 minutes
22:36 Prop 2B's Field Base Pump valves CLOSED

22:43 LTSV→50% and CLOSED
22:53 Finished UV Rinse of Liq Tank
23:03 Thought for future: It might be worthwhile to do a Level Calibration for Liquefaction Tank using the UV flow meter line.
23:20 Began SIP Procedures on Liq Tank
Steam ON
23:29 Liq Tank @ +5 psi, Steam OFF, VacPump ON
23:39 Liq Tank @ -10 psi, VacPump OFF, Steam ON

**2015-06-23**
00:06 Opening Liq Tank lines to steam now
00:25 PAHT AG ON
00:32 Metso Boiler ON
00:37 HP Seal Water Pump ON
00:38 Liq Tank @ 250°F.
Began 90-minute timer
00:43 RevScr to BTAG ON
01:03 PSB field valve for steam opened.
01:09 C5 Discharger to HSMC ON
01:12 CV#2 and Metso Steam ON
Steam OFF.
Gasket has died on us?
01:17 CV#2 OFF. This fix for the Metso Steam could be a while.
02:10 Finished SIP wait for Liq Tank
Nutrients added to Prop 2A/B
02:45 Now Inoculating Prop 2A
Initial: (L) 22.0%; pH=6.99; (T) 99.6°F; 0.49 psi
02:52 Stopped Dump Chamber Cycle
02:53 Prop 2A Inoculated
(L) 23.6%; pH=6.95; (T) 97.7°F; 0.45 psi
03:07 Now Inoculating Prop 2B
Initial: (L) 44.6%; pH=7.05; (T) 99.5°F; 0.34 psi
03:11 t=0hr Prop 2A Sample Taken
(L) 22.5%; pH=6.94; (T) 97.9°F; 0.42 psi
03:17 t=0hr Prop 2B Sample Taken, Prop 2B Inoculated.
(L) 46.7%; pH=7.00; (T) 99.6°F; 0.04 psi
04:29 Began adding UV Water→Liq Tank. Target Volume=400 gallons
Feeding at 2.0 GPM
Field still working on boiler for Metso.
Blue Boiler no-go.
04:34 Going to do test-run of boiler soon. It might be working now.
04:43 WW pH=11.3 Cond=2.4 mS/cm Level=73.8%
04:45 Metso Dump Cycle restarted, Metso Steam ON
04:48 Heating up WW pick heater. Sending out @ 74.1%
Flow~29-30 GPM
04:51 CV#2 to FBCC ON
04:58 T-pipe Vent CLOSED @ $T_U$=217°F
05:15 All Metso Vents CLOSED

05:19 Steam coming out of the side of Screw Press
05:27 PSF (@ 100%) and PSBTC ON at 54 psi
Scrubbers ON
05:29 FBLBs ON @ 60% (refilling PSB entirely)
05:31 Barely any flow coming off of Bleach Scrubber flow meter.
Looking back @ CR#16, last 12 hours of that campaign had Bleach Scrubber's Level and Flow drop to 0.
05:38 Bleach Scrubber Pump and $CO_2$ Scrubber Fan OFF
05:40 PSBLBs ON @ 60%. PAMP#2 ON in CAS, FBLBs→35%
05:41 Bleach Scrubber refilled to 20% so far.
Pump and $CO_2$ Scrubber Fan ON
05:44 FBLBs→25%, Screw Press steam leak seems to be resolved
05:47 Bleach Scrubber Pump OFF. Scrubber filled to 53%
05:50 PSF→95%
05:51 FBLBs→20%
05:55 PSF→91%.
Metso at Temp and Pressure.
05:56 PSF→87%, FBLBs→25%
06:03 Bleach Scrubber Pump ON
06:05 PSF→95%
06:22 Finished adding UV Water→Liq Tank.
Result: 400 gallons = 14.9% Level
Level Trend from February 2015 Calibration shows that level as 287 gallons
6:25 FBLBs→30%
6:38 FBLBs→35%, PSF→100%
7:39 PSF→105%
PSBLBs' Amps are a ***LOT*** more active than normally. (highest before~4.2 Amps)
07:40 FBLBs→30%
07:45 PSBLBs' load just spiked to 4.8 Amps
07:57 PSF→108%
08:10 Metso Flow Rate Test started (two hours)
*Shift Change*
09:06 PSF→110%
09:36 PSF→90→80%
10:10 Flow Rate Test completed.
10:27 Liquefaction Tank→Level24% ~ 450 gallons
Turned ON Agitation, added a bit of water
Level = 24.3% →456 gallons
Biomass flow rate= 71.58lbs DW/hr
Biomass DW=31.75%
Liquefaction settings (from start-up worksheet)
15-hour retention time
Volume=858 gallons (~42.7% Level)
Enzyme Flow=0.00358 GPM (Pump @ 10.16%)
UV Water Flow=0.5 GPM
10:58 PSF→90%
11:00 Start Feeding Liquefaction.
(T) 105°F; pH=8.51; Level=24.9%

