Log Book
Campaign 08

2015-01-26

07:59 Process Water ON
08:04 CIP Systems ON and heating tanks
08:06 WW Pump ON (Recirc)
08:26 Having issues WW Pump flow
75.8% Level, pH=8.0, Cond=894 µS/cm
08:30 Sending out WW
Installing spargers for Propagators 2A and 3A
09:43 Flushing CIP Header with Rinse CIP water
09:44 PAMT Concentration=2.5% at 4993 lbs
09:48 Rinsing out Prop 2B→3B Transfer Lines with Rinse CIP
09:50 Rinsing out Prop 2B→3B Transfer Lines with UV Water
10:02 35 lbs of 85% Phosphoric Acid needed for PAMT
Add Acid (Note Cond#1)
Mix in Tank for ~15 minutes
Flush Acid Lines (Note Cond#2)
Add Water until Cond#1 is reached. (Note Cond once more)
10:47 Prop 2B SV OPEN @ 25%
10:48 Prop 2B SV CLOSED
10:54 Began Prop 2B SIP Procedures
Prop 2B SV OPEN @ 10%
10:56 Prop 2B @ +5 psi, SV CLOSED. VacPump ON
@-10 psi, VacPump OFF. Prop 2B SV→Auto
11:14 Opening Prop 2B Transfer Lines to Steam
11:30 Reached 250°F in Prop 2B
Began 90-minutes wait timer
12:22 Rinse CIP of Prop 2A through Sprayballs for 15 minutes
Ferm B Pump ON
12:30 WW back into Recirc Loop. Trying to diagnose problems
12:31 WW Pump OFF
12:34 WW Pump ON
12:40 Finished Rinse CIP of Prop 2A
12:51 CIP Header into Prop 2A
Ferm B Pump ON
12:57 Caustic CIP of Prop 2A Transfer Lines
13:00 Finished Prop 2B SIP wait period
13:11 Began Caustic CIP of Prop 2A through sprayballs for 15 minutes
13:13 Prop 2B SV CLOSED
13:22 Base B Pump#4 ON @ 75% for 15 seconds
Then OFF
13:26 Finished Caustic CIP of Prop 2A
Prop 2A SV OPEN @ 25%
13:27 Prop 2A SV CLOSED
13:41 Ferm B Pump ON
13:45 Ferm B Pump OFF

14:01 Ferm B Pump ON
UV Rinse of Prop 2A's transfer lines
14:22 BBP#4 ON @ 75% for twenty seconds
14:39 Prop 2B Temp Control→"NORMAL" in Auto
14:43 Prop 2A SV OPEN @ 25%
14:44 Prop 2A SV CLOSED
14:51 Rinse CIP Pump ON
UV Rinse DONE on Prop 2A
14:53 WW Pump Override ON. Running to 5%
Ferm B Pump OFF
15:12 Began SIP Procedures on Prop 2A
Temp Control→Auto
15:14 Reached +5 psi in Prop 2A. SV CLOSED, VacPump ON
15:15 Reached -10 psi in Prop 2A. VacPump OFF. SV OPEN
15:21 WW Pump OFF. Level @ 5%
Pump locked out for work on it.
15:51 WW Pump cleaned out.
16:19 Reached 250°F in Prop 2A
Began 90-minutes wait timer
17:29 Initial PAMT Values
L=64.3%; Cond=18.5 mS/cm; W=4992 lbs
17:31 PATP ON @ 100%
17:33 PATP OFF
L=65.2%; Cond=20.9 mS/cm; W=5031 lbs
Slight over shot. Ran 4 pounds over
Had switch off pump with six pounds before target weight
Account for spindown by 10 pounds in future
Allowing 15 minutes of mixing
13:00 Finished Prop 2A SIP wait period
Prop 2A SV CLOSED
17:55 Prop 2A Temp Control→"NORMAL" in Auto
18:02 PATP ON @ 100%. Flushing lines with Process Water
Target is 5132 lbs
18:10 PATP OFF
L=67.0%; Cond=22.4 mS/cm; W=5131 lbs
18:11 Adding Process Water to drive PAMT Conductivity down
18:25 Finished Process Water addition to PAMT
L=78.2%
Cond=20.8 mS/cm
W=5719 lbs
18:40 C5 Pump ON @ 80%
19:37 Began adding Hydrolyzate to Prop 2B.
Target=10.6%
19:38 Flow confirmed into Prop 2B
19:41 C5 Pump→50→40%; Massive foaming in Prop 2B
Anti-foam addition too hot for addition right now
No level increase so far
Agitator in air according to Joe

