Log Book
Campaign 04

2014-09-08

08:40 Began SIP Procedure on Prop 2B, Steam into jacket; 10 min Caustic dump to WW
09:14 Caustic CIP Ferm C Sprayballs
09:17 Reached 250°F in Prop 2B, holding for 1 hour
10:20 Steam OFF to Prop 2B
10:23 2B Temp Control ON
10:43 Caustic to pHA Vent
10:45 Caustic Cycle through first sprayball
11:00 Caustic Cycle through second sprayball
11:20 Target for 2B UV is 27.6%
11:22 UV Cycle Started, going to floor, Rinse Tank @75%
11:57 UV in 2B, bouncing between 27.3%→27.8%, Agitator ON
12:05 C5 Agitator ON
12:10 C5 Pump ON
12:26 Combined a couple of ammonia totes
13:40 2B Final Target Level is 43.2%
13:45 Pumping Hyd to 2B
13:58 No gain in level yet, may have a clog
14:20 2B level all over, hard to be exact
14:25 Done pumping to 2B~43.2% (Bouncing)
C5 Pump OFF, acting up
14:27 Raising pH to 8 using Metering Pump#5
15:06 2B pH=8, shut off Pump#5
15:20 Spargers ON to 2B (Affecting level)
Probably foaming
C5 Pump back ON
16:16 Running Beta Gluconase Pump to test flow rate @ 22%
16:20 C5 Pump back OFF, still not right
22%=1.283 GPH=0.0210 GPM
20%=1.084 GPH=0.0180 GPM
17:15 Shut down CIP/Rinse Pumps/Heat
Another 22%=1.261 GPH=0.0210 GPM

2014-09-09

08:00 Looks like 2B Agitator kicked around 6:15 AM this morning due to level fluctuation
08:36 Put Caustic to WW
Steam into 3B Jacket
08:47 WW→Buckeye 95.2%, pH 10.15, Cond 3.22 mS/cm (36.4 GPM)
08:48 Steam into Prop 3B
All transfer lines open, going to try to pull Vac. On them to enable steam into them
08:54 Vac Pump ON, Steam OFF
09:00 Vac Pump OFF, Steam ON
09:23 Reached 250°F in Prop 3B, holding for 1 hour
09:24 Opening nutrient addition lines to 3B
10:25 Steam OFF to 3B

10:30 Cooling water into 3B Jacket, Temp Control to Auto, filtered air ON
11:02 Calibrating pH probe for 3B, Probe "B"
11:13 Probe 'B' (lower) installed spargers @ ft^3/min
11:21 Putting UV into 3B, 25% for now
TARGETS FOR 3B: UV-25.9%, Final-37.2%
11:34 3B Agitator ON
11:50 3B @25.9% UV, rinsing C5 line→3B
Recirc C5
12:05 C5→3B. Started @ 50%, went to 80%
12:25 C5 done, bringing pH to 8 with Base Pump#8, flushing C5 line to pump
12:30 Pump#8 FAST, overshot to 8.3 in 5 min
12:36 Running WW as close to empty as possible
3B Level in a "Dead Spot", locked @ 37.6%, no wavering w/ agitation.
When filling went right from 37.1→37.6% and stayed.
12:45 Big jump in 3B to 42.7%, will have to watch
12:50 WW Pump OFF, 5% lost flow, going to flush it out
12:54 WW Pump valved out and pump flushed, bypass OFF
Spargers appear to be causing foaming in Props, antifoam going in @ inoculation.
14:04 Nutrients in 2B = 5g/L Final Concentration Glucose
Plan is to inoculate @ 15:00
C5 starting was 39.1%, 36.5% after 2B
28.2% after 3B
14:21 Antifoam to 3B through nutrient pump
15:00-Inoculating 2B (5%)
(L) 41.6%; pH=6.99; (P) 1.62 psi; (T) 97.8°F
Bleach Scrubber/ CO_2 Blower ON
16:00 With Antifoam in 3B level looks to be 2% lower than target. Per Ismael-leave as is for now
17:54 Rinsing Beta Gluconase Pump/lines.
5 liters UV, then 3 liters of 20% Alcohol, then 5 liters UV
18:15 Pump OFF
18:17 Steam in Jacket of Liq
18:24 Steam to Liq
18:38 Liq @ 5 psi, Vac Pump ON
18:47 Vac Pump OFF, Liq @ -10. Steam back ON
Pumped down scrubber-water on in manual?
18:58 Phantom Levels in Liq
19:50 250°F in LIQ
Shift Change
20:01 Need to remember to dump from Phosphoric Acid Mix Tank into Hold Tank soon
20:06 Manually adjusting steam valve for Liq tank by 2 3% every 3-5 minutes.
20:42 Sterilizing Liq Tank transfer lines and sample lines
15 minutes minimum
20:59 Having to reopen steam valves
21:05 Going to get Acid Samples
Mix Tank @ 52.0%; 20.6 mS/cm; 4335 lbs
Hold Tank @ 7.8%; 22.4 mS/cm
21:09 Finished Sterilizing transfer and sample lines for Liq Tank
21:29 Finished SIP for Liq Tank. Turned Temp Control→MAN@-5%