11:09 t=8hr Prop 2A Sample Taken; 0.05 ACFM
(L) 21.2%; pH=6.47; (T) 100.0°F; 0.21 psi
[EtOH]=1.39 g/L
11:12 t=8hr Prop 2B Sample Taken; 0.05 ACFM
(L) 41.6%; pH=6.49; (T) 98.0°F; 0.29 psi
[EtOH]=1.35 g/L
11:15 PSF→100%
11:32 PSF→105%
12:00 Start taking sample from METSO.
12:15 Power Outage!!
12:41 Metso Sample taken
12:42 PSF→100→95→90→95→100→105%
15:14 Liq Agitator to 100%
16:49 PSF→110%
17:22 PSF→120%
18:04 Latner Boiler water hardness good
18:21 PSF→125%
18:31 Biomass Livebottoms→35→40→50%
18:42 FBLBs→55→50%
18:46 FBLBs→45%
19:07 BBP#5→1.0→1.2→1.3 GPH
19:14 PSF→130%
19:15 FBLBs→40→35→30%
19:22 BBP#5→1.4→1.6→1.5 GPH
19:46 FBLBs→35%
19:49 FBLBs→40%
19:51 FBLBs→50→75%, dangerously low level
*Shift Change*
19:53 FBLBs→50%
19:57 t=17hr Prop 2B Sample Taken; 0.05 ACFM
(L) 38.1%; pH=6.30; (T) 99.9°F; 0.18 psi
19:59 t=17hr Prop 2A Sample Taken; 0.05 ACFM
(L) 21.2%; pH=6.30; (T) 100.2°F; 0.29 psi
20:00 Began SIP Procedures on pHAT.
Steam ON
20:03 pHAT @ +5 psi, Steam OFF, VacPump ON
20:04 pHAT @ 10 psi, VacPump OFF, Steam ON
20:08 FBLBs→40%
20:23 BBP#5→20%, BBP#4→15%
20:44 pHAT @ 250°F.
Began 90-minute timer
20:56 Lab reported Prop 2A pH=6.23
Set points for 2A/B→6.42/6.40 respectively
21:11 Steam into Prop 3A/B jackets
21:27 FBLBs→25%
21:43 Current Metso Settings:
Temp=185°C=366°F; Pressure=150 psi (A)
FBLBs → 30% (M); PSF @ 130% (M)

CV#1&2 @ 100% (M); ScPr @ 9.0 RPMs (A)
PAMP#2 CAS; Acid Cond=17.6 mS/cm; (2%); Acid Flow @ 6.00 GPH (CAS)
PSBLBs @ 60% (M); PSB Level-Camera; Temp=110°F (A)
Have PSB AG again.

22:15 Finished SIP of pHAT.
Steam OFF
22:17 PSF→125%
22:23 Began SIP Procedures on Prop 3B.
Steam ON
22:25 Began SIP Procedures on Prop 3A.
Steam ON
22:28 Prop 3B @ +5 psi, Steam OFF, VacPump ON
22:34 Prop 3B @ 10 psi, VacPump OFF, Steam ON
22:41 Prop 3A @ +5 psi, Steam OFF, VacPump ON
22:46 Prop 3A @ 10 psi, VacPump OFF, Steam ON
23:05 pHAT TC→"NORMAL" in Auto
23:06 Prop 3B @ 250°F.
Began 90-minute timer
23:26 Prop 3A @ 250°F.
Began 90-minute timer
23:32 Prop 2A/B [Ethol]= 6.66 g/L and 5.76 g/L respectively
23:40 FBLBs→40%

