Log Book
Campaign 06B

2014-11-14 Prep Day

07:37 Warming up steam pipes
07:41 UV, Hot, Cooling Water Pumps ON
07:53 Prop 2B SV OPEN @ 50%
07:55 Prop 2B SV CLOSED
08:43 Prop 2B SV OPEN; Began SIP Procedures
08:47 2B SV→25→Auto (requested by Joe to speed things up)
08:50 Prop 2B @ +5 psi; Vacuum Pump ON (Not normal sounds)
08:51 Prop 2B @ -10 psi; Vacuum Pump OFF; Prop 2B SV OPEN
08:52 Prop 2B @ 1.5 psi; steam traps opened
09:04 Yesterday, closing shift left BW drain CLOSED but left BWP running all night
Drain was supposed to be OPEN to keep solids from settling out
Agitator was OFF
09:09 CO_2 Scrubber Pump ON. Forgot to close Cooling Water valve to Vacuum Pump
09:12 CO_2 Scrubber Pump OFF.
Prop 2B @ 250.0°F. Began 2hr SIP Wait timer
09:16 Sterilizing Inoculation Port on Prop 2B
10:54 WW pH=8.17; Cond=5.04 mS/cm
11:00 WW Pump ON @ 81.4% Level
12:23 Troubles with WW flow (Level=54%)
12:26 Prop 2B SIP done.
SV CLOSED.
12:29 WW Flow~24 GPM
12:30 Prop 2B Temp Control→"Norma: in Auto
Began Cooling Prop 2B
12:33 Prop 2B TC→"SIP" in Manual @ -5%
12:34 Prop 2B Cooling resumed
14:26 WW Pump OFF. Pick Heater OFF
15:21 Cooling Water Pump OFF and ON
Prop 2B Temp @ 120°F
Briefly hit 96.4°F, then Hot Water switched and then temp flipped over set point with Cooling Water going on, but Temp had yet to go down after nearly an hour.
15:35 Instead of waiting another 30 minutes for sterilization of Antifoam, we will be adding UV Water first to save time.
16:13 pH Probe in Prop 2B
16:19 Water in Prop 2B flowmeter. Peter getting tools for it.
16:52 Air NOT flowing through Prop 2B's sparger
Method ONE: 17 gal UV Water (17.1%) +20 gal C5=43% Level total
Method TWO: 20 gal C5 (22%) +17 gal UV Water=43% Level total
17:52 C5 Pump ON @ 50% then 80% in loop.
18:01 Sending C5 to 2B @ 80% pump speed.
C5 Starting Level @ 14.85%
18:28 C5 Stop going into 2B
18:29 Started pumping UV Water in 2B
18:38 Hit level 43%

18:39 Level jumps from 41.2% to 43.1%
18:43 Started Base Pump #5 @ 15% into 2B
18:48 Prop 2B Agitator ON. Base B Pump #5 OFF
18:50 2B pH reads 3.84
18:55 Started Base Pump #5 @ 20%
19:06 UV Pump OFF
19:14 2B pH=7.44 Base B Pump #5 OFF
19:16 Base B Pump #5 ON
19:25 2B pH=8.03. Base B Pump #5 OFF
19:26 2B Level reads 45%
Potable Water OFF (Joe's request)

2014-11-15
07:55 Potable Water Pump ON
07:57 UV Water Pump ON
08:10 Re-installing Old Vibrator unit because New Vibrator unit too weak.
08:33 HP Seal Water Pump ON and OFF
08:35 HP Seal Water Pump
08:37 Reversing Screw to Blow Tank Agitator ON
08:39 C5 Discharger to High-Shear Mixing Conveyor and Metso Steam ON
08:40 PA Hold Tank Agitator and MP#2 ON
08:42 Scrubbers ON
08:52 CV#2 and 1 ON
08:53 FBCC ON
08:54 T-Pipe Vent CLOSED
08:55 PSB Steam ON (CAS); FBLBs ON @ 35%
09:25 FBLBs OFF
09:30 Metso Vents CLOSED
09:41 PSF and PSB TC ON
09:52 No steam leaking out of Knifegates according to Joe
09:57 PSB LBs ON @ 70%; Acid→4.67 GPH; Feeding Metso @ 69 psi
10:05 PSF→95%
10:11 ScPr→7.0 RPMs
10:23 FBLBs ON @ 65%
10:37 FBLBs→95%
10:40 Prop 3B SV Open @ 50%
10:42 FBLBs→120%; Prop 3B SV CLOSED
10:47 FBLBs→CAS
10:50 Prop 3B SV→25%→Auto. Began SIP Procedures on Prop 3B
10:52 Prop 3B@ +5 psi. VacPump ON
10:53 C5 Discharger Vent OPEN, cracked to equalize Temp in Metso
10:56 PSF→92%
10:58 Prop 3b @ -10 psi, VacPump OFF; Resumed Steam
10:59 PSF→88%
11:01 PSBLBs→80%; Acid→5.33 GPH
11:04 Metso @ Temp and Pressure
Temp=185^{o}C~365^{o}F; Press~150 psi(A)
FBLBs=100%(CAS); PSF=85%(MAN)

CV#1&2=100%(MAN); Acid~5.33 GPH (CAS)
Screw Press=5.0 RPMs; PSB LBs=80%(MAN)
PreSteamBin=75%(A) & 180°F (A)