Natural Cooldown
21:56 Gluconase Pump ON @ 16%
22:22 Gluconase Pump→50%, checking for plugs
Paul hasn't seen any flow yet
22:36 2B pH Control ON and set @ 6.45 to check running of Pump #5
Current pH=6.45
22:41 Gluconase Pump→95%, still no flow indicated in control room
22:45 Gluconase Pump OFF
23:32 pH Adj SIP Temp Control→Auto
23:41 Turned on Cooling Water to VacPump
23:44 Paul and Peter had to use wrenches and work on steam trap for pH Adj Tank
23:46 pH Adj Steam OFF
Pressure dropping quickly even without VacPump
23:50 VacPump ON, running pH Adj to -10 psi
23:51 VacPump OFF, @ -10 psi
23:54 Cooling Water Supply to VacPump OFF
23:56 Steam to pH Adj Tank ON, Target 250°F
Was already up to -3.5 psi before steam on (maybe a leak?)

2014-09-10
00:15 Glueconase Pump @ 60% and then OFF
00:16 GP ON @ 85%
00:17 GP OFF & ON @ 85%
00:18 GP OFF again
00:20 Base B Pump#5 set @ 20%; pH Control set @ 6.35
Everything works fine for 2B pH Control
00:33 GP ON @ 16%
00:48 Having to manually open up steam into pH Adj.
Temp had flatlined and then dropped some
00:54 Reached 250°F in pH Adj. Began 1hr SIP wait
GP @ 18%Flow=0.0118 GPM=0.708 GPH
01:02 GP→18%
GP @ 18% Flow=0.0150 GPM=0.900 GPH
01:27 GP→42%
01:30 GP→24% (More useful number for pump speed chart)
Flowrate=0.0235=1.44 GPH
01:49 GP→26%
Flowrate= 0.0266 GPM=1.56 GPH
02:11 GP→36%
02:14 Steam to pH Adj OFF. Finished SIP Wait
02:37 GP OFF
03:00 T=12hr Sample Taken from Prop 2B
(L) 41.6%; pH=6.30; (P) 1.60 psi; (T) 98.4°F
03:37 T=12hr 1.24 Ethanol Concentration (Lab pH=6.27)
Probably slower than last campaign which is good.
04:02 AAP#1 ON @ 2% (doing more pump calibrations)
04:03 to 05:00 Did Pump Calibrations on Aqueous Ammonia Pump#1
05:48 to 06:44 Running Pump Calibrations on Base B Pump#3

07:10 Gluconase Pump ON @ 95% (Rinsing out with UV Water)
07:49 GP OFF
07:52 GP ON @ 95% (Final Rinsing of pump)
Shift Change
08:25 Gluconase Pump OFF
08:26 Filling PreSteam Bin
HP Seal Water Pump ON, ScPr/Reversing ON
08:30 Pretreatment ON, Bottoms (Bin) OFF
08:39 Only 6.8% in Hold Tank, need results on Mix Tank-Holding
08:57 CO_2 Scrubber ON
T-pipe CLOSED
09:20 Hydrolyzer Vents CLOSED
09:24 PSF and PSB LBs ON
09:36 Feeding Metso
09:51 Bin Bottoms ON
10:17 Metso @ Temp and Pressure
10:20 Steam to Jacket of Ferm C, moving schedule up due to lack of biomass
Metso Settings:
Feed Bin→80%(C); PSF→98%(M); CV #1 & 2→100%(M)
Hyd→150 psi (A); PSB→72% (A) @ 110°F; ScPr→5.0 RPM (A)
10:30 Steam to Ferm C
10:40 C @ +5psi, Vac Pump ON
10:55 Paused SIP, CO_2 Scrubber Level out of range and alarm on valve
Wasn't even pumping
11:00 CO_2 Scrubber Pump working, pumping down
11:25 Vac Pump back ON
11:52 Vac Pump OFF, Steam ON
12:20 Flowrate Test started
12:30 250°F in Ferm C, 1hr hold
2B pH holding at 6.3 with set point of 6.3 and Pump#5 @ 15%
12:40 Probe 'B' calibrated and in BOTTOM if Liq
12:47 Caustic to Sump, pH of WW is 5.08
12:50 Putting 20% UV in Liq until we know exact amount after Flowrate Test
CO_2 Level back to going all over like before
15:10 Moving from Mix Tank (47.4%) →Hold Tank (4.4%)
Was never told lab results
13:30 Steam OFF to Ferm C, SIP Complete
13:48 Of course Liq Level Sensor "locked up" when filling from bottom.
Went from 17→23% and stayed. Started filling from top and it came back ~18%
14:01 20% UV in Liq
14:08 Mix Tank Agitator OFF
LIQ TARGETS:
Level=22.5% to feed; Enzyme-0.021 GPM; Water Addition-0.5 GPM; Final Level=50%
14:22 Liq @ 22.5%, Temp only 102.6°F, waiting on Temp
14:33 WW pH-8.60 Cond-0.1 Tank-93%
14:36 Sending WW ~34-35 GPM to start
14:39 Acid Transfer Done. Hold @76%, Cond~21.6 mS/cm
15:00 Adding Nutrients to 3B