**2015-06-24**

00:07 Metso Sample Taken
00:15 PSF→130%
00:37 Finished SIP of Prop 3B. Steam OFF
00:49 Liq Tank Sample Port Steam ON
00:52 FBLBs→35%
00:58 FBLBs→30%
01:00 Finished SIP of Prop 3A. Steam OFF
01:01 DW Liq Tank Sample Taken
(L) 38.2%; pH=5.00; (T) 122.9°F; 0.59 psi
01:05 pH probe in pHAT
01:30 FBLBs→35%
01:41 Prop 3B TC→"NORMAL" in Auto
01:43 Prop 3A TC→"NORMAL" in Auto
02:00 PER ISMAEL, began adding UV Water→Liq Tank @ 0.5 GPM
02:05 Plan is to pump 180 gallons of slurry to each propagator.
Prop 3A→17.8%; Prop 3B→20.0%
02:05 FBLBs→38%
02:10 PSF→125%
02:11 LP ON @ 75%
LT→pHAT
02:13 LP reversed
02:14 Flow reported into pHAT, "Very strong flow"
02:15 FBLBs→42%
02:18 PHAT ON and OFF

02:19 pHAT ON @ 4.8% Level
02:20 AAP#3 ON in CAS. pHAT pHC ON in Auto
02:24 LP→60%, pH probe in Prop 3A
02:28 Cooling transfer lines into Prop 3s. pH probe into Prop 3B
02:30 t=0hr Liq Tank Sample Taken
(L) 35.8%; pH=5.04; (T) 122.1°F; 0.50 psi
02:33 FBLBs→35%
02:35 LP→50%
02:39 pAP ON @ 75%
pHAT→Prop 3A
Target=17.8%, 180 gallons
02:41 Good Flow→Prop 3A
02:48 t=0hr pHAT Sample Taken
(L) 57.7%; pH=6.41; (T) 98.9°F; 0.81 psi
02:51 Adding nutrients→Prop 3A
03:00 CIP Systems ON, tanks heating up
03:02 PSF→130%
03:03 t=24hr Prop 2A Sample Taken; 0.05 ACFM
(L) 20.7%; pH=6.56; (T) 99.2°F 0.40 psi
03:12 t=24hr Prop 2B Sample Taken; 0.05 ACFM
(L) 42.0%; pH=6.51; (T) 98.9°F; 0.25 psi
03:14 Prop 3A AG ON @ 50% (12.3% Level)
03:17 Prop 3A AG→95%
03:25 Just had the level of Prop 3A spike from 15.6% to 19.5%
03:26 Nutrients added→Prop 3A
03:28 Prop 3A→60%, trying to get better reading
03:30 pAP→85%
03:33 PER ISMAEL, finished filling Prop 3A.
pHAT→Prop 3B
03:38 LP→45%
03:39 About to Inoculate Prop 3A with Prop 2A
Pre: 19.2% pH=4.56; (T) 94.6°F; 0.02 psi
03:41 Inoculating Prop 3A now.
Prop 2A AG, TC, and pHC OFF
03:42 Prop 3A AG→95%
03:44 Finished Inoculation of Prop 3A.
Prop 3A pHC ON, set @ 6.40, BBP#7 set @ 30%
03:51 t=0hr Prop 3A Sample Taken; 0.5 ACFM
(L) 21.2%; pH=6.30; (T) 96.2°F; 0.05 psi
03:55 LP→35%
04:00 LP→30%
04:06 Prop 3B AG ON @ 50% and OFF
04:07 Prop 3B AG ON @ 50%
04:11 LP→40%
04:12 LP→50% and reversed. Adding nutrients→Prop 3B
04:13 Prop 3B AG→95%
04:17 Prop 3B @ Level, nutrients added→Prop 3B
04:20 pHAT→LT.