11:08 PSF→84%
11:17 OPENED Both Ferm C Nutrient Lines
Only sterilizing Nutrient Line on TOP of Prop 3B
Doing with Prop 3B Steam
11:18 Reached 250.0°F in Prop 3B. Began 2-hour timer
11:19 Leaking steam around Prop 3B Level Sensor
11:23 PSBLB→90%; Acid→6.00 GPH
11:27 WW pH=4.48
11:38 PSF→88%
Squeeze rate on 11/12/14 was 11.4% in two hours
11:48 FBLBs→120%
11:53 PSBTC acting up suddenly.
11:54 PSBTC definitely making noticeable noise according to Paul
Vibrator→60 psi
PSBLBs→80%
11:55 PSF→98→110%
11:56 PSF→120%; PSBLBs→70%
"Sounds like rocks knocking around in PSBTC"
Belts are not shaking
Caustic Soda added to WW
12:03 Vibrator→80 psi
12:04 PSBLBs→60%, Acid→4.00 GPH
PSB Level not going up still.
12:07 PSF→110%
WW pH=6.34
12:16 WW Pump ON and OFF
12:19 PSBLBs→70%; Acid→4.67 GPH
WW Pump ON @ 87.2% Level; Flow~27.5 GPM
12:21 PSF→105%
12:29 PSBLBs→80%; Acid→5.33 GPH
12:43 PSBLBs→90%; Acid→6.00 GPH
12:48 PSF→107%
12:53 BFBLB→110%; PSB @ 64.2%
12:56 Screw Press→3 RPM. Start Squeeze
12:59 FBLB→65→45%; Drain to C5 Tank OPEN
13:01 PSBLBs→95%; Acid→6.33 GPH; FBLBs→25%
13:03 ScPr→2.7 RPMs
13:10 FBLBs→30%; ScPr→2.5 RPMs
13:15 FBLB→40%
13:19 ScPr→2.3 RPMs
13:20 PSF→115%; FBLBs→65%
13:22 FBLB→100%
13:24 FBLBs→120%
13:25 ScPr→2.0 RPMs
13:33 ~~On-watch.~~ NOPE. Spikes in PSB TC beginning.

PSB Vibrator @ 80 psi now as a result.
Coinciding with PSB Level DROP

13:34 PSF→120%
13:35 PSBLBs→80%; Acid→4.67 GPH
13:39 Got 2nd alarm of 10+ psi in Blow Tank.
13:45 Joe going up to "pulsate" PSB Vibrator to see if it helps
13:46 PSBLBs→70%; Acid→4.67 GPH; FBLBs→90%
BIG SPIKE in FBCC but it kept going and went back down.
13:48 PSF→110%
13:55 PSBLBs→80%; Acid→5.33 GPH; PSF→105%; FBLBs→60%
13:58 Ending SIP on Prop 3B
14:03 PSBLBs→90%; Acid→6.00 GPH
14:09 ScPr→1.8 RPMs
14:18 FBLBs→80%
14:23 ScPr→1.6 RPMs
14:27 FBLBs→120%
14:39 FBLBs→60%
14:42 FBLBs→30%
14:53 FBLBs→60%
15:02 FBLBs→90%
15:07 FBLBs→120%
15:15 Heating up CIP Rinse Tank
15:17 PSB Level @60% and dropping. Noting to see if there is correlation with troubles in PSB TC and PSF
15:39 PSB Level above 64% now, yet to have any spikes in PSBTC
15:42 FBLBs→80%
15:48 C5 Pump ON @ 90% (Current level=24%)
15:49 C5 Pump→50%
Need to turn on as soon as we start squeezing to run it through Heat Exchanger
15:52 FBLBs→50%
15:54 FBLBs→30%
15:59 FBLBs→20%
16:05 FBLBs→40→50%
16:11 FBLBs→90%
16:16 FBLBs→120%
16:25 FBLBs→80%
16:32 Prop 2B Inoculated and T=0hr Sample Taken
L) 43.9%; pH=6.76; (T)98.7°F; +0.96 psi
1.52 g/L [Ethol] in flask
16:35 FBLBs→30%
16:42 Prop 2B Vacuum Breaker OFF
16:48 FBLBs→70%; Running Rinse Water through hoses to clear out
16:53 FBLBs→120%
17:04 FBLBs→30%
17:23 Rinse Tank systems OFF
17:25 FBLB→80%
17:31 FBLBs→100%
17:35 FBLBs→120%; Bleach Scrubber Level Alarm still going off.

17:57 Prop 2B Manual Field Valve OPEN
17:58 FBLBs→70%
18:35 Reached 40% Level in C5 Tank
Starting Metso Blow Tank Sample
18:47 FBLBs→90%
18:59 Metso Blow Tank Sample Finished
19:00 PSBLBs→100%, Acid→6.67 GPH; FBLBs→120%
19:41 FBLBs→110%
19:55 FBLBs→70%
19:59 FBLBs→30%
Shift Change
20:19 ScPr→5.0, drains changed, flow rate test soon, 2 hours
20:39 C5 Tank should read ~9.8% when done pumping→3B for verification.
Targets: Hz→22.6% (200 gallons); UV→36.8%
21:11 Sending C5→3B
Can't bypass 2B Agitator
21:43 PSF→100%
22:01 Steam into Liq Jacket
22:11 3B was filling steady until ~15%, now dropping, going by C5 level for now.
NO FLOW FROM CHUTE TO DUMPSTER!!! PLUGGED?
Looks like Feed Screw to Press plugged up
22:27 C5→3B done
22:30 Feed OFF, Steam OFF. Conveyors OFF to Blow Tank, Screw Press to Blow Tank washing down
22:34 Starting SIP Liq
Screw Press isn't turning. Everything OFF.
3B Level all over. pH probe submerges @ 22.4%.
Target was 22.6%. Shut off a little after reaching probe
22:49 Working on scPr coupling
23:15 Liq @ 250°F