15:08 Strange Level Drop in 3B
15:12 Pressurizing 2B for inoculation
IF anyone took a 24hr on 2B:
(L) 43.7%; pH=6.30; (P) 1.97 psi; (T) 98.2°F
15:16 2B @ 14.21 psi
15:20 3B inoculated!
T-0hr sample
(L) 33.6%; pH=7.16; (P) 5.90 psi; (T) 98.1°F
15:31 Metso→Liq
Plan is to run Enzyme @22% even if we don't see flow.
15:49 Confirmed that Liq Level ***ALWAYS*** acts up.
15:50 Temp Control/pH Control OFF 2B, Temp in SIP
~~16:00 T=0 Metso Sample Taken~~
16:04 Enzyme valve was shut. Going to double flow for amount of time off (33min)
36% on Pump=0.042GPM
16:33 T=24 on 2B=5.3 g/L→NOT adding glucose at this time.
16:30 Cut Enzyme Flow back to 22%
17:00 CIP heated
17:33 Rinse Cycle of 2B (to Floor)
First C5 line back to pump
18:14 Pausing CIP of 2B for samples
18:20 Metso First Sample Taken (2hrs Late)
18:24 to 19:40 PSF Acting up suddenly and randomly
18:30 Caustic Cycle of 2B
18:55 pH Control to AUTO for 3B (it's 6.36) pump. Starting @ 45% speed
19:40 Too many Scrubber alarms to count
19:55 WW Flow dropping opened sample port for a bit and it helped.
SHIFT CHANGE
20:17 Need to keep an eye on WW flowrate
Ongoing headaches with CO_2 Scrubbers
20:24 CO_2 Scrubber Proc Water →MAN @20%
Doing for 5 minutes to see about draining down level somewhat
20:29 Continuing CO_2 Scrubber drain-down for 5 more minutes
20:33 Proc Water→ CO_2 Scrubber @ 26%
20:35 CO_2 Scrubber Proc Water→Auto. This might help.
Process Water Flowrate set @ 1.10 GPM
20:39 WW Flowrate just jumped from ~29 GPM to 31+ GPM
20:45 Caustic Concentration=2.857% @ 25.9% Level
21:02 Still having issues with CO_2 Scrubber level
21:06 Caustic Tank Level set @ 50%
Began adding Process Water (Auto)
Will then add 1,002 lbs of Caustic Soda
Then fill up rest of way to 70%
21:15 to 21:24 Brief hiccups with PSF
21:48 pH Adj Probes are B→Top; A→Bottom
21:50 Steam ON to Liq Tank Sample Port
WW flowrate~25.5 GPM
21:57 Liq Tank Level @ 50%, starting pH Adj Temp Control soon

22:00 Liq Pump ON @ 50% (4.5 GPM)
pH Adj Temp Control→"NORMAL" @ Auto
22:01 UV Water Flowrate to Liq Tank set @ 1.6 GPM
22:03 We have flow into pH Adj Tank
Need to control pump in MAN to keep level ~50%
22:06 Temp Control for Ferm C→"NORMAL" @ Auto
Current Temp is 140.6°F
22:09 T=0hr Liquefaction Sample Taken
(L) 49.7%; pH=5.00; (P) 0.31 psi; (T) 122.0°F; (UV) 1.6 GPM; Enzyme=0.023 GPM
22:14 pH Adj Agitator ON (Level~12%; Joe gave go-ahead)
22:15 AAP#3 ON→CAS; pH Adj pH Control ON→Auto
22:19 to 22:49 Trying to get even flow with Liq Pump, backflushing lots
22:58 T=0hr pH Adj Sample Taken
(L) 72.5%; pH=7.10; (P) 0.59 psi; (T)98.9°F
22:59 Liq Pump→45%; pH Adj Pump ON @ 85%
Level Sensor is one-inch above slurry @ 82% level
Sending to Ferm C!
23:05 to 23:57 Constant adjustment of Liq and pH Adj Pumps
23:24 BBP#8→55%
23:54 Steam ON to 3B Sample Port
Ismael wants Ethanol concentration sample.

2014-09-11
00:05 to 02:07 Working with pAP and LP pump speeds at least once every 15 minutes
00:26 WW Pump OFF; so much hate for CO_2 Scrubber this run
3B [Ethol]=1.3 g/L; T=9hr 3B sample
00:37 pH Adj Level Sensor is WAY OFF right now
Will have to do 15min checks and work off Liq Level and pump speed
00:52 Began adding Caustic Soda to Caustic Tank (1,002lbs)
Current level=51.5%
01:14 Caustic Addition Complete; 56.2% Level
01:23 Set Level Control for Caustic Tank @ 68% (Target=70%)
02:24 Clog in the line between pH Adj→Ferm C
Pressure>5 psi
03:00 T=12hr Sample Taken from Prop 3B
(L) 35.4%; pH=6.31; (P) 0.79 psi; (T) 98.2°F
03:04 to 04:06 Neverending Issues with Liq and pH Adj Pumps
03:12 Lots of foam in pH Adj. Level IS very high apparently.
03:20 Fermc Agitator Override ON. Agitator ON
Level=10.6%
03:25 Caustic Tank done. Level=69.3%
03:43 Steam to Liq Tank Sample Port ON
03:59 Liq Sample Port clogged again
Began adding Proc Water to Phos Acid Mix Tank
Target Weight=3,000lbs
04:01 T=6hr Liquefaction Sample Taken
(L) 50.0%; pH=4.99; (P) 0.59 psi; (T) 121.8°F; (UV) 1.6 GPM; Enzyme=0.023 GPM
04:06 Still doing backflushes of Liq and pH Adj Pumps every 15 minutes