C5 Level from 72.8→~70%
19:42 C5 Pump into Recirc. Loop
20:00 C5 Pump→80%
Shift Change
20:09 C5 addition to 2B is done, overshot for about 1%, OK'ed by Ismael
20:14 Adding UV water to 2B, agitation on
20:18 May had overshot UV, total level about 48%
20:22 Conditioning 2B to pH 8
20:29 Adding water to 2A, then Hydrolyzate, and AntiFoam
20:47 Base pump #5 off, pH 8.01
20:54 Done filling 2A, level ~30.4%
20:57 Base Pump #4 on to 2A
21:01 2A conditioned
Field Note: Base pump #4 works a lot faster than #5, check #5 before next campaign
21:03 Reversing screw on to liquefaction, level rising
21:15 Clening, rinsing deadlegs of liquefaction/slurry lines
22:05 Sprayball rinse of liquefaction
22:41 Refiling and reheating rinse tank
22:48 WW in recirculation (70 GPM)

2015-01-27
00:43 Starting rinse cycle of pHA
01:07 Starting rinse cycle of 3A
01:36 Starting rinse cycle of 3B
02:12 Caustic cycle of transfer slurry lines and enzyme addition system
03:07 Caustic cycle of liquefaction tank
03:24 Liquefaction tank steam inlet open 50% to pop the dead space
03:58 Caustic cycle of pHA, steam inlet open 50% and base addition lines open to pop the dead space
04:55 WW pH = 12.2, sending to Buckeye, level = 65.8
05:02 Caustic cycle of 3A
05:28 Caustic cycle of 3B
06:02 UV cycle of various lines
06:45 UV cycle of liquefaction tank
06:52 WW off (buckeye's request)
07:09 UV cycle of liquefaction tank and draining to floor, rinse tank full
07:40 UV cycle of 3A
Shift Change
08:05 Prop 3A SV→50%
08:06 Prop 3A SV CLOSED
08:15 WW Pump ON, assuming pH is still high
08:18 Sending out WW @ 59.0%
Flow~35.6 GPM
08:20 Ferm C Pump OFF; 3A UV Rinse done
08:26 Ferm C Pump ON; doing Prop 3B Uv Rinse apparently
08:42 CV#2 ON
Metal Detector locked OPEN
08:43 CV#1 and FBCC ON (Emptying Feed Bin)
08:44 FBLB ON @ 50%

08:48 FBLB OFF
08:59 FBLB ON @ 50%
09:05 Finished UV Rinse of Prop 3B. Ferm C Pump OFF
09:15 PAMT Readings below; draining Acid Tote Pump line
L=77.9%
Cond=20.9 mS/cm
W=5717 lbs
09:31 Adding Nutrients to Prop 2B
Done @ 9:36
09:37 FBLB OFF
09:38 PATP ON @ 10%
09:39 PATP→50%
09:40 PATP OFF.
Weight Sensor varying a good bit.
L=78.3%; Cond=22.2 mS/cm; W=5739 to 5749 lbs
Turns out the weight variation was due to strong wind blowing over the sensor
Letting sit for 15 minutes
FBLB ON @ 100%. Running Milled Sorghum through Biomass Handling
Still dumping at Metal Detector. Verified using PSB Camera
Feeding good according to Kevin
09:56 PATP ON @ 25%. W=5742 lbs
09:57 PATP OFF
L=78.4%
Cond=22.4 mS/cm
W=5744 lbs
09:58 PATP ON @ 25%. Rinsing line with Process Water
Target W=5794
Sorghum feeding constantly and good according to Joe
10:03 PATP→50%
10:06 PATP PFF
L=79.2%
Cond= 23.9 mS/cm
W=5793 lbs
10:07 Inoculating Prop 2B
(L) 41.3%; pH=6.88; (T) 97.8°F; (P) 1.53 psi
10:09 Adding Process Water to PAMT to lower Conductivity of the tank
Target Cond=22.4 mS/cm
10:14 Liq Tank SV OPEN @ 20%
10:15 t=0hr Prop 2B Sample Taken; 0.05 ACFM
(L) 46.5%; pH=6.84; (T) 99.8°F; (P) 1.51 psi
10:19 Began Liq Tank SIP Procedures
FBLBs OFF
10:21 BmH Systems OFF
10:23 Finished adding Process Water to PAMT
L=89.8%
Cond= 22.6 mS/cm
W=6357 lbs
10:26 Liq Tank SV CLOSED. Tank @ +5 psi