2014-11-16
00:22 Screw running, didn't find anything wrong, possibly locking ring came loose
Plug somewhere in the system
01:41 SIP done Liq/transfer lines
01:46 Prop 2B in pH Control
01:54 Plug cleared between ScPr Feeder and ScPr
02:06 Tried to clear Metso, high amps on Hydrolyzer Discharger Screw, shut back down
02:27 3B Agitator ON, paused UV (unsure of level) will condition to pH 8 and let level settle
VERY ODD JUMP IN 2B pH. 6.3→6.49 at once, pump#5 never even came on
02:53 3B @ 8.0
02:55 Conveyors running to clear out
03:00 3B Temp Control ON
03:04 Discharge Screw found to have a lot of burnt biomass in it, Kevin said it had been there a while.
03:15 Steam Metso, Conv. ON all cleared out
03:45 3B finally done
03:56 Feeding Metso @ 65 psi. PSBLBs @ 100%, PSF @ 110%
04:07 PSBLB→80%, PSF→120% to clear out
04:12 Feed OFF/Steam OFF. Chute looks plugged (no door on new one).

04:30 T=12hr Prop 2B Sample Taken
(L) 43.9%; pH=6.29; (T) 98.8°F; (P) 0.10 psi
04:56 Steam to pHA
VIBRATOR ON METSO NO LONGER WORKING
05:49 Steam ON to Metso again
06:10 PSBTC and PSF ON
pHA @ 250°F→dropped when doing transfer
Ball Vent on Metso may be clogged.
06:23 Feeding Metso @ 79 psi, PSBLB→75%, PSF→100%
06:26 PSF→110→120%
06:46 PSBLB→80%, PSF→100%
06:58 PSF→95%
Not gaining much pressure/temp in Metso
07:00 PSB→85%
07:14 pHA back to 250°F, start hold
07:15 PSBLB→90%
07:28 PSF→98%
07:30 PSBLB→95%
07:37 PSF→100%
07:45 PSBLB→100%; Metso back to Temp and Pressure
Shift Change
07:56 FBLB→75→100%
08:07 FBLB→120%
08:14 Doing 30-minute reoccurring timer to check ScPr
08:15 Liq Tank Temp Control→"Normal" in Auto
08:25 FBLB→60%
08:26 PSB Vibrator back ON; Joe says it's running fine.
08:33 FBLB→90%; pH Adj SV→85%
08:45 FBLB→100%
08:52 FBLB→90%
08:58 Out of Boiler Additives, switching to new container
09:00 FBLB→50%
Boiler Water tested and found good
09:03 FBLB→25%
09:13 FBLB→40%
09:20 FBLB→90%
09:24 FBLB→120; PSF→105→110%, PSBTC spiking
09:25 PSF→120%
09:26 PSBLBs→80%
09:33 PSF→110→115%; still spiking in PSBTC
09:48 FBLBs→100%; still dealing with PSBTC; PSF→120%
09:57 PSBTC seems clear. Will give 5-10 minutes more
09:58 PSF→110%; FBLB→70%
10:03 PSBLB→90%; Acid→6.00 GPH
10:24 FBLB→40%
10:27 PSBLB→95%
10:30 PSF→105%
10:35 FBLB→65→55%

10:36 FBLB→70%
10:39 FBLB→65%
10:46 FBLB→73%
10:53 FBLB→CAS
11:00 PSBLB→95%; Acid→6.67 GPH
11:05 PSF→110%
11:06 pH Adj Tank SIP Finished
11:07 Ferm C transfer from pH Adj Tank CLOSED
11:11 FBLB→100%
11:17 FBLB→CAS
11:28 FBLB→30%
11:31 FBLB→73.5%
11:43 Will start Flow rate test in 20 minutes
12:00 T=19.5hr Prop 2B Sample Taken
(L) 44.2%; pH=6.34; (T) 101.0°F; (P) 0.14 psi
12:03 2B Temp reads 101°F on HMI
Reads 97.98°F on local meter
12:08 Steam OFF to 2B Sample Port
12:10 Cooling Water TIC→MAN@50%
Cooling Water line for Prop 2B Field-closed
12:19 Adding nutrients to 3B, waiting on Field Agents
12:28 FBLB→60→30%
12:30 Trace Metals Pump#2 ON @ 100% to 3B
12:51 FBLB→85%
13:01 FBLB→120%
13:02 TMP#2 OFF
Beginning Inoculation of Prop 3B, Initial values:
(L) 36.8%; pH=7.16; (T) 99.8°F; (P) -0.01 psi
T=20.5hr Sample from Prop 2B
(L) 42.1%; pH=6.42; (T) 99.8°F; (P) +2.76 psi
13:17 Inoculating Prop 3B
13:18 Prop 2B Agitator, pH, and Temp Control OFF
13:22 Finished Inoculating Prop 3B
(L) 39.2%; pH=7.03; (T) 98.2°F; (P) 0.00 psi
13:28 Feed Bin speed @100%
13:39 Feed Bin speed @90%
13:45 Feed Bin speed @85%
13:52 Feed Bin speed @75%
13:54 Feed Bin speed @60%
14:02 Began adding UV Water to Liq Tank (Target=22%)
14:11 Liq Tank Agitator ON @ 100% at 15% Level
14:24 FBLBs→90%; Screw Press C5 Drain (to C5 Tank) OPEN
14:28 FBLBs→70%; ScPr→3.0 RPMs
14:37 FBLBs→90%
14:52 ScPr→2.7 RPMs
15:06 GP ON @ 50% (Enzyme Lines were REALLY caked.)
15:13 GP→85%, Liq heating flatlined @ 111.4°F
15:15 GP OFF