04:22 Too much foaming in pH Adj to see anything.
04:26 BIG spike in pressure for line between Liq and pH Adj.
04:31 LP OFF. MAJOR Clog in Liq→pH Adj Line
pAP →35%
04:34 Attempting to flush out Liq→pH Adj Line with UV Water
04:36 Looks like clog got blown out successfully
Waiting for line to drain out then
04:40 Liq Agitator→60% (Level=51.5%)
04:42 LP ON @ 85%
04:43 Liq Agi→40%
04:44 LP OFF (line pressure>24 psi); Blasting UV Water into pH Adj
04:45 LP ON @ 85%
04:49 Liq Agitator→60%
04:50 6+ psi IN pH Adj Tank right now. Gotta clear out another clog or something
Joe might be adding antifoam to pH Adj Tank if this continues
04:51 Timer for backflushes now every TEN minutes
pH Adj Tank is practically full right now
04:56 Liq Agitator→100%; pH Adj Level "For sure going down" according to Joe
At completely full tank with covered top probe, that probe was still reading 5.01
Either no mixing going on, or probe is bad.
Don't think probe is bad.
05:06 Phosphoric Acid Mix Tank @ 3,000lbs
Process Water Valve closed; Level=28.2%
05:37 Acid Addition Pump ON @ 100%; Target Weight=3185lbs
05:52 Overshot Acid Addition by 90lbs from split attention
Post-addition weight=3275lbs; Cond=46.6 mS/cm; Level = 31.8%
Acid Addition Pump OFF
05:54 Acid Mix Tank Agitator ON
05:58 WW pH=5.42; Will need to dump Caustic into sump
06:01 Dumping Caustic into sump for 10 minutes
06:06 Will have to drain some of Acid Mix Tank to floor
06:08 T=18hr Blow Tank Metso Sample Taken
185°C; 6.67 Acid GPM; 150 psi
06:13 Caustic Drain Closed; New WW Sample in ten minutes
Apparently, one of the Hydrolyzate drains on Screw Press was left open
06:37 WW pH=10.94
06:39 WW Pump ON; Level=74.3%; Cond=1.42 mS/cm
Flow> 31 GPM
Getting some "non-major" spikes in Liq Level
Er, "minor" was the word I was trying to us. Really tired.
06:55 Liq Tank level went really weird for a minute before returning to normal.
06:57 PSB LBs spiked, shut down with no alarm!
PSF, PSB TC, and Metso Steam OFF
07:01 PSF→PSB LBs ON and Metso Steam ON
07:03 PSF @ 70%, Manually stepping up Metso SV
07:07 to 07:28 Constant Adjusting of PSF as getting feed going consistently
07:26 Acid Addition Pump ON @ 25%; Draining out the line
07:30 Acid Addition Pump OFF

07:33 Acid Addition Pump ON @ 75%; Flushing Addition Line with Proc Water
3275lbs; 31.7%; 43.9 mS/cm
07:36 Acid Addition Pump OFF
3298lbs; 32.3%; 45.7 mS/cm
07:37 Draining Acid Mix Tank. Target Weight=2535 lbs
07:48 Finished draining Acid Mix Tank
2531 lbs; 18.5%; 45.7 mS/cm
07:50 Began adding Process Water to Acid Mix Tank; Target Weight=6,005lbs
SHIFT CHANGE
08:30 Continuing Issues with CO_2 Scrubber and pHA levels
08:40 Trying Liq Pump in Auto/Cascade
09:09 Water OFF to Acid Mix Tank, 6004/5lbs; Cond=22.5
10:35 Nutrients Adding to Ferm C, slower~20%
10:48 Took early sample of 3B for possible early inoc.
(L) 35.7%; pH=6.30; (P)0.77 psi; (T) 98.4°F
11:00 Started Draining Cooling Water (~90%)
11:10 Transfer 3B→Ferm C
Start: (L) 21.2%; pH=6.72; (P) 2.73 psi; (T) 98.4°F
Finish: (L) 24.1%; pH=6.64; (P) 0.38 psi; (T) 98.7°F
Temp/pH Control OFF for 3B
11:22 Stopped Draining Cooling Water (~70%)
11:39 Nutrient Pump→50%
3B only 1.3 g/L. Out of sugar. Don't think got enough Hyd. In it (3B Level indicator unreliable).
May start going off of C5 Tank Level, more reliable
14:28 Rinse Cycle of 3B
15:09 Caustic Cycle of 3B
15:40 UV Cycle of 3B
Paused a@ 15:47 to do UV through nutrient lines
15:59 Flushing Nutrient lines to 3B
16:06 WW OFF, pump valved OFF and flushed clear
16:18 Flushing nutrient lines to Ferm C
16:30 T=18hr Liquefaction Sample Taken
(L) 49.8%; pH=4.99; (P) 9.3 psi; (T) 121.9°F
17:00 T=6hr Ferm C
(L) 33.3%; pH=6.35; (P) 0.55 psi; (T)98.5°F
Sample Port Clogged
17:27 pH in Auto for Ferm C, Pump #3, trying 70%
17:52 Put pH back in Manual. Stalled @ 6.4
Ferm is alive but "stalled." May be a looooooooooong fermentation
18:00 T=30hr Metso Sample
18:30 Tightening packing on bottom knifegate, steam/air blowing out.
19:26 pH back into Auto for Ferm C. pH=6.31
Pump#3 @ 70% with S.P. of 6.33
19:51 Pump#3 to 80%
SHIFT CHANGE
20:07 Ferm pH Control set@ 6.40
20:11 POWER LOST
20:12 Pot, Proc, and HP Seal Pumps ON