pHAT TC and pHC OFF
04:22 FBLBs→30%, pAP→75%
04:24 t=25hr Prop 2B Sample Taken; .05 ACFM
(L) 40.5%; pH=6.58; (T) 99.1°F; 0.25 psi
04:26 Now Inoculating Prop 3B with Prop 2B
Pre: 20.0%; pH=6.21; (T) 93.7°F ;0.05 psi
04:27 Prop 2B AG, pHC, and TC OFF
04:29 Prop 3B now Inoculated.
04:35 PSBLBs Amps spiked to 5.7 (!!!)
04:36 t=0hr Prop 3B Sample Taken; 0.5 ACFM
(L) 23.5%; pH=6.52; (T) 98.2°F; 0.00 psi
04:44 WW Pump rinsed out
04:45 pAP→50%
05:12 LP→55%
05:17 LP→60%
05:25 FBLBs→45%
05:27 Flipping CIP Header to Rinse
05:38 Prop 3B pHC ON, set @ 6.45. BBP#8 @ 30%
05:39 LP→55%
05:42 Rince CIP through Prep Tank lines→Prop 2A/B
05:59 pAP→55%
06:05 Began Rinse CIP of Prop 2A lines and vents. Ferm A Pump ON
06:08 Ferm A Pump OFF
06:09 Ferm A Pump ON
06:10 pAP→61%
06:13 Began Rinse CIP of Prop 2A through sprayballs for 15 minutes
Rinse Pump→85%
06:14 FBLBs→40%
06:15 Prep Tank AG ON (filled with Rinse Water)
06:20 FBLBs→35%
06:23 LP→50%
06:28 Finished CIP of Prop 2A. Rinse Pump→55%
06:30 pAP OFF. Swapping inserts/tubing
06:31 Ferm A Pump OFF
06:34 FBLBs→30%
06:36 LP→40%
06:37 pAP ON @ 75%
06:44 pAP→60%
06:49 Rinse CIP of Prop 2B's lines and vent. Ferm A Pump ON
06:57 Ferm A Pump OFF
07:00 WW pH=10.71 Cound=979 µS/cm 82.9% Level
Sending out WW now. Flow~31 GPM
07:02 Ferm A Pump OFF
07:04 Began Rinse CIP of Prop 2B through sprayballs for 15 minutes
Rinse Pump→85%, Ferm A Pump ON
07:07 pAP→60%
07:19 pAP→50%
07:22 Began Prop 2B sprayball#2 now

07:24 LP→45%
07:25 PSF→135%
07:26 Prep Tank AG OFF
07:29 Lab reported Prop 3A/B pH=6.13/6.10
pH set points increased to 6.60
07:30 pAP→455
07:32 FBLBs→40%
07:36 pAP→42%
07:37 Finished Rinse CIP of Prop 2B. Rinse Pump→55%
07:39 Ferm A Pump OFF
07:58 Ferm A Pump OFF
08:00 t=6hr Liq Tank Sample Taken
(L) 34.0%; pH=4.99; (T) 120.9°F; 0.62 psi
*Shift Change*
09:01 pAP SIC→42%
09:02 FBLBs→35%
09:14 Changed water addition to Liquefaction to 1.0 GPM
Dry weight was 17.5% @ 8:00 AM
09:32 t=6hr Prop 3A Sample Taken; 0.5 ACFM
(L) 20.5%; pH=6.54; (T) 98.7°F; 0.01 psi
09:41 Flushed the line from Liquefaction to pH Adj. Tank with UV Water. The line pressure was ~19 psi.
After flush, pressure went back up to 19 psi. Liquefaction Pump @ 70% speed
09:45 Changed pH setting for 3A back 6.35.
pH for fermentation needs to be measured right away after being sampled.
10:01 Changed speed of pH Adj. pump to 70%. Level in pH Adj. to 42%
10:06 3A sample [EtOH]=2.15 g/L
10:15 pAP→55%, LP→50%
10:28 t=6hr Prop 3B Sample Taken; 0.5 ACFM
(L) 24.0%; pH=6.54; (T) 97.8°F; 0.02 psi
Lab pH=6.41
10:30 pAP→65%, Level is 46.6%
10:33 Changed pH setting in 3B to 6.45
10:38 Start pretreatment shut down
10:41 Phosphoric Acid Pump OFF
10:42 Cablevays OFF
10:44 Water and Enzyme OFF for Liquefaction
10:45 Started cool-down of Liquefaction.
Temp set to 77°F.
11:03 3B sample [EtOH]=1.87 g/L
pAP→75%
11:37 Turned ON PSF and PSBTC. Pressure in system is 49 psi.
11:44 Cleared Level Sensor of pH Adjustment Tank and level looks good. Level=32%
Slow down pH Adj Pump to 65% and then to 60%
12:12 Changed speed of pH Adj Pump to 50%, Level 25%
13:24 PHP SIC→55%
13:29 LP SIC→45%
14:03 Continue CIP of 2B and 2A
14:34 Liq Pump→55%