10:28 VacPump ON. PAMT Cond= 22.4 mS/cm
10:36 Liq Tank @ -10 psi. VacPump OFF. Liq Tank TC→Auto
Still leaking steam out of Liq Tank Agitator motor packing.
11:22 WW Pump OFF. Tank Valve CLOSED. Pump rinsed
12:02 Reached 250°F in Liq Tank
Began 90-minutes wait timer
12:30 Going to try SIPing pH Adj Tank with Liq Tank steam if possible.
If nothing else, it saves a few steps by purging out normal air with steam for pH Adj Tank.
13:46 Liq Tank SIP done. Liq Tank SV CLOSED. Will cool normally.
13:53 Starting steam to pH Adj. Tank.
Air purged out using Liq Tank steam out through transfer lines open to atmosphere.
14:09 Adding Nutrients to Prop 2A.
14:28 Reached 250°F in pH Adj Tank
Began 90-minutes wait timer
14:33 CIP Systems OFF
14:34 Inoculating Prop 2A
(L) 30.5%; pH=6.86; (T) 99.7°F; (P) 1.51 psi
14:43 t=0hr Prop 2A Sample Taken
(L) 32.0 %; pH=6.82; (T) 97.5°F; (P) 1.62 psi
14:58 CO_2 Scrubber Fan and Bleach Scrubber Pump ON
15:01 Began UV Addition to Liq Tank
Target Unknown as of now
Doing to help cool tank
Will start Cooling Water to Liq Tank @ 160°F
15:38 Ball-valve for Acid Tote connection broken.
Make sure to check if it's fixed before trying to use PATP
15:44 Liq Tank TC→"NORMAL" in Auto
15:59 Finished pH Adj Tank SIP wait period
16:02 pH Adj Tank SV CLOSED
16:11 PAMT Concentration=3.04% FINALLY.
16:17 Initial Liq Tank UV Target~22.0% (whenever pH probe is reading right)
16:25 Began SIP Procedures on Prop 3B.
Prop 3B SV OPEN @ +5%, then →Auto
Skipping VacPump stage
16:39 Began SIP Procedures on Prop 3A
Same deal as Prop 3B
Liq Tank TC set @ 130°F to get Hot Water flowing sooner
16:44 Reached 250°F in Prop 2B
Began 90-minutes wait timer
16:54 Liq Tank Level Sensor going nuts again. Will add UV until it calms down.
17:00 3A Pressure @ 10.5 psi when 220°F (should be around 3 psi ideally)
Will try bleeding some air out.
NOTE-Sampling 2-Propagators every EIGHT hours.
17:16 Reached 250°F in Prop 3A. Started 90-minute SIP timer.
17:18 Paused UV add to Liq Tank. Liq Tank AG ON.
Level showing ~20.5% immediately after AG switched ON.
17:20 Liq Tank AG OFF
Joe says it sounded rough

Level immediately surged to 26.7% again.
Joe reported both impellers were exposed to air

17:22 Resumed UV Add to Liq Tank
17:30 HP Seal Water Pump ON
17:34 RevScr to BTAG ON
17:37 C5 Discharger to High-Shear Mixing ON
17:39 PAHT AG ON, Steam to Metso ON
17:44 CO_2 Scrubber Pump ON
17:46 Liq Tank AG ON @ 25% speed
17:50 T-pipe Vent CLOSED @ T_U = 214°F
17:54 CV#2 ON
17:55 CV#1 & FBCC ON
17:58 PSB Steam ON→CAS
18:00 ALL Metso Vents CLOSED
18:02 Liq Tank AG→100%
18:04 Stopping UV Water Add to Liq Tank. Level between 26.7 and 27.0%
18:08 Turned on steam to Prop 2B Sample Port
18:11 PSF ON @ 100% (58 psi)
18:12 PSB TC ON
18:15 PSB TC OFF
18:22 PSB TC ON @ 103 psi
18:23 T=8hr Prop 2B Sample Taken
L=47.6%; pH=6.64; (T) 97.7°F; (P) 0.12 psi
18:25 PSBLB ON @ 50%, PAMP #1 ON @ 10%
Feeding Metso @ 111 psi
18:27 FBLB ON @ 50%; PAMP #1→25%
18:28 PAMP #1→20→15%
18:34 Finished SIP on Prop 3B. SV CLOSED
18:39 Biomass coming out of RevScr chute now
18:40 PSBLBs→60%, Acid→4.00 GPH
I think I need to reduce steam to PSB so I can see better with the camera.
18:44 FBLBs→75%
18:49 PSBLBs→70%, Acid→4.67 GPH. Metso at Temp and Pressure
18:51 FBLBs→50→30%
18:55 FBLBs→50%
18:56 CLOSED Prop 3A SV
18:58 FBLBs→60→45%
19:02 FBLBs→25%
19:08 FBLBs→40%
19:09 PSBLBs→80%, Acid→5.33 GPH, PAMP#1→20.5%
19:10 FBLBs→55→70%
19:14 FBLBs→55%
19:17 Prop 3B TC→"NORMAL" in Auto
19:20 FBLBs→40→55%
19:25 Prop 3A TC→"NORMAL" in Auto
19:29 PSBLBs→90%, Acid→6.00 GPH, PAMP#1→23%
19:35 FBLBs→60%
19:39 FBLBs→55→45%