15:19 FBLBs→70%
15:20 PSF→107%
15:24 Caustic Tank heating up. Refilling Rinse Tank
15:26 Metso Blow Tank Sample Taken
15:29 FBLBs→30%
15:36 AC Units reset in MCC. FBLBs→50%
15:43 FBLBs→90%
15:45 Adding UV Water to Liq Tank. Target=25.1; Liq Tank Settings:
0.016 GPM Enzyme Flow
1.09 GPM=1.1 GPM UV Water flow when pumping
7-hr retention time (no initial UV water extra)
2.13 GPM flowrate OUT
44.9% Level overall in Liq Tank
15:49 ScPr→5.0 RPMs, Screw Press C5 Drain (to C5 Tank) CLOSED
15:53 FBLBs→110%
16:04 FBLBs→120%
16:09 FBLBs→80%
16:17 FBLBs→90%
16:18 Pausing UV Water Addition. Level between 24.5% and 25.2%
16:19 Before Feeding Liq Tank Values
(L) 24.7%; pH=9.03; (T) 118.7°F; (P) 2.52 psi
16:21 Feeding Liquefaction Tank NOW
Reversing Screw and Discharge Valve Overrides ON
16:28 AAP#1 ON in CAS, Liq Tank pH Control ON
16:30 GP→50% as asked by Ismael
16:33 GP→18.7%
16:36 FBLB→110%
16:47 FBLB→70%
16:50 FBLB→30%
16:58 FBLB→60%
17:09 Liquefaction Level trend does NOT look very consistent
17:15 FBLB→80%
17:40 FBLB→95%
17:46 Flipping CIP Header to Rinse Water. Ferm C Pump ON
17:49 Ferm C Pump OFF
17:57 Beginning initial Rinse of Prop 2B. Ferm C Pump ON
Rinse Pump→80%
Initial kill-verification sample done
17:59 Rinse Pump→55%, Ferm C Pump OFF
18:07 C5 Pump OFF; FBLBs→85%
18:10 Rinse CIP of Prop 2B for Vent and C5 Line, Ferm C Pump ON
18:13 Ferm C Pump OFF
18:14 Rinse CIP of Prop 2B through Sprayballs for 15 min
Ferm C Pump ON, Rinse Pump→80%
18:23 FBLBs→65%
18:30 Steam ON to Ferm C Jacket
18:33 Ferm C Pump OFF
18:34 Ferm C Pump OFF

18:44 Began SIP Procedures of Ferm C. SV→15%→Auto
18:45 FBLBs→75%
18:48 Ferm C Spargers CLOSED; Ferm C @ 5.5 psi, Steam OFF, VacPump ON
18:56 Prop 3B pH Control→Auto, set @ 6.48, Pump #8 @ 40%
19:24 Ferm C @ -10 psi, VacPump OFF, Resuming SIP
19:26 FBLBs→85%
19:40 FBLBs→100%
19:49 FBLBs→110%
19:55 PSF→105%
19:59 Ferm C @ 250°F
Shift Change
20:16 Bleach Scrubber [Level] Alarm OFF
20:20 Ferm C back to 250°F, overshot Temp/Pressure earlier and had to start over
20:28 PSF→108%
20:30 Side Panel blew off ScPr-Great.
ScPr→9 RPMs
PSF→110→112%
Changed pH SP on 3B→6.35 (was 6.48?)
20:44 Build-up of C5 in ScPr was problem. Line to Reversing Screw was CLOSED.
Now OPEN and ScPr @ 9.0 RPMs.
21:14 PSF→110%
21:48 Rinsing TMP#1
21:52 SIP Complete on Ferm C
Steam OFF
21:55 Ferm C Spargers ON, steam to Jacket OFF
22:02 Ferm C in Temp Control

2014-11-17
00:37 Sending Liq→pH
T=0 Liq Tank Sample Taken:
(L) 44.7; pH=5.00; (T) 121.7°F; (P) 0.72 psi
00:36 WW Pump OFF to clean
00:37 Temp Control on pHA, Liq Level in CAS
00:40 UV→Liq @ 1.1 GPM
00:48 Override ON for pHA AG, AG ON
pHA pH Control in Auto @ 6.5
01:00 T=12hr Prop 3B Sample Taken
(L) 38.6%; pH=6.31; (T) 98.5°F; (P) 0.35 psi
01:07 Bypass OFF on pHA Agit.
01:28 3B @ 5.4 g/L→too high. Going add Hz to 3B
01:30 pHA→Ferm C, Pump in Auto @ 2.0→2.3 GPM
01:57 Just had ½ hour battle with PSBTC.
Got PSBLB→65%, PSF→120% Finally over (?)
Walk back up
@50% pHA not mixing well. Going to 40% Level
Adding ~50 gallons C5 to 3B, growing too fast, Temp to 86°F
02:03 PSBLB→75%, PSF→95%
02:06 C5 Addition done, Level of 3B 43.5%, added ~55 gallons