15:00 t=13hr Liq Tank Sample Taken (one-hour late)
(L) 44.9%; pH=5.03; (T) 93.1°F; 1.61 psi
15:33 t=12hr Prop 3A Sample Taken; 0.5 ACFM
(L) 20.6%; pH=6.29; (T) 98.0°F; 0.04 psi
Lab pH=6.27
15:40 Changed pH set point for 3A to 6.38
16:00 Sample 3A [EtOH]=5.38 g/L
16:02 Adding slurry to 3A to fill to 250 gallons (~24.1% Level)
Pre-addition Level=20.3%
16:08 Put slurry in loop back to Liquefaction Tank.
Level in 3A=24.2%
16:13 Post-Addition Prop 3A Sample Taken
(L) 24.5%; pH=6.29; (T) 97.4°F 0.5 ACFM
16:20 Started re-heating Caustic and Rinse Tanks
16:33 t=12hr Prop 3B Sample Taken; 0.5 ACFM
(L) 23.9%; pH=6.40; (T) 98.3°F; 0.02 psi
Lab pH=6.29
17:01 Sample 3B EtOH=2.75 g/L
17:55 Phosphoric Acid Agitator shut down
18:30 Start adding slurry to 3A
Goal is to add 30 gallons to get 26.9% Level. At start, Level was 24.4%
18:31 Changed speed of BBP#7→35%
18:36 Stopped Adding Slurry to 3A
(L) 26.9% pH=6.27 (T) 97.9°F
18:43 Post-Addition Prop 3A Sample Taken
(L) 26.9%; pH=6.30; (T) 98.4°F; 0.5 ACFM
18:54 PAP SIC→60→50%
19:06 LP SIC→50%
19:52 PAP SIC→50%
*Shift Change*
19:58 t=18hr Liq Tank Sample Taken
(L) 41.2%; pH=5.03; (T) 87.6°F; 1.41 psi
20:25 pAP→50%
Bottom drain line for Prop 3A is not clean.
Leo was trying to air the line out when "a bunch of nasty shit came out."
20:37 pAP→52%
21:24 pAP→45%
21:37 t=18hr Prop 3A Sample Taken
(L) 26.8%; pH=6.32; (T) 98.2°F; 0.02 psi
21:38 pAP OFF, pHAT pHC ON
21:43 LP→40%
21:47 pAP ON @ 50%; pHAT→Prop 3A
Prop 3A Target=310 gallons=29.6%
21:57 Transfer to Prop 3A complete. pAP OFF
pHAT pHC OFF
21:58 pAP ON @ 50%, pHAT→LT
22:02 Nutrients added→Prop 3A
22:05 Post-Addition Prop 3A Sample Taken

(L) 29.5%; pH=6.32; (T) 98.3°F; 0.04 psi
22:17 pAP→45%
22:30 t=18hr Prop 3B Sample Taken; 0.5 ACFM
(L) 24.9%; pH=6.39; (T) 98.0°F; 0.01 psi
[Ethol]=3.71 g/L
22:43 LP→45%
22:51 LP→50%, pAP→40%
23:00 Prop 3B Lab pH=6.2, 3B SP→6.5
23:01 pAP→45%