19:47 FBLBs→60
19:49 PSBLBs→100%, Acid→6.67 GPH, PAMP#1→25%
19:51 FBLBs→75→63%
Shift Change
20:30 WW in recirculation
20:46 METSO down, started to run rough before shift change.
Had to back PSBLB to 60%, PSF to 130%, vibrator to 40 PSI.
Couldn't clear out the chute. Plan to clear out and try again
21:09 Opening vents to drop pressure
21:06 PHA tank hot water valve alarm disabled
21:09 Clearing chute, PSB transfer is clogged bad.
21:17 WW pH-9.75
21:22 WW going out
21:50 PSB transfer conveyor and chute cleared
21:59 Gates cycling again, steam to METSO on, biomass handling on
22:04 Rinse water to 3A (bottom has brown residue on)
22:37 Feeding METSO @ 105 PSI, 60% PSBLB, 100% PSF
22:40 Dampener found @ 65 PSI, backing to 55 PSI
22:44 2A sample taken, 8hrs sample
(L) 30.1%; pH=6.44; (T) 99.8°F; (P) 0.1psi
22:47 PSBLB to 70%, FBLB to 80%
22:54 PSF to 105%
22:59 PSBLB to 80%, PSF to 110%
23:02 METSO @ temp/pressure
23:03 PSF to 112% then 115%
23:10 PSF to 117% then 120%, trying to keep PSF amps in the 9s
23:15 30mins SIP of 3A, PSF to 125%
23:20 Steam into 3A
23:26 PSBLB to 90%
23:33 Vacuum pump off to 3A, steam back on
23:37 FBLB to 70% (can't see any more in the camera)
23:47 PSBLB to 100%, PSF to 130%
23:52 PSF to 125%, PSBLB to 90%, spikes starting

2015-01-28
00:07 3A reached 250 F, sterilizing transfer lines
00:27 pH control in auto for 2A, Setpoint =6.35, pump @ 18%)
00:48 Fought METSO for 45 minutes, got down to 50% PSBLBs, many changes. PSBLBs is operating at 60% now, hoping to get to 90%. Will leave it at 90% if all possible.
00:55 PSBLB to 70%, PSF to 100%
00:56 Steam off to 3A
00:56 PSBLB has been sitting @ 90%, FBLB off on interlock for about 20 mins
Can't see anything with camera
01:08 See above, level plummeting
01:08 3A in cool down
01:28 Too much noise from PSB, down again
01:41 Biomass handling off
01:58 Depressurized cleared PSB transfer conveyor and the chute,

02:17 Cycle gates again, steam on to METSO
02:30 2B sampled, 16hr
(L) 45.9%; pH=6.33; (T) 98.97°F; (P) 0.18 psi
02:30 2B in auto pH mode now, Big spike to start, put pump to 10% (normally 20%)
02:40 Dampener not sealing, got to 70 PSI, and leaked steam, depressurizing to reset
02:46 Dampener was not set right
02:29 Looks ok now, cycling again and adding steam
03:12 Feeding (again), PSBLB to 60%, PSF to 100%
03:22 Two alarms straight on upper knife gate, but cycling
03:24 PSBLB to 70%, now alarm on bottom one, still cycled
03:33 PSBLB to 80%
03:44 PSF to 100%
03:53 PSF to 105%
03:57 PSBLB to 90%, PSF to 110%
04:01 Walked PSF to 130%, trying to keep amps in 9s
04:09 PSF to 135%
04:36 METSO at temperature and pressure, PSBLB at 90% for 1 hr
FB-60%, PSF-135F, CV 1&2 -100%, Hydrolyzer Discharge – 1.6 RPM @ 170 PSI
PSB – 82% level, 180F, PSBLB – 90%/3.6 RPM, ScPr – 9 RPM, Acid pump #1 24.5%
04:46 WW done; pup isolated & flushed
04:52 Acid holding tank @ 6.5%, transferring from acid mix tank
05:30 1 hr flowrate test, PSBLB to 90%, PSF to 135%,
Hydrolyzer - 170 PSI / 375F=190C, Acid – 6 GPH
06:09 Sanitizing enzyme lines (beta Glucanase pump)
06:13 2B pH control back in manual, stuck at around 6.39
06:30 2A sample 16 hrs
(L) 30.0%; pH=6.30; (T) 99.9°F; (P) 0.14psi
06:31 Just reported that the Chute is cracked
06:33 Stopped phosphoric acid transfer from mixing to holding tank, Hold tank level = 79%
Liquefaction target
Start with UV 406 gallons = 21.5%
1 GPM UV addition when adding biomass
Enzyme addition = 0.018 GPM = 20% pump speed
Final target 1136 gallons = 52.39%
07:34 We can't start, have to drain Liquefaction tank down
07:50 Feeding from Metso to Liquefaction, pH control in auto, enzyme addition started
Shift Change
08:21 WW Pump ON in Recirc Loop @ 53.0%
08:24 Going to sample Prop 2B to figure out what to do with it.
08:29 FBLBs→90%, Level dropping and Temp rising.
08:35 T=22hr Prop 2B Sample Taken
(L) 43.0%; pH=6.38; (T) 99.2°F; 0.15 psi
T=18hr Prop 2A Sample Taken
(L) 30.0%; pH=6.33; (T) 97.9°F; 0.04 psi
08:40 FBLBs→75%
09:01 FBLBs→50%
09:10 Prop 2A & 2B TCs set @ 86°F to slow down
09:12 FBLBs→70%