02:10 PSBLBs→85%
Added another 3B Sample, 07:00 (18 hr)
02:15 PSBLB→90%
02:17 PSBLBs→95%
02:20 PSBLBs→100%, PSF→100%
02:22 pHA~40%, slowed pump 2.3→2.0 to try to hold there.
02:25 T=1hr pH Adj Tank Sample Taken
Level-39.4%; pH=6.50; (T) 99.5°F; +2.35 psi
02:27 PSF→105→110%
02:29 Need 14.1% in Ferm C to inoculate. Currently 4.1%
02:34 PSF→112→115%
02:38 Liq pump @ 2.0 GPM (CAS)
pHA pump @ 22.5% (MAN) to hold ~40% in pHA
02:51 PSF→112%
"Lazy" Hot Water valve on pHA keeps alarming
02:52 pHAP→23%
03:21 pHAP→24%
03:39 pHAP→24.5%
03:40 Metso Sample Taken
03:41 PSF→115%
03:58 pHAP→25% ("Burped" pHAP Pump, pressure spiked, went to 50% for a couple seconds, good now)
Lab sample of pH Adj was 6.53. Erratic on screen, running level of 40
04:21 pHAP→23.5%
Plan is to inoculate Ferm C @ 08:00
If 14% at least in C
04:42 Heating up Caustic Tank
04:57 Flipping Header Rinse→Caustic
05:00 pHAP→22%
05:02 Caustic Cycle of 2B
05:24 pHAP→23%
05:29 pHAP→24%
05:30 Flipping Header to UV Water
05:35 UV Cycle of 2B
06:00 pHAP→22.5%
06:14 2B CIP Complete
06:29 pHAP→23%
06:30 T=6hr Liq Sample
(L) 45.0%; pH=5.04; (T) 121.8°F; (P) 0.51 psi
06:46 pHAP→23.5%
06:57 23.25%
07:00 T=18hr 3B Sample
(L) 43.3% pH=6.39; (T) 85.6°F; (P) 0.19 psi
07:12 pHAP→23%
NO FERM INOCULATION UNTIL LEVEL>14%
07:27 T=18hr Prop 3B Sample [Ethol]=5.96 g/L. so it did slow down between temp drop
07:36 Looking into (small) drop in Liq Pressure
07:40 pHAP→24$

07:43 Reversed pHAP Pump (first of night)
07:46 pHAP→25%
Shift Change
08:17 FBLBs→30%
08:19 pAP→35%, sudden random spike in pH Adj Tank Level (from 40→86.6%)
Visual check is said to be around 50%
08:21 pAP→28%
08:24 pAP→25%
08:25 pH Adj Level back down to norm-NOPE, IT'S NOT.
08:34 FBLBs→120%
08:37 pAP→20→23%
08:41 pAP→28%; FBLBs→90%
08:49 Ferm C Agitator (and Override) ON; FBLBs→110%
08:51 pAP→26%
08:52 FBLBs→120%
08:55 pH Adj Tank Level Sensor has officially become useless now.
Field says 40-50%, Sensor says 80%
09:02 pAP→30%
09:04 pH Adjustment Tank Level Sensor Alarms DISABLED
09:08 TMP#1→15%, adding Nutrients to Ferm C
Valves now OPENED
09:10 Prop 3B Temp SP→98.6^{o}F as asked by Ismael
09:11 pAP→27%
09:14 TMP#1→75%
09:15 TMP#1→15%
09:16 Backflushed pAP. pAP→ 40%
09:17 pAP→65%, backflushed again
09:18 TMP #2 ON @ 75→15%
09:21 pAP→30%
09:26 2nd Trouble with pAP. PSB Level not really building up
pAP→35%
09:29 TMP #2→30%
09:31 TMP #2→20%
09:33 pAP→30%; slight hiccup with hot water supply to pH Adj Tank
09:35 pAP→25%
09:41 pAP→20→22.5%; Reached 14.2% Level in Ferm C
09:44 Ferm C Initial Values
Level-14.2%; (T) 98.0^{o}F; +0.18 psi
09:45 Verifying Drain pipes clear of Caustic
Ferm C and Prop 3B Sample Ports Steam ON
CONFIRMED Lines clear of CIP fluids
09:50 T=21hr Prop 3B Sample Taken
(L) 43.3%; pH=6.43; (T) 91.4^{o}F; (P) 1.18 psi
09:55 Slurry into OPEN field valve for Ferm C Steam (SIP Line). Nasty.
09:59 Inoculating Ferm C with draining Prop 3B. Ferm C @ 14.4% Level
Ferm C airflow set @ 5.3 ACFM
10:01 pH and Temp Control OFF for Prop 3B
10:07 Prop 3B Agitator OFF

