Log Book
Campaign 16

2015-06-02

07:35 Process, Potable, Hot, Cooling, and UV Water Pumps ON
07:39 Chiller ON
07:43 Warming up steam pipes
07:53 Something appears to be wrong with Hot Water Heat Exchanger or Pump
07:54 Hot Water Pump OFF
08:10 Hot Water Pump ON and OFF
08:13 Hot Water Pump ON. Issue resolved
08:37 Steam into Prop 2A/B jackets, not pulling a vacuum on either tank
08:38 Began SIP Procedures on Prop 2B
08:40 Began SIP Procedures on Prop 2A
10:18 Prop 2A/B transfer lines unclogged (don't know which)
10:47 Prop 2A @ 250°F.
Began 90-minute timer
10:47 Prop 2B @ 250°F. Began 90-minute timer
12:20 Finished SIP of Prop 2A.
Steam OFF
12:24 Prop 2A TC→"NORMAL" in Auto
12:27 Finished SIP of Prop 2B.
Steam OFF
12:31 Prop 2B TC→"NORMAL" in Auto
14:35 Began filling Prop 2A with UV Water.
Will fill to known level and then drain down via sample port.
14:45 UV→Prop 2A done. Level @ 13.8%, letting it balance out while doing Prop 2B
14:47 Began UV→Prop 2B using same method
14:49 Finished UV→Prop 2B, Level~37%
14:52 Draining Prop 2A→~25 gallons (4.8% Level)
14:54 Prop 2A at 25.3 gallons (5.3% Level)
14:55 Began draining Prop 2B to 25 gallons
15:05 Stopped draining Prop 2B. Letting it sit to confirm level
15:12 Prop 2B @23.8%, 23.9 gallons
15:21 Prop 2B drained down
15:55 Antifoam added to both Propagators. C5 Pump ON @ 50%
15:57 Adding C5→Prop 2A. Target Level=22.2%
15:58 Flow confirmed→Prop 2A
16:11 Prop 2A @ 21.2% Level. C5 Pump OFF
16:14 C5 Pump ON @ 50% and OFF after 20 seconds, Prop 2A Level~23%
16:15 Prop 2A AG ON
16:16 Prop 2A AG OFF. Prop 2A Level holding @ 22.6%
16:18 Prop 2A AG ON, BBP#4 ON @ 20%, conditioning→pH=8
16:20 C5 Pump ON @ 50%, flow confirmed →Prop 2B
Target=40.8%
16:29 Prop 2A TC OFF
16:33 C5 Pump OFF, pausing C5→Prop 2B
16:35 Prop 2B AG ON, mixing things a bit

16:36 Prop 2B AG OFF
16:37 BBP#4→15%
16:38 Prop 2B AG ON, BBP#5 ON @ 20%, conditioning→pH=8
16:44 C5 Pump ON, flushing out pumps
16:46 C5 Pump OFF; BBP#4→10%
16:50 Prop 2A @ pH=8; BBP#4 OFF, popped base valve→Prop 2A OPEN and CLOSED
17:03 BBP#5→15%
17:05 BBP#5→10%
17:10 Prop 2B @ pH=8. BBP#5 OFF
17:19 Prop 2B TC OFF
18:31 Began SIP Procedures on Liq Tank
18:36 Liq @ +5 psi, Steam OFF, VacPump ON
18:45 Liq @ -10 psi, VacPump OFF, Steam ON
19:20 Opening Liq Tank transfer lines to steam
Shift Change
22:36 Liq SIP Complete
23:25 Handling ON, CV#1 and 2 back to 100%

2015-06-03
00:00 HP Pump ON, Lower Conv. ON, Dump System ON
00:03 rest Conv. ON, Steam into Metso
00:16 T-pipe Vent CLOSED, Scrubbers ON
00:25 UV→Liq. 3 GPM for 150 minutes, hopefully level comes around.
00:28 Lower vents CLOSED
00:44 PSF and TC ON
00:45 Liq pH probe cal'd and in
00:58 Temp Control ON 2A and 2B
01:02 Feeding Metso PSBLB @ 60%
PSF 100%
01:07 WW in Recirc, ~ 45 GPM
01:15 PSF→90%
01:30 Metso @ T&P
01:31 PSF→85→80%
02:01 Nutrients in 2A and 2B
02:38 Inoc. 2B
02:42 Liq AG ON @ 50%, TC ON Liq
02:48 t=0hr Sample of 2B
(L) 43.2%; pH=6.90; (T) 99.6°F; 0.03 psi
02:55 Water OFF to Liq, 450 gallons, Level @ 22.4%
02:58 Inoc. 2A
03:09 t=0hr Sample of 2A
(L) 25.0%; pH=6.92; (T) 99.6°F; 2.32 psi
03:40 Flow rate test started
03:48 WW pH=5.69, 10 minutes of Caustic addition started
04:39 WW pH=8.35
04:44 WW→GP ~32 GPM
06:09 Rinsing Enzyme hoses
Extending flow rate test, all over the place