**2015-06-25**
00:22 pAP OFF, pHAT pHC ON
00:28 pAP ON @ 50%, pHAT→Prop 3A
Targets= 340 gallons = 32.3% Level
00:31 pAP→60%, LP→45%
00:32 Nutrients added→Prop 3A
00:35 There might be problems with pH sensor in pHAT
00:38 Add→Prop 3A done.
pHAT→LT
pHAT pHC OFF.
pAP→50%
00:40 t=21hr (Post-Addition) Prop 3A Sample Taken
(L) 32.2%; pH=6.32; (T) 98.3°F; 0.04 psi
00:56 pAP→45%
01:07 pAP→40%
01:33 LP→50%
02:07 pAP→45%
02:08 t=24hr Liq Tank Sample Taken
(L) 37.3%; pH=5.23; (T) 83.6°F; 1.66 psi
03:05 pAP→48%
03:15 pAP→55%, LP→45%
03:24 pAP→50%
03:36 t=24hr Prop 3A Sample Taken
(L) 32.3%; pH=6.32; (T) 98.7°F; 0.04 psi
[Ethol]=10.7 g/L
pAP→45%
03:37 pAP OFF. pHAT pHC ON
03:40 LP→35%
03:42 pHAT is apparently over 50% full when level @ 36%
03:48 pAP ON @ 45%.
pHAT→Prop 3A
Target=370 gallons = 35.1% Level
03:53 LP→30%, pAP→50%
03:56 pHAT→LT.
Finished adding→Prop 3A
03:58 Post-Addition Prop 3A Sample Taken
(L) 35.3%; pH=6.32; (T) 98.7°F; 0.04 psi
04:03 LP→40%

04:14 pAP→40%
04:26 LP→42.5%
04:28 t=24hr Prop 3B Sample Taken; 0.5 ACFM
(L) 24.9%; pH=6.44; (T) 98.6°F; 0.00 psi
If [Ethol]=>5.0 g/L, then fill to 300 gallons.
[Ethol]=5.35 g/L
04:47 pAP OFF. pHAT pHC ON
04:52 LP→50%
04:53 pAP ON @ 40%
pHAT→Prop 3B.
Target=300 gallons = 29.2%
05:04 pAP→45%
05:07 pAP→50%
05:12 Prop 3B at Level. pHAT pHC OFF
pHAT→LT
05:15 Post-Addition Prop 3B Sample Taken; 0.5 ACFM
(L) 29.6%; pH=6.49; (T) 98.2°F; 0.00 psi
05:38 pAP→45%
06:30 pAP OFF
06:32 LP→40%
06:35 LP→30%
06:38 pAP ON @ 45%
pHAT→Prop 3A
Target=400 gallons = 37.8% Level
06:44 Prop 3A filled.
pHAT→LT
pHC OFF
06:46 AAP#1&3 OFF, all nutrients added→Prop 3A
06:51 Prop 3A Level Sensor varying a good deal.
06:57 LP and pHAT TC OFF
07:02 pHAT AG and pAP OFF
07:09 WW Pump ON in Recirc @ 63.2% Level
07:40 WW pH=11.67; Cond=3.66 mS/cm; 71.1% Level
Sending out WW. Flow~29 and 30 GPM
*Shift Change*
09:00 Filling Rinse Tank to 90%
09:40 t=30hr 3A Sample Taken; 0.5 ACFM
(L) 36.8%; pH=6.35; (T) 98.7°F; 0.02 psi
10:07 3A pH (Lab) 6.34 and EtOH=13.13 g/L
10:36 t=30hr Prop 3B Sample Taken; .5 ACFM
(L) 29.9%; pH=6.53; (T) 98.8°F; 0.00 psi
10:54 Adjust pH setpoint for 3B to 6.35 (from 6.5)
15:30 t=36hr 3A Sample Taken; 0.5 ACFM
(L) 37.4%; pH=6.33; (T) 98.3°F; 0.02 psi
Lab pH=6.36
16:25 t=36hr 3B Sample Taken; 0.5 ACFM
(L) 29.0%; pH=6.30; (T) 98.2°F; 0.02 psi
Lab pH=6.15 (was late)

19:30 CIP complete on pHAT and LT
New PSF could not be installed due to thrust bearing having to be cut to remove old PSF
*Shift Change*
19:47 Prop 3B [Ethol]=13.29 g/L
20:21 WW Pump ON @ 79.6% Level
20:44 WW pH=11.8; Cond=6.74 mS/cm; 80.2% Level
21:36 t=42hr Prop 3A Sample Taken; 0.5 ACFM
(L) 36.4%; pH=6.35; (T) 98.7°F; 0.02 psi
[Ethol]=16.1 g/L
21:48 RevScr ON, going to Liquefaction Tank, rinsing out into the tank
21:50 ScPr ON
22:03 RevScr and ScPr OFF
22:18 Began UV Rinse CIP of Liq Tank through Sprayball#1 for 15 minutes
Rinse Pump→85%
22:34 t=42hr Prop 3B Sample Taken; 0.5 ACFM
(L) 29.4%; pH=6.29; (T) 98.6°F; -0.01 psi
[Ethol]=16.01 g/L
22:38 Began Rinse CIP of Liq Tank through Sprayball#1 for 15 minutes
22:52 Finished Rinse CIP of Liq Tank
23:19 Began UV Rinse of Liq Tank for 25 minutes through Sprayball#1