09:24 FBLBs→85%
09:26 FBLBs→120%
09:29 FBLBs→90%
09:33 WW pH=6.43; Cond=528 µS/cm; Level=67.3%
5 min addition of Caustic to WW Tank
09:37 PSBLBs→80→70→50%, Acid→4.67 GPH→3.33 GPH, PAMP #1→15%
09:41 PAMP #1→14%
09:42 PSBLBs→35%, PSF→130%
09:43 PSF→120%; PAMP #1→10%
09:46 FBLBs→70%; Alternating PSB Vibrator pressure
09:47 FBLBs OFF (high level warnings)
09:49 PSBLBs→50%, PAMP #1→14→17%
09:52 AAP#1 OFF, Field Tote Valve CLOSED
09:53 AAP#1 ON in CAS, PAMP #1→15→13.5%
09:56 PSF→110%; PSBLBs→60%, FBLBs→40%
09:58 PAMP #1→15→16%
10:00 PSF→115%, FBLBs→60%
t=24hr Prop 2B Sample Taken
(L) 43.5%; pH=6.45; (T) 87.2°F; (P) 0.27 psi
10:02 PSF→120%
10:03 PSF→115%, WW pH=9.74 Cond=692 µS/cm
10:05 PSF→110→120%
10:06 PSF→110%
10:08 PAMP #1→16.2%
10:10 PSF→110%
10:12 PSBLBs→50%, Acid→3.33 GPH
10:16 FBLBs→40%
10:19 Stopped PSB Vibrator Alternations
10:22 PAMP #1→13.8%, PSF→105%
10:25 PSBLBs→70%, Resumed Alternating PSB Vibrator pressures again
10:26 PSF→110%, PAMP #1→17→18.5%
10:28 FBLBs→45%
10:32 Starting WW pick heater; sending out WW @ 81.0%
10:34 FBLBs→60→85%
10:35 PSBLBs→80%, Acid→5.33 GPH, PAMP→20%
10:37 FBLBs→110%
10:42 PAMP#1→21.5%, FBLBs→70%
10:44 PSF→120%
10:51 PSBLBs→70%, Acid→4.67 GPH, PAMP#1→19%
10:55 PSF→110%. Might work or help
10:56 PSBLBs→50→35%
10:57 FBLBs→60%
11:00 Stopped Feed to Liq Tank, UV and GP OFF
11:01 PSBLBs to PSF OFF
11:04 Opening Vents to Metso, FBLBs OFF
11:05 PAMP #1 OFF
11:14 PSF ON @ 100%
11:16 PSB Level Sensors covered

11:20 PSF OFF and ON
11:22 PSBTC ON
11:27 PSBTC and PSF OFF, T-pipe Vent CLOSED
11:28 Steam to Metso ON
11:38 ALL Metso Vents CLOSED
11:45 PSF and PSBTC ON (50 psi)
12:07 PSBLBs ON @ 50%, Acid @ 3.33 GPH, PAMP #1 ON @ 12% (96 psi)
Feeding Metso
Top knifegate leaking noticeably
12:08 FBLBs ON @ 60%
12:09 PAMP #1→15%
12:10 FBLBs→50%
12:13 FBLBs→25→40%
12:15 PSB Temp Setpoint @ 110°F
12:17 FBLBs→50%
12:21 PAMP #1→14.5%
12:24 Going to add 10 g/L for 3L solution to each propator.
12:25 PSBLBs→60%, Acid→4.00 GPH, PAMP #1→17%
12:31 FBLBs→80→95%
12:33 FBLBs→80%
12:37 Tightened Top knifegate packing
12:38 FBLBs→60%
12:42 Blowback Damper set @ 52 psi
12:46 FBLBs→80%
PSBLBs→70%, Acid→4.67 GPH, PAMP #1→19%
12:50 FBLBs→90%
12:52 FBLBs→80%
12:54 Metso at Temp and Pressure
12:56 Metso Settings:
Temp=190°C=375°F; Pressure=170 psi(A)
FBLBs @ 80% M; PSF @ 100% M
CV#1&2 @ 100% M; ScPr @ 9.0 RPMs (A)
PAMP #1 @ 19%, Acid Con= 22.1 mS/cm; Acid Flow @ 4.67 GPH
PSBLBs @ 80% M; PSB @ 82% Level (A) with CAMERA and 110°F (A)
12:59 FBLBs→90→80%
13:01 PSBLBs→80%, Acid→5.33 GPH, PAMP #1→21→20.5%
13:05 FBLBs→85%
13:10 Need to check valves on 3-Propagators C5 Lines to prevent Slurry getting into them.
13:19 FBLBs→70%
13:21 Liq Tank UV Flow set @ 0.5 GPM
Continuous flow will be adjusted based off of dry weight when Liq Tank is sampled.
13:25 FBLBs→55%
13:27 FBLBs→65%
13:31 FBLBs→75%
13:40 FBLBs→80→90%
13:43 FBLBs→100%
13:49 FBLBs→120%
13:54 Reversing Screw→"FORWARD" (Knifegate to Liq Tank OPEN