10:10 Ferm C pH Control ON, Base B Pump #3 set @ 75%
10:12 FBLBs→90%
10:14 Prop 3B EMPTY
10:15 Heating up CIP Tanks, refilling Rinse Tank
Finished Inoculation of Ferm C
10:25 T=0hr Ferm C Sample Taken
(L) 17.9%; pH=6.27; (T) 98.5°F; (P) -0.03 psi
10:34 Prop 3B @ 21hr [Ethol]=6.41 g/L
10:38 pAP→21%
10:40 TMP #1&2→50%; FBLBs→50%
10:53 FBLBs→25%
10:57 FBLBs→45%
11:05 pAP→15%; LP backflushed
11:07 pAP→20%
11:10 FBLBs→95%
11:22 FBLBs→120%
11:38 TMP #1&2→15%, TMP #2→90% (Most of SMB gone)
11:43 FBLBs OFF due to spiking in Amps of FBCC
11:44 PSBLBs→85%; Acid→5.67 GPH
11:45 FBCC OFF
11:47 pAP→22%
11:52 For sure biomass build-up on FBCC paddles
FBCC ON, brief minor spikes then fine
11:53 FBLBs ON @ 120%
12:20 PSB Level STILL not recovering! @ 46.5%
(Also, thunder outside with driving rain)
12:25 FBLB and FBCC OFF so Joe can clear them out better.
12:30 FBCC and FBLB (120%) ON
12:42 T=12hr Liq Tank Sample Taken
Level-44.8%; pH=5.00; (T) 122.0°F; 0.61 psi; (UV) 1.1 GPM
T=0hr Ferm C pH=5.85
Probably not right.
12:45 FBCC should be cleared out
12:50 PSBLBs→100%; Acid→6.67 GPH
13:07 PSB Level FINALLY going up again
13:09 pAP→22.5%
13:22 pAP→25%
13:26 TMP#2 OFF; TMP#1→75%
13:33 pAP→45→65→55→45→35→30→25%, clog cleared
13:43 PSF→112%
13:44 pAP→65→80→60→50→40→30→25%
13:45 FBLBs→100%
13:56 TMP#1 OFF
13:59 FBLBs→25%
14:02 TMP#1 ON @ 75%
14:04 TMP#1 OFF
14:06 TMP#1 ON @ 75%
14:11 Blew out another clog in pH Adj→Ferm C with pump speed shift

14:18 pAP→85% for 20 seconds→65→55→45→35→30→25%
14:19 FBLBs→60%
14:21 TMP#1→50%
14:23 PSF→115%; FBLBs→95%; PSBTC acting up.
14:24 PSF→120%
14:27 PSBLBs→90→80→70%
pAP→65→85→45→35→25%
14:30 TMP#1→100%
14:31 FBLBs→110%
14:32 pAP→45%
PSBLBs→60%; FBLBs→120%; PSB Level in freefall.
14:38 PSF→115%
14:42 pAP→35%
14:43 pAP→25%
14:44 PSF→105%, Still in Trouble-Zone with PSBTC
14:48 FBLBs→90%
Vibrator is losing effectiveness noticeably.
14:51 PSBLBs→75%, Acid→5.00 GPH
14:53 pAP reversed
14:55 PSBLBs→90%, Acid→6.00 GPH
FBLBs→75%
Need to make new Phosphoric Acid batch. Level=22%
14:59 PSBLBs→100%, Acid→6.67 GPH
15:01 FBLBs→85%
15:08 T=12hr pH Adj Tank Sample Taken
Level-UNKNOWN; pH=6.55; (T) 99.2°F; +1.98 psi
PSF→110%
15:13 pAP→20%
15:15 TMP#1 OFF.
Was pumping through top pH port
Only sporadically pumping base into Ferm C
Should be pumping more often by this point, right?
15:17 PSF→105%
15:22 pAP→25%
15:25 WW Pump flushed out and Tank valve CLOSED
15:33 Possible that top knifegate is leaking. Number of alarms>30
15:37 FBLBs→75%
15:42 pAP→27%
15:48 FBLBs→105%
15:54 pAP→25%
16:00 now there is a SECOND leak on (in?) the Screw Press
16:02 pAP→20%
16:05 pAP→17.5%
16:07 Metso Blow Tank Sample Taken
16:10 T=6hr Ferm C Tank Sample Taken
Level-24.3%; pH=6.30; (T) 98.7°F; -0.05 psi
16:14 Ferm C Nutrient Valves CLOSED
16:20 FBLBs→120%