**2015-06-26**
00:09 Began UV Rinse through Liq Tank Sprayball#2 for 25 minutes
01:13 WW Pump OFF and rinsed
03:36 t=48hr Prop 3A Sample Taken; 0.5 ACFM
(L) 37.2%; pH=6.32; (T) 98.5°F; 0.02 psi
[Ethol]=17.23 g/L
04:37 t=48hr Prop 3B Sample Taken; 0.5 ACFM
(L) 29.4%; pH=6.32; (T) 98.6°F; -0.01 psi
[Ethol]=16.48 g/L
*Shift Change*
09:33 t=54hr Prop 3A Sample Taken; 0.5 ACFM
(L) 36.2%; pH=6.32; (T) 98.3°F; 0.01 psi
09:43 Prop 3A Lab pH=6.29
10:35 t=54hr Prop 3B Sample Taken; 0.5 ACFM
(L) 29.2%; pH=6.32; (T) 98.2°F; 0.01 psi
10:39 Prop 3B Lab pH=6.29
13:00 Prop 3B and 3A TC set to 140°F
14:00 Prop 3B and 3A pHC OFF
14:40 Power Outage.
15:03 Prop 3B @ 140°F
16:15 Prop 3A @ 140°F
18:03 Prop 3B hold timer done
18:10 Began Pumping Prop 3B→Beer Well, Ferm A Pump ON
19:15 Prop 3A hold timer done
19:25 Began Pumping Prop 3A→Beer Well, Ferm A Pump ON
New PSF not installed yet
Bleach Scrubber ended campaign at 26.2% Level.

Cannot recall a campaign where it has dropped so much so rapidly. Most of the drop happened after Metso was shut down. $CO_2$ Scrubber Pump was left on after Metso had been shut down. Might need to check on PSB Livebottoms. The current trend from this campaign was highly worrisome. New PSF might fix the issue, but the currents for PSBLBs need to be watched. Campaign highpoint= 5.8 Amps was reached several times. Previous highpoint~4.4 Amps.

Log Book Keys

Color Coding

| | |
|---|---|
| blue text | tank refill log (i.e., bleach, caustic acid) |
| green text | notes from field |
| purple text | problems |
| red text | sampling/inoculation-related information |
| yellow highlight | process notes, major issues |

Abbreviations

| | |
|---|---|
| AAP | Aqueous Ammonia Pump |
| AG | Agitator |
| BT | Blow Tank |
| BW | Beerwell |
| BWP | Beerwell Pump |
| C5 Discharger | Hydrolyzer Discharge Screw |
| CIP | Clean in Place |
| CV | CableVey-Cable conVeyors |
| DFP | Decanter Feed Pump |
| FBLBs | Feed Bin Live Bottoms |
| FBTC/FBCC | Feed Bin Transfer/Collection Conveyor |
| GP | Gluconase Pump |
| HPSWP | High Pressure Seal Water Pump |
| HSMC | High Shear Mixing Conveyor |
| LIQ | Liquefaction Tank |
| LP/LIQP | Liquefaction Tank Pump |
| PA | Phosphoric Acid |
| PAHT | Phosphoric Acid Holding Tank |
| PAMP | Phosphoric Acid Metering Pump |
| PAMT | Phosphoric Acid Mix Tank |
| pAP | pH Adjustment Tank Pump |
| PATP | Phosphoric Acid Tote Pump |
| pHA | pH Adjustment Tank |
| Prop | Propagator |
| PSBLBs | Pre-Steam Bin Live Bottoms |
| PSF | Plug Screw Feeder |
| RevSc | Reversing Screw |
| ScPr | Screw Press |
| SIP | Sterilize in Place |
| SV | Steam Valve |
| WW | Waste Water |