Feeding Liquefaction Tank now
GP ON @ 20%, UV ON @ 0.5 GPM
FBLBs→100%
13:57 FBLBs→80%
14:05 FBLBs→95%
14:10 FBLBs→70%
14:13 FBLBs→55%
14:15 FBLBs→70%
14:18 PAMP #1→21.5% (Flowrate bouncing a lot)
14:24 FBLBs→90%
14:26 FBLBs→70→80→70%
14:29 FBLBs→50%
14:32 FBLBs→60%
14:34 T=24hr Prop 2A Sample Taken
(L) 27.0%; pH=6.60; (T) 86.5°F; (P) 0.30 psi
14:35 FBLBs→50%
14:44 Liq Tank UV Water OFF (Miscalculation on Liq Tank)
14:45 T=28hr Prop 2A Sample Taken, 4L Xylose Solution added to Prop 2B
(L) 42.5%; pH=6.58; (T) 87.2°F; (P) 0.02 psi
14:48 FBLBs→60→75%
14:55 T=24.5hr Prop 2A Sample Taken, 4L Xylose Solution added to Prop 2A
(L) 27.0%; pH=6.60; (T) 86.5°F; (P) 0.30 psi
FBLBs→85%
14:58 FBLBs→65→80%
Need something to cover PSB Camera's lens to prevent condensation over it (and thus not be able to use it effectively)
15:23 Liq Tank Sample Taken (for dry-weight determination)
(L) 39.9%; pH=5.03; (T) 121.8°F; (P) 0.78 psi
15:27 GP set @ 18.7% (Re-did calculations again)
15:32 Began running PSB SV in Manual (so the camera won't get fogged over)
15:38 FBLBs→75%
15:43 PAMP #1→21.65%
15:50 T=3hr Metso Blowtank Sample Taken
15:55 PSB SV→55%
17:00 PSB SV→60%; FBLBs→70%
17:02 PSB SV→55%
17:03 FBLBs→75%
17:07 PSB SV→45%
17:10 FBLBs→80%
17:11 PSB SV→55%
17:13 PSB SV→50%
17:16 FBLBs→85%
17:19 FBLBs→95%
17:22 FBLBs→110%
Joe just did a brief boiler blowdown.
Metso dropped around 30 psi by 17:24
17:25 FBLBs→85%
17:26 PAMP #1→21%

17:30 FBLBs→78%
17:34 PSB SV→55%
17:40 WW Pump OFF
17:41 FBLBs→75%
17:51 FBLBs→72%
17:52 Metso Temp and Pressure recovered.
17:56 PSB SV→60→57%
17:58 pH Adj Tank pH probe set to "B"
18:12 FBLBs→65%
18:15 FBLBs→75%
18:19 t=32hr Prop 2B Sample Taken
(L) 41.4%; pH=6.36; (T) 87.2°F; (P) 0.02 psi
PSB SV→52%
18:21 PSB SV→57%
18:28 FBLBs→77%
18:33 PSB SV→50%
18:36 FBLBs→80%
18:41 FBLBs→85→90%
18:46 PSB SV→46%
18:52 FBLBs→95%
18:59 FBLBs→105%
19:02 Prop 2B AG tried to randomly shut down while Joe was working on getting Prop 3B pH meter to work properly.
AG speed→95%
19:04 FBLBs→80%
19:09 FBLBs→75%, PSB SV→50%
19:18 FBLBs→70%
19:20 FBLBs→60→40%
19:28 PSF→108%
19:30 FBLBs→75%
19:35 Steam ON to Liq Tank Sample Port
19:50 FBLBs→80→90%
20:01 Liq Tank Sample Taken
(L) 50.2%; pH=4.98; (T) 121.9°F; (P) 0.90 psi
Shift Change
20:07 WW in recirculation
20:20 FBLB to 95%
20:21 Water addition to Liq is 1.3 GPM now, trying to keep level between 50-55%, pump 52.5% (C)
20:45 Pumping Liq to pHA, with 1.3 GPM UV
pHA filling target is 40%
21:00 2B sample taken
(L) 42.1%; pH=6.37; (T) 99.1°F; (P) 0.17psi
21:06 2B to 3B transfer, 3B level ended up @ 1.9%
21:10 pH control and temperature off for 2B
21:10 Liq sample taken
(L) 52.5%; pH=5.02; (T) 121.4°F; (P) 1.14psi
21:29 WW sampled, pH = 6.3
Adding 2 minutes caustic