20:13 pH Adj Agitator ON; Liq and Ferm C Agits still ON
20:16 Screw Press→ Blow Tank Agi ON
20:18 Bleach Scrubber and CO_2 Fan ON
20:19 CO_2 Scrubber Pump and Steam to Metso ON
20:20 Feeding Metso again
20:21 CV#2 ON; LP→CAS; GluPump→22%; CV#1 ON
20:23 BioHandling ON
20:24 UV, Hot, Cooling Water ON
20:25 Base B#3 set @ 80%
20:27 Stepping up Metso SV and Feed Bin Livebottoms
20:30 LP→70%; Clogging in both lines
pAP tripped. Back ON→70%
20:35 AAP#1&3→CAS
20:39 C5 Agitator ON
20:40 Caustic Pump OFF
20:45 Manually bumped-up AAP#1&3
Base B Pump #3→95%; Ferm C pH set @ 6.45
20:50 Metso @ Temp and Pressure again
20:55 WW pH=6.85
Dumping Caustic into sump for 4 minutes
20:59 Caustic Dump done, rinsing dump area with UV Water
21:01 Ferm pH set @ 6.55 (current pH=6.23)
21:09 pAP OFF to check and possibly replace Loadshare element
21:11 pAP ON @ 65%
21:15 Starting 17-minute timer to check pH Adj Level in sight glass
21:15 to 22:30 Constantly monitoring and adjusting LP and pAP
21:19 Ferm C pH Control set @ 6.65 (Current=6.22)
21:24 WW pH=7.01; Cond=796 µS/cm
21:26 WW Pump ON; Level=71.7%
21:34 Running Base B#3 in MAN @ 95% for 5 min to boost Ferm C pH
Current pH=6.21
21:39 Doing 2nd run of base to Ferm C
Current=6.20
21:44 Doing 3rd 5min of Base to Ferm C; pH=6.20
21:49 Ferm C pH=6.19; Doing 4th 5min of base
21:54 Finished 4th run of base to Ferm C. Paul checking on Pump
21:55 Base Pump ON @ 95% for 2 minutes continuously
22:04 BBP#3 in MAN @ 95% continuous; Ferm C pH=6.18
22:07 pAP OFF; Loadshare element broken
22:10 pAP ON @ 50%
22:13 BBP#3 being worked on
22:20 BBP#2 and Override ON @ 90%
22:21 BBP#2 OFF
22:22 T=24hr Liq Tank Sample Taken
(L) 48.2%; pH=4.90; (P) 0.51 psi; (T) 121.9°F
22:22 BBP#2 ON @ 90% and connected to Ferm C while BBP#3 is down; Ferm C pH=6.17
22:33 BBP#2 and override OFF; Base Addition→Ferm C clogged
Ferm C pH=6.60

22:41 Did 10-second test of BBP#3. Still working on it
22:44 Steam ON to pH Adj and Ferm C Sample Ports
22:46 Ferm C pH Control→Auto set @ 6.50
22:47 to 22:53 Clogging between Liq Tank and pH Adj Tank
22:59 T=24hr pH Adj & T=12hr Ferm C Samples Taken
[pH]: (L) Unknown; pH=6.95; (P) 0.40 psi; (T)100.5°F
[Ferm C]: (L) 42.0%; pH=6.45; (P) 0.56 psi; (T) 98.7°
23:06 to 23:58 Wrestling with PSF and PSB TC amps
23:10 T=25hr Getting Pan-weight Liq Tank Sample
(L) 48.2%; pH=4.90; (P) 0.51 psi; (T) 121.9°F
23:20 Ferm C pH set @ 6.42; confirmed working
23:25 T=12hr [Ethol] of Ferm C=1.65 g/L