16:27 Ferm C Pump ON
16:29 T=6hr [Ethol]=1.9 g/L
16:30 Ferm C Pump OFF
16:36 FBLBs→90%
16:39 FBLBs→60%
16:41 Prop 3B Initial Rinse CIP, Rinse Pump→80%, Ferm C Pump ON
Initial Kill Sample Taken
16:42 Rinse Pump→55%, Ferm C Pump OFF
16:44 Adding Process Water to Rinse Tank with steam (heating it up)
16:51 FBLBs→30%
17:02 Rinse Pump→80%, Ferm C Pump ON
Rinse CIP of Prop 3B Vent/C5 Lines
17:04 FBLBs→70%
17:05 Rinse Pump→55%
17:07 FBLBs→110%, Ferm C Pump OFF
17:09 Began Prop 3B Rinse CIP through sprayballs for 15 min
Ferm C Pump ON
17:13 FBLBs→120%
17:17 pAP→20%
17:24 Rinse Pump→55%, Ferm C Pump OFF
Finished Prop 3B Rinse CIP
17:37 pAP→25%
17:39 Flipping Header to Caustic
17:40 Ferm C Pump ON
17:44 FBLBs→90%
17:48 Caustic CIP of Prop 3B's C5/Vent Lines
17:49 Ferm C Pump OFF
17:51 Began Caustic CIP of Prop 3B
Caustic Pump→80%, Ferm C Pump ON
18:01 pAP→23%
18:11 Caustic Pump→55%
18:16 Ferm C Pump OFF
18:20 FBLBs→80%
18:24 Ferm A Pump ON
18:29 Ferm A Pump OFF
18:35 T=18hr Liq Tank Sample Taken
Level-44.8%; pH=5.00; (T) 122.0^{o}F; 0.61 psi; (UV) 1.1 GPM
18:41 pAP→65→35% and reversed
18:43 pAP→25%
18:48 Ferm C Pump ON and OFF
18:50 FBLB→95%
18:54 Ferm C Pump ON
18:57 Began Prop 3B UV Rinse through Sprayballs for 15 min.
19:05 WW Pump ON @ 87.8% Level, pH=10.5, Cond=8.5 mS/cm
Flow~30 GPM
19:13 Ferm C Pump OFF. Finished 3B UV Rinse
19:17 pAP→20%
19:19 FBLB→80%; Top Knifegate alarming A LOT

19:24 FBLB→40%
Base B Pump #3 pumping more often now
19:33 Caustic Pump and Agitator OFF
19:49 FBLB→120%
Shift Change
20:41 Filling Mix Tank to 4000 lbs with water
21:02 POWER OUTAGE!! All Systems ON quickly
21:15 And Back running Metso→Liq→pHA→Ferm C
21:38 pHAP→23%
21:45 pHAP→24%
22:05 T=12hr Ferm C Sample Taken
(L) 30.6%; pH=6.30; (T)98.5°F; -0.02 psi
22:07 Reversed pHAP
22:15 4000 lbs water in Mix Tank, ~ 46.2%
22:20 pHAP→26%
22:27 PSF→110%
22:55 Reversed pHAP Twice
TARGET IS FERM C→38%, SHUT DOWN METSO AND PUMP LIQ FORWARD
23:20 pHAP→24%
23:42 Filling/Heating Rinse Tank

2014-11-18
00:30 Liq Sample 24hr
Level-44.9%; pH=4.95; (T) 121.8°F; 0.90 psi
00:35 Adding 182 lbs (Phosphoric Acid) to Mix Tank
00:45 Adding Water to Mix→5000 lbs, ~64.5%, Cond=21.8 mS/cm
01:21 Chasing Acid Line
02:19 Stopped Feed/Steam. Chute Plugged and only needed 2% more, Reverse Screw to Bin
UV Water/Enzyme OFF
02:26 Boiler/Handling OFF
02:30 pHA 24hr (L) Unknown pH=6.53 (T)99.6°F +3.27 psi
02:39 Acid DONE
5559 lbs; Cond=21.8 mS/cm; Level=75.0%
02:43 AA Pump#1 OFF
02:55 Liq Pump 35%, pHA 32%
03:02 Tried to empty Transfer, squealed. We'll pull chute when cool and clear out
03:11 LP-38%, pHAP-35%, Walking up to empty while keeping pHA in check
03:18 LP-42%, pHAP-39%
03:38 LP-45%, pHAP-42%
03:57 LP-48%, pHAP-45%
Liq Tank Level Indicator freaking out, AG in Bypass
04:00 T=18hr Ferm C Sample Taken
(L) 39.2%; pH=6.30; (T)98.3°F; -0.00 psi
04:48 Sped Liq→70%
05:04 Looks like reached side draw on Liq; Pump and AG OFF. Temp Control OFF, pumping out pHA.
AAP#3 OFF
05:13 pHAP→80% (To empty)
05:19 pHAP Pump, AG, Temp Control OFF

06:08 Doing preliminary flush on Liq, pHA, and all associated Lines
06:15 Metso washed down, will clear chute tonight, focusing on clearing Liq/pHA for now.
Rinse Cycle done on Liq
Shift Change
08:32 Base B Pump#3→75%; Just a hunch, but we normally run it @ 75%
08:38 PSB TC and PSF LOCKED OUT. Disconnects set to OFF. Removing PSB TC chute
09:02 Chute is apparently completely clogged with biomass.
09:42 PSB disconnect set to RUN. Going to run PSB TC in reverse to see if it helps.
09:44 PSB TC ON
09:45 PSB TC OFF
09:48 WW Pump OFF. Pump flushed and tank CLOSED
09:58 T=24hr Ferm C Sample Taken
(L) 41.0%; pH=6.30; (T)98.7°F; -0.04 psi
10:04 PSB TC chute REMOVED
12:40 8.42 g/L [Ethol] for 24hr sample
16:11 Clog in Ferm C Sample Port. Popping with steam supply line
16:24 T=30hr Ferm C Sample Taken
(L) 41.0%; pH=6.30; (T)98.7°F; -0.04 psi
16:41 Going off of Base B Pump#3 run-times, Ferm C is picking up.
17:36 Heating up Caustic Tank
17:55 12.73 g/L [Ethol] for 30hr Ferm C Sample
17:59 Initial Rinse of pH Adj Tank
18:23 Doing Rinse of pH Adj Tank Transfer Lines
18:38 Began Rinse CIP of pH Adj through BOTH Sprayballs
18:41 Rinse Pump→80% (Joe's instructions)
18:43 Reset timer. Now Sprayball#1
North-facing Sprayball does NOT spin.
18:59 Began Sprayball #2
19:16 Rinse Pump and Agitator OFF
Shift Change
20:56 Transfer Lines, #1 Sprayball Liq, #2 Sprayball Liq
Caustic
22:00 Ferm C 36hr 14.66 g/L
(L) 41.4%; pH=6.30; (T)98.7°F; -0.04 psi
22:04 Transfer Lines, #1 pHA Sprayball, #2 Sprayball pHA
Caustic
23:02 UV everything to floor, Rinse full
Powerwashing Metso from top down