21:40 pHA transfer to 3B
(L) 43.4%; pH=6.61; (T) 99.4°F; (P) 1.43psi
21:50 Confirmed flow into 3B
22:10 Caustic and rinse systems on
22:29 WW sampled, pH = 10.93
22:30 3B agitator on (Bypassed)
22:33 WW going out at 35 GPM
22:35 2A sampled
(L) 28.02%; pH=6.37; (T) 86.1°F; (P) 0.18psi
23:07 3B sample taken
(L) 21.0%; pH=NA; (T) 98.6°; (P) 0.45psi
Adding nutrients every 200 gallons
200 gallons level indication for 3B = 22.6%
400 gallons level indication for 3B = 41.5%
600 gallons level indication for 3B = 60.4%
800 gallons level indication for 3B = 79.2%
200 gallons level indication for 3A = 19.6%
400 gallons level indication for 3A = 37.8%
600 gallons level indication for 3A = 56.0%
800 gallons level indication for 3A = 74.1%
23:20 pH control on for 3B
23:27 Spargers 3A/3B changed to 1.1 CFM
23:47 Flipping header with rinse water

2015-01-29

00:05 Rinsing C5 to 2B line
00:12 Rinse cycle of 2B
00:15 Steam valve to Metso @ 95%, Both gates leaking.
If can't hold, we'll shut down and push it forward
Dead spot on 3B level @39.9%
01:00 Caustic cycle of 2B
01:03 FBLB speed went to 0%, motor stayed on, PSB level wasn't high (I probably fat fingered it)
01:52 Lots of foam in 3B, that may be part of level issue
01:55 Antifoam into 3B
02:17 UV cycle of 2B
02:17 More antifoam into 3B
02:20 Lost 3B level all together (0%)
03:10 3B level back @ 85% (visually False)
03:25 Liquefaction sample taken
(L) 52.66%; pH=5.02; (T) 121.05°F; (P) 0.69psi
03:45 more anti foam to 3B, level went from 95% to 0%
03:48 Turned off pH control to 2A, creeping up
03:55 2A sample taken
(L) 27.9%; pH=6.4; (T) 86.9F; (P) 0.33psi
04:04 2A to 3A transfer 3A level about 1.5%
04:08 pHA transfer to 3A
04:19 Stopped metso feed to Liq, water /enzyme off
04:21 Steam/Feed off to Metso; liq pump in auto @ 2 GPM

04:23 Final nutrients in 3B, sample taken
(L) ?% ; pH=6.30; (T) 98.7F; (P) 0.63psi
04:28 Hangdling off
False reading in 2B, visually confirmed
04:51 Starting rinse cycle of 2A
05:18 conveyors/HP pump to blow tank off
05:20 Wash down metso
05:29 Lower conveyors, CO_2 scrubbers off
Small leak around 2A agitator seat
05:47 3A t=1 hr sample
(L) 22.16%; pH=6.32; (T) 98.7F; (P) 1.37psi
05:49 Manual valve found closed on base pump #7, rectified
Base pump #7 doesn't look like it comes on with auto pH control.
Don't know if it's graphics or not physically coming on. Will have to watch it rest of run
06:38 Base pump #7 does not come on in auto control but valve does open.
Seem to recall this issue from a long time ago. Running pH control manually.
06:42 cooling water supply temp controller starting to not working properly.
In manual mode, keeps managing valves
07:23 WW off, pump isolated and flushed
07:25 UV cycle of 2A
07:33 Reversed LIQ pump (1st time)
Shift Change
08:07 Finished UV Rinse of Prop 2A
08:10 Ferm A Pump OFF
08:29 Prop 3A pH Control now running properly in Auto
09:01 Prop 3A (600 gal) Nutrients Added
09:12 Filling and heating the Rinse Tank
09:30 Getting bad level reading on Liq Tank now
09:37 Liq Pump reversed
09:57 t=13hr Liq Tank Sample Taken
(L) 26.4%; pH=5.01; (T) 121.9°F; (P) 1.44 psi
Fairly certain we're not pumping from Liq Tank right now.
09:58 Liq Pump→80%
10:01 Got flow back into pH Adj Tank
10:13 t=12hr pH Adj Tank Sample
(L) 30.2%; pH=6.59; (T) 100.9°F; (P) 2.12 psi
10:18 LP→85→90%
10:25 t=6hr Prop 3A Sample Taken
(L) 72.8%; pH=6.31; (T) 98.8°F; (P) 0.48 psi
t=12hr Prop 3B Sample Taken
(L) Unknown%; pH=6.31(T) 98.5°F; (P) 0.50 psi
10:26 LP OFF. We're done pumping. Confirmed visually.
10:36 Finished pumping to Prop 3A from pH Adj
Pump and Agitator OFF for pH Adj
Draining remainder of pH Adj to the floor
10:37 Final nutrient addition to Prop 3A DONE
AAP#3 OFF
10:45 pH Adj Tank pH and Temp Controls OFF