2014-09-12
00:08 to 01:19 Issues with PSF, constant adjusting and attention
01:11 Continual issues with pAP and Liq Pump needing backflushes
01:47 to 03:29 Ten-minute checks on pH Adjustment Tank and pump
Generally adjusting LP or pAP at least once every check
03:36 Bad clog between Ferm C and pH Adj Pump
Pressure in pH Adj confirmed that it was backing up into tank
03:45 to 04:02 Flurry of issues with Plug Screw and Transfer Conveyor loads
03:58 T=30hr Liquefaction Sample Taken
(L) 49.5%; pH=5.01; (P) 0.40 psi; (T) 121.8°F; (UV) 1.6 GPM
04:19 Liq Gluconase Pump→24% (1.26 GPH)
Checking for flow in HMI flow meter
04:20 GluPump→26% (1.3 GPH)
04:21 GP→30%; 5min timer started
04:27 Doing 30-second burst of GP@75% CONFIRMED FLOW READING
GP→25% CONFIRMED
Been having SO MUCH CLOGGING at pH Adj Pump
04:28 GP→24% CONFIRMED
GP→23% CONFIRMED
04:29 GP→22.75% CONFIRMED
04:31 GP→22.5% CONFIRMED
04:33 GP→22%; Ended flow experiment
05:01 T=18hr Fermentor C Sample Taken
(L) 51.4%; pH=6.34; (P) 0.73 psi; (T) 98.6°F;
05:05 Getting surges in Bleach Scrubber level now. It's auto-dumping to Sump
05:40 T=18hr [Ethol]=5.43 g/L for Ferm C Sample
05:50 Ferm C Spargers still set at 11 AFCM
05:50 to 06:10 More PSF Issues
05:59 to 07:39 Continual adjustments/issues with pAP and LP
06:26 T=42hr Metso Blow Tank Sample Taken
06:35 to 07:25 More issues with PSF cropping up. Lots of adjustments.
Still clearing alarms constantly for pH Adj Tank and CO_2 Scrubber Levels
06:42 Knifegates making some noises according to Peter "Build-up and gunk on there"
SHIFT CHANGE
08:25 to 09:46 PSF amps all over the place. Lots of work

09:21 Waste Water Pump found ON???? And pick heater, but no flow?
09:30 WW→6.09, adding Caustic
09:53 pHA not pumping, clogged to C?
09:58 pHA OFF, Valve @ C OFF, trying to clear line
10:06 Clog resolved, maybe
10:16 Bleach Scrubber Level took immediate dive to 14%, Refilling to 50%
10:20 T=36hr Liq Tank Sample Taken
(L) 51.4%; pH=5.00; (P) 6.36 psi; (T) 121.8°F;
10:35 to 11:54 Struggling with PSF amps
10:58 WW pH @ 10
11:08 WW finally going, 30 GPM only
11:20 T=24hr Fermentor C Sample Taken
(L) 60.8%; pH=6.34; (P) 1.10 psi; (T) 98.8°F
11:21 T=36hr pHA Sample Taken
(L) Unknown; pH=7.02; (P) 0.72 psi; (T) 100.4°F
12:40 Had Scrubber pump checked. Stream to sump VERY low
13:00 Tired of Scrubber Alarms. Shut off pump and stroked valve a few times. Stream MUCH better. Holding level, water @ 1.3 GPM, we'll see…
13:21 Didn't last, tried again, starts out OK and then pump struggles
13:51 Scrubber running normal discharge valve only @ 83%. Now if only pHA level would stop
14:31 to 15:35 Rough patch in Plug Screw Feeder
14:55 WW @ 27 GPM
16:00 T=42hr Liq Tank Sample Taken
(L) 49.7%; pH=4.97; (P) 0.44 psi; (T) 121.7°F;
17:05 T=30hr Fermentor C Sample Taken
(L) 68.7%; pH=6.29; (P) 1.05 psi; (T) 98.4°F;
17:25 Bottom Knifegate clogging, Boss said "Run it"
17:50 pH went nuts in Liq. Bounced all over. Took Agitation to 50% for a minute, put back to 100% and its stable. Pocket? Something on probe? Flowrate of biomass is Diff. now, since PSF is only 80%
18:00 Pretreatment Sample Taken
18:33 C5 Pump ON for Recirc
Lower Knifegate is clogged, have to watch pressure in system/steam valve to make sure it's not blowing by into Blow Tank
19:59 C5 Pump OFF
SHIFT CHANGE
20:20 Feed Bin Live Bottoms OFF
20:21 Discharge Valve to C6 Storage Dumpster NOT opening
Field working on tracing lines and checking the solenoid
20:27 C6 Discharge Valve OPEN. Duct taping magnet back on.
20:28 Reversing Screw in REVERSE
Gluconase Pump and UV Water to Liq Tank OFF
Ferm C Target Level=76.3%
20:31 PSBLB to PSF, Feed Bin Live Bottoms, and Metso Steam OFF
20:32 CV #1 & 2 OFF; Phosphoric Acid Metering Pump #2 OFF
20:34 to 21:01 Issues with pH Adj Pump
20:58 PSF ON @ 100%, PSB TC ON; PSF Override ON (to allow blowback releasing)
21:25 PSB TC, PSF, and High-Shear Mixing Conveyor OFF
C5 Hydrolyzer refusing to SHUT DOWN