2014-11-19
04:00 Ferm C 42hr 18.11 g/L
(L) 41.4%; pH=6.30; (T)98.7°F; -0.04 psi
Clearing Knifegates out
Shift Change
08:27 FBCC Field Disconnect set to OFF
09:46 Steam ON to Ferm C Sample Port
10:00 T=48 Ferm C Sample Taken
(L) 41.6%; pH=6.30; (T)98.5°F; -0.04 psi

10:32 T=48 Ferm C [Ethol]=19.4 g/L
10:33 Ferm C pH Control OFF. Temp Set-Point→140°F
10:49 BWP OFF.
It was reported to be smoking.
Might have gotten clogged.
11:30 BWP ON & OFF
Lab's autoclave not heating properly according to Ira.
11:39 BWP ON
11:53 Liq Tank SV OPEN @ 80→105% (Purging Steam Traps)
11:54 Liq Tank SV CLOSED
13:41 Liq Tank SV OPEN @ 40%
13:43 Liq Tank SV CLOSED
15:18 WW pH=12.00, Cond=6.08 mS/cm
15:21 WW Pump ON @ 65.1%
Flow is pretty low and struggling
15:31 WW Flow above 20 GPM finally
15:55 Ferm C Temp @ 130.6°F
16:13 Prop 3B OPEN @ 20% and CLOSED and OPEN @ 10%
16:16 Prop 3B SV CLOSED
18:15 Reached 140°F in Ferm C. Started 3-hr Wait Timer
Sample ONCE @ End of timer
19:13 WW Pump OFF. Tank CLOSED and Pump flushed
19:15 Reversing Screw ON in REVERSE
19:17 Reversing Screw OFF
Shift Change
20:10 Caustic/Rinse in Recirc. Rinse heating
20:35 Scrubber OFF
21:01 Secanter Feed Tank empty, Distillation lined up to it
22:29 DFT AG ON
Distillation Logbook has more details.
22:33 Last Sample from Ferm C
(L) 41.5%; pH=5.57; (T)140.1°F; -0.03 psi
22:36 Transferring Ferm C→BW. Temp Control OFF. BW @ 6.1%
23:39 Transfer done. BW→30.9%
Clogging in distillation.
Might be worth getting some kind of heating/cooling system for Beer Well.
Shift Change

2014-11-20
08:30 Rinsing out Distillation with Process Water
Apparently had bad clogging last night
09:03 HPLC might be really messed up.
Filters have been swapped several times.
09:37 Heating up CIP tanks
09:45 Cooling and Hot Water Pumps OFF
09:55 Cooling Water Pump oil changed.
10:06 Began Rinse CIP of Ferm C through Sprayballs for 15 minutes.
Rinse Pump→80%

10:14 Ferm C Pump ON. Rinse Pump Override ON
10:17 Ferm C Pump OFF
10:19 Apparently CIP Lines to Distillation were left OPEN.
Explains why Rinse Tank Level went down so fast.
Might be something wrong with HMI computer's USB ports.
10:29 Looks like Rinse Water got into Rectifier.
10:44 WW pH=5.54 @ 92% Level. Adding Caustic Soda
10:47 Blowing Slurry out of Ferm C Main Steam Line with Steam
10:49 Finished blowing out Slurry from Ferm C Main Steam Line
11:17 WW pH=10.26, WW Pump ON @ 94.6% Level
CIP Rinse Pump on 80%. Doing another 15-minute rinse of Ferm C. Still have solids coming out.
11:32 Finished Rinse CIP of Ferm C. Rinse Pump→55%
11:36 Rinse Systems OFF
12:25 Open pHA to Ferm C valve for 30 seconds.
12:28 Turned on Ferm C Pump; CIP Caustic Pump from 55→80%
Started Caustic CIP of Ferm C through Sprayballs for 15 minutes.
12:45 Finished Caustic CIP of Ferm C
13:26 Ferm C Pump OFF
13:28 Caustic through Ferm C Coil and Vent. Ferm C Pump ON
13:30 Ferm C Pump OFF
14:37 Ferm C Pump ON
14:53 Caustic and UV Systems OFF.
Replacing UV Water Pump Oil
15:17 Process Water Pump OFF. Replacing Oil.
15:57 Process Water Pump ON. Potable Water Pump OFF.
Replacing Potable Water Pump Oil.
16:15 Potable Water Pump ON. WW Pump OFF, rinsed out and valve CLOSED.
17:27 Hot, Cooling, and UV Water Pumps ON.
17:28 UV Water Pump OFF & ON & OFF

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