06:35 PSF→85%
06:43 Water hardness good for Metso Boiler
07:06 Formula for pump speed appears to have been deleted, working on it
07:09 Enzyme Pump Speed-11.05%
07:12 Metso→Liq
Target 36.1%, pHC ON
07:30 Enzyme ON
07:33 Liq AG→70%
07:38 Metso Sample Taken.
Shift Change
07:51 LTAG→65%
07:52 Metso Blow Tank Sample Finished
08:02 LTAG→70%
08:07 FBLBs→50%
08:12 FBLBs→60%
08:22 FBLBs→50%
08:29 Began SIP Procedures on pHAT
08:31 LTAG→60→70%
08:32 pHAT @ +5 psi, Steam OFF, VacPump ON
08:33 FBLBs→45%
08:34 pHAT @ -10 psi, VacPump OFF, Steam ON
08:35 FBLBs→40%
08:37 FBLBs→35%
08:46 LTAG→75%, opening pHAT transfer lines to steam
08:47 LTAG→80%
08:50 FBLBs→45%
08:57 FBLBs→50%
09:08 FBLBs→45%
09:18 FBLBs→40%, LTAG→85%
09:27 LTAG→100%
09:47 LTAG→70%
A level reading for Liq Tank would be nice
10:00 pHAT @ 250°F.
Began 90-minute timer
10:20 FBLBs→35%
10:25 LTAG→85→100%
10:32 FBLBs→45%
10:42 FBLBs→40%
10:52 FBLBs→35%
11:11 FBLBs→40%
11:19 t=8hr Prop 2A/B Samples Taken; 0.06/0.05 ACFM
2A: (L) 23.9%; pH=6.51; (T) 100.2°F; 1.22 psi
2B: (L) 42.4%; pH=6.45 ;(T) 98.2°F; 0.56 psi
11:30 Finished SIP of pHAT. Stepping down steam valve. Steam OFF after three minutes
12:13 FBLBs→35%
12:22 Prop 2B pH Control ON @ 6.39, BBP#5 set @ 10%
12:31 FBLBs→40%
12:57 Began SIP Procedures on Prop 3A

12:59 Began SIP Procedures on Prop 3B
Note: Not pulling a vacuum on either Prop 3.
13:22 FBLBs→35%
13:24 Prop 3B @ 250°F. Began 90-minute timer
13:27 FBLBs→30%
13:38 Prop 3A @ 250°F. Began 90-minute timer
13:39 FBLBs→40%
13:41 FBLBs→35%
13:50 FBLBs→40%
14:01 WW Pump OFF. Pump rinsed and valve closed
14:13 FBLBs→35%
14:56 Finished SIP of Prop 3B. Steam OFF
15:07 FBLBs→30%
15:09 Finished SIP of Prop 3A. Steam OFF
15:37 FBLBs→35%
15:48 FBLBs→45%; pHAT TC→"NORMAL" in Auto
15:53 FBLBs→55%
16:04 FBLBs→50%
16:07 FBLBs→45%
Metso Settings:
Temp=185°C=366°F; Pressure=150 psi (A)
FBLBs @ 45% (M); PSF @ 85% (M)
CV#1&2 @ 100% (M); ScPr @ 9.0 RPMs (A)
PAMP#2 CAS Acid Cond=17.6 mS/cm ; Acid Flow @ 6.00 GPH (CAS)
PSBLBs @ 60% (M); PSB Level-Camera; Temp=110°F (A)
16:12 CIP Systems ON, heating up Tanks
16:32 FBLBs→40%
16:47 Prop 3B TC→"NORMAL" in Auto
16:53 Prop 3A TC→"NORMAL" in Auto
17:01 Lab mentioned that sugars and inhibitors yields are higher this time compared to CR#15.
Probable sign of inconsistent biomass feeding?
Initial Level Targets for Prop 3A (17.8%) and Prop 3B (19.5%)
17:08 Solids Sample Taken from Liq Tank; No UV Water yet
(L) 33.0%; pH=5.01; (T) 120.9°F; 0.56 psi
17:13 WW Pump ON @ 54.2% Level
Some thunder and lightning outside with heavy rain. Hoping power stays on.
17:57 Liq Tank DW=14.5%
18:08 FBLBs→45%
18:09 WW pH=7.00 Cond=460 µS/cm; 67.8% Level
18:11 UV Water ON @ 0.62 GPM→Liq Tank
Official t=0hr Mark for Liq Tank
18:13 Heating up WW pick heater. Sending out @ 68.8%
18:25 Need to revisit Dump Cycle timing PER ISMAEL
18:44 pHAT TC OFF
18:45 LP ON @ 50%, LT→pHAT, setting up for Recirc.
18:48 LP OFF. Tubing broken already
18:52 LP ON @ 85%
18:55 LP→60% (Line pressure~20.8 psi after slowing down)

19:02 pHAT AG ON
19:07 BBP#5→12.5%
19:08 pAP ON @ 60%, pHAT→LT
19:11 t=16hr Prop 2A/B Samples Taken; 0.06/0.05 ACFM
2A: (L) 22.8%; pH=6.34; (T) 97.9°F; 1.51 psi
2B: (L) 40.4%; pH=6.32; (T) 97.6°F; 0.38 psi
19:32 pAP→65→70%
19:42 FBLBs→50%
19:47 pAP OFF. pHAT TC and pHC ON, AAP#3 ON, LP→45%
19:51 LP→40$
19:52 LP→30%
19:55 pAP ON @ 75%; pHAT→Prop 3B
19:57 Flow→Prop 3B confirmed
19:58 LP→45%
Shift Change
20:00 Metso Sample Taken
20:10 Liq DW 15.6%
20:18 Nutrients going into 3B
20:22 3B AG ON (13.3%) Field reported OK, pHC ON @ 40%
20:31 2B Sample Taken
(L) 40.5%; pH=6.34; (T) 99.5°F; 0.59 psi
20:36 pHA→3A, 3B Full
20:39 2B→3B
Pre: (L) 19.7; pH=6.33 (T) 96.2°F; 0.08 psi
Post: (L) 22.5% pH=6.32; (T) 98.6°F; 0.03 psi 0.5 ACFM
20:50 t=0hr 3B Sample
(L) 22.4%; pH=6.32; (T) 98.4°F; 0.04 psi
20:51 2A Sample Taken
(L) 22.9%; pH=6.