11:15 Getting weird level readings from Prop 2B
11:55 Doing initial Rinse of Liq Tank through Sprayballs for 5 minutes.
Rinse Pump→55%
11:56 Liq Tank Temp Control OFF
12:12 Liq Tank Agitatior OFF
14:10 WW Pump ON @ 50.3%
14:30 Doing initial 4-minute Rinse of pH Adj.
14:45 Starting Rinse CIP of various pHAT and LT transfer lines
15:50 WW pH=9.07 Cond=2.54 mS/cm Level @ 69.0%
15:58 WW Pump OFF (looks clogged)
16:01 Refilling and Reheating Rinse Tank
WW Pump ON; Steam ON to Prop 3A/B Sample Ports
16:04 Heating WW Pick Heater, sending out @ 71.5% Level
Flow around 29.5 GPM
16:11 t=18hr Prop 3B Sample Taken
(L) Unknown%; pH=6.32; (T) 98.7°F; (P) 0.62 psi
16:13 t=12hr Prop 3A Sample Taken
(L) 75.9%; pH=6.31; (T) 98.8°F; (P) 0.43 psi
16:34 Opening up drain for Cooling Water Tank
Level @ 95%
17:30 Cooling Water Tank drain CLOSED; Level @ 40%
17:43 Putting WW back into Recirc Loop so Rinse Tank will heat up faster.
18:13 Heating up WW pick heater. Sending out WW (78%)
18:14 Began Rinse CIP of pH Adj Tank for 15 minutes
Rinse Pump→85%
18:30 Finished Rinse CIP of pH Adj Tank. Rinse Pump→55%
18:32 Began Rinse CIP of Liq Tank for 15 minutes
Rinse Pump→85%
18:47 Finished Rinse CIP of Liq Tank
Rinse Pump→55%
18:49 Doing 5-minute insurance Rinse of Liq Tank
Rinse Pump→85%
18:55 Finished insurance Rinse CIP of Liq Tank
Rinse→55%
19:15 Doing Caustic CIP of various Liq and pHAT transfer lines.
19:59 Began Caustic CIP of pHAT through sprayballs (15 minutes)
Shift Change
20:45 Caustic cycle of Liq/pha/lines
22:00 3B sample 24hr
(L) ?%; pH=6.31 (T) 98.8F; (P) 0.69psi
22:09 3A sample 18 hrs
(L) 75.9%; pH=6.30; (T) 98.9F; (P) 0.55psi
22:28 Caustic done, UV cycle now

2015-01-30
00:18 WW off
04:00 sample 3B still 0.2 g/L
(L) ?%; pH=6.30; (T) 98.6F; (P) 0.66psi

04:05 Sample 3A 1.6 g/L
(L) 75.4%; pH=6.31; (T) 98.5F; (P) 0.59psi
04:41 3B hasn't changed @ 30hrs, killing @ 140°F, base off
06:38 3B @ 140F
07:20 Bleach scrubber level LAH
Shift Change
08:03 CIP Systems ON and heating up
09:42 Prop 3B TC OFF (set in SIP mode)
10:00 t=30hr Prop 3A Sample Taken
(L) 74.0%; pH=6.30; (T) 98.8°F; (P) 1.33 psi
10:18 t=30hr Prop 3A [Ethol]=2.75 g/L
10:21 Began heating up Prop 3A to 140°F
10:32 Prop 3A pH control OFF
10:38 Prop 3B Kill-verification Sample Taken
(L) ?%; pH=5.78; (T) 142.9°F; (P) 0.88 psi
11:26 Hot Water Heater set @ 185°F
11:54 Rinse Tank @ Temperature
12:36 Ferm A drained
12:40 Prop 3A at 140°F. Began 3-hour kill wait timer
13:08 Rinse CIP of Ferm A through sprayballs for 15 minutes
Ferm A Pump ON, Rinse Pump→85%
13:27 Finished Rinse CIP of Ferm A. Rinse Pump→55%
13:29 Ferm A Pump OFF
13:31 Rinse Pump→85%. Ferm A Pump ON. Water out of Ferm A not quite clear yet
13:38 Ferm A Pump OFF
14:02 Began Rinse CIP of Beerwell. Rinse Pump→85%, BWP ON
14:10 BWP OFF, Rinse Pump→55%
14:31 WW Pump ON @ 50.8% Level
14:34 More Rinse CIP of Beerwell. Rinse Pump→85%
14:41 Pausing Rinse of Beerwell. Rinse Pump→55%
14:42 Refilling and reheating Rinse Tank
15:14 UV Rinse of Beerwell
15:47 WW pH=10.31 Cond=3.04 mS/cm @ 69.0% Level
15:49 Finished UV Rinse of Beerwell
15:52 Sending out WW to Buckeye. Level @ 71.2%
15:59 Prop 3A Kill-verification Sample Taken
(L) 75.9%; pH=6.14; (T) 143.0°F; (P) 1.22 psi
16:01 Prop 3A TC OFF, mode to SIP
16:02 Cooling and Hot Water Pumps OFF
CO_2 Scrubber Fan and Bleach Scrubber Pump OFF
17:10 CIP Systems OFF
17:17 Stopped pumping WW to Buckeye
17:18 WW Pump OFF
17:25 Process Water OFF
17:27 MCC Manual control causes Variable-Speed motors to run @ 50%
Good to know.
17:30 Steam and Potable Water Pump OFF
17:50 Turned ON; UV, Process, and Potable Pumps

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