21:29 Resetting C5 Hydrolyzer in MCC
21:30 C5 Hydrolyzer ON and OFF
21:31 C5 Hydrolyzer Discharger OFF
21:33 to 21:41 More Issues with ph Adj Pump. Might have been blown another insert
21:47 Bottom Dump Knifegate OPEN
21:50 CIP at Temp
21:51 Bottom Dump Knifegate OPEN
22:07 LP OFF; Doing Final pumping from pH Adj→Ferm C Now
22:11 WW Pump OFF
22:12 AAP#1 OFF
22:13 Doing CIP of Liq→pH Adj transfer lines
22:21 to 22:54 Trying to clear clogging in pH Adj Tank; Might have broken a Loadshare element.
22:21 pH Adj Agitator OFF
22:25 AAP#3 and CO_2 Scrub Pump OFF
22:39 pH Adj Agitator ON
22:50 pH Adj Agitator OFF
22:57 pAP ON @ 85%; Metso Shut Down
23:02 Steam ON to Ferm C Sample Port; pAP OFF
23:04 Ferm C Slurry Line Valve CLOSED
23:19 T=36hr Fermentor C Sample Taken
(L) 76.4%; pH=6.33; (P) 0.92 psi; (T) 98.4^{o}F;
23:31 HP Seal Water Pump OFF
23:36 Started 15min Rinse of pH Adj Sprayball #1
23:39 Liq Pump OFF due to 25 psi in line
23:40 LP ON @ 85%
23:52 Started 15min Rinse of pH Adj Sprayball #2

2014-09-13
00:08 Finished Rinse CIP of pH Adj Tank
00:31 Ferm A Pump ON
00:33 to 00:35 Caustic CIP of pH Adj transfer lines
00:37 LP OFF
00:40 LP ON @ 85% and OFF
00:41 LP ON @ 85%
00:42 LP OFF
00:43 LP ON and OFF
00:56 Temp Control OFF for pH Adj; Add UV Water to Liq Tank; Ferm A Pump OFF
00:58 LP ON @ 85%; Switched over to bottom drain pipe of Liq Tank
01:00 Decanter Feed Tank Agitator ON
01:02 to 01:17 to clear out clogs in Liquefaction Line
01:30 Liq Tank Temp Control OFF
01:44 Reason for poor pumping: LOTS of rocks in bottom of Liq Tank
01:57 Liq Tank clogged SO BAD THAT WE CANNOT EVEN DRAIN IT TO THE FLOOR.
02:10 WW pH=10.43
02:12 WW Pump ON; Level=43.0%
Starting early to hopefully avoid solids settling in the bottom of the WW tank
02:14 Ferm A Pump ON
02:15 Began Caustic CIP on pH Adj for 15 min; through Sprayball#1

02:19 Liq Tank Agitator OFF
02:21 Paused Caustic CIP on pH Adj
02:27 Resumed Caustic CIP on pH Adj
02:36 Finished Caustic CIP#1 on pH Adj
Began Caustic CIP#2 on pH Adj for 15 min
Finished Caustic CIP#2 on pH Adj
03:35 Ferm A Pump OFF
03:45 Began UV Rinse of pH Adj Tank (two sets of 15min)
03:46 Steam ON to Ferm C Sample Port
04:01 T=36hr [Ethol]=17 g/L
04:05 T=42hr Fermentor C Sample Taken
(L) 76.5%; pH=6.33; (P) 0.87 psi; (T) 98.4°F
04:42 Decanter Feed Pump ON @ 20% (~2.50 GPM)
04:44 DFP→CAS; Decanter Flow Control set @ 3.00 GPM
04:54 Finished CIP Cycle for pH Adj Tank
05:14 WW Flowrate less than 20 GPM (current=17.2 GPM)
05:20 Began Rinse CIP of Liq Tank for 15min.
05:23 WW Pump OFF, flowrate FAR too low (~15.2 GPM and going down)
05:25 Going to restart Rinse CIP for Liq Tank
Drain completely clogged. Rinse Pump→55%
05:27 Began Rinse CIP for Liq Tank for 15 min
Rinse Pump→85%
05:31 Rinse Pump→55%; Paused Rinse CIP
05:47 Losing flow going to Decanter; Flushing DFP again
DFP OFF then back ON
05:51 DFP-OFF
05:52 DFP ON @ 20% MAN→40%
05:53 DFP→60%→80%
05:55 DFP OFF
06:03 Resumed Rinse CIP for Liq Tank; Rinse Pump→65%
Overflowing Decanter (service door glued shut???)
06:05 Paused Rinse CIP again. Rinse Pump→55%
06:42 Resuming Rinse CIP for Liq Tank
06:51 Rinse CIP Paused
07:00 Resuming Rinse CIP for Liq Tank
07:06 Finished Rinse CIP for Liq Tank (Rinse Agitator OFF due to level)
07:16 Rinse Agitator back ON
07:17 Refilling Rinse Tank and getting it to Temp
Need to run through Liq Tank at least 5 minutes more at high pump speed.
WW flowrate snuck its way up to 30 GPM
07:45 Rinse Tank @ 36% level and 180°F
07:46 Doing one last Rinse CIP of Liq Tank
Rinse Pump→80%
07:52 Done with Rinse CIP for Liq Tank
SHIFT CHANGE
08:35 First 5min Caustic→Liq (Ferm A Pump ON)
08:48 Rinsing Beta G lines→Liq
09:19 Resumed 2nd 5min Caustic→Liq

09:46 Last 5min Caustic→Liq
10:42 Couldn't get pressure in pHA Tank, Found Rupture Disk→BW was blown.
Don't have another
10:55 UV Cycle #2, also getting transfer port on side of tank
11:00 T=48hr sample Taken from Ferm C
(L) 76.5%; pH=6.33; (P) 0.87 psi; (T) 98.6°F
11:47 Last UV Rinse (Problems pumping last one)
11:50 Decanter Feed Tank rinsed and decanted
12:53 Drained down Hot Water Tank
15:46 WW OFF (5%)
17:00 T=54hr sample Taken from Ferm C
(L) 76.5%; pH=6.33; (P) 0.91 psi; (T) 98.3°F
17:30 pH Control OFF Ferm C, Temp to 140°F
SHIFT CHANGE
20:38 CIP pumps and Agitators OFF

2014-09-14
00:01 Reached 140°F in Ferm C. Began 1hr wait
01:04 T=1hr Kill-sample Taken from Ferm C
(L) 76.6%; pH=5.69; (P) 1.48 psi; (T) 140.0°F
02:08 T=2hr Kill-sample Taken from Ferm C
(L) 76.5%; pH=5.67; (P) 1.40 psi; (T) 139.8°F
03:00 T=3hr Kill-sample Taken from Ferm C
(L) 76.6%; pH=5.65; (P) 1.37 psi; (T) 139.8°F
03:31 Ferm C Pump ON; Pumping from Ferm C to Beerwell
Beerwell~14%; Ferm C~76.5% initially
03:35 CO_2 Scrubber Fan and Bleach Scrubber OFF
03:47 CIP Pumps, Agitators, and Heat ON
04:12 Ferm C Temp Control OFF
04:13 Cooling and Hot Water Pumps and Chiller OFF
04:23 Cooling Water Pump ON to check for leaks
04:33 Cooling Water Pump OFF; Tommy found the leak
04:37 Ferm C Agitator OFF
04:50 Ferm C Pump OFF (Ferm C empty, Beerwell~68.7%)
05:11 Accidentally filled up (some of) Ferm with UV Water left in the CIP Header. Will take kill-sample from it anyway.
05:25 Initial Kill-step (from UV water) sample taken from Ferm C
05:39 Doing initial Rinse CIP kill-step with sampling. Rinse Pump→80%
05:40 Rinse Pump→55%, clogging in the lines; cleaning out with UV water
06:04 Began 15 min Rinse CIP of Ferm C; Rinse Pump→80%
06:10 CO_2 Scrubber Pump ON (level was 88!)
06:12 Paused Rinse CIP of Ferm C, Rinse Pump→55%
Waiting to drain it out
06:14 CO_2 Scrubber Pump OFF
06:16 Adding Process Water to Rinse Tank
06:29 Did 10-second burst of SIP steam valve @ 50% into Ferm C at Joe's request
06:30 Doing 3min burst of SIP SV @ 50% into Ferm C
06:32 Ferm C SIP SV CLOSED

SV OPEN @ 75% (20sec)→95%(5sec)→25%

06:33 Ferm C SIP SV→75%

06:34 3-minute timer for Joe on Ferm C steaming

06:37 One more minute of SIP SV @75%

06:38 Ferm C SIP SV CLOSED

06:45 Resuming Rinse CIP of Ferm C; RP→80%

06:51 Paused Rinse CIP of Ferm C; RP→55%

Refilling and reheating Rinse Tank

07:13 Rinse Tank @ Level and Temp again

Resumed Rinse CIP of Ferm C. RP→80%

07:22 Pausing Rinse CIP of Ferm C

Refilling and reheating Rinse Tank

Still looks really dirty coming out of Ferm C

07:42 Putting UV Water into Ferm C from CIP Header to keep flow going and prevent clogging

Last kill-step sample taken

SHIFT CHANGE

08:21 More Rinse to Ferm C

08:35 Turned OFF Acid Tank Agitators

09:10 Finally clear, doing 5min Rinse high-speed to floor

09:23 pH=6.83, close but tank only 70%

Adding Caustic to Sump

10:13 Flushing transfer lines from knuckle→pH, then knuckle→Ferm C

10:48 Rinsing Nutrient Lines→Ferm C

11:56 Had to dig out WW Pump again

pH=9.9 Good flow, 40 GPM

13:56 "Tuned" discharge valve for CO_2 Scrubber in field

14:06 Caustic Cycle of Ferm C

14:40 UV Cycle on Ferm C

14:50 CIP down

15:28 Ferm C spargers OFF

15:30 WW OFF, pump valved OFF-flushed

16:03 UV Pump/Lamps OFF

16:20 Steam OFF, Process OFF, Potable ON, Ismael to turn OFF

BW and C5 Agitators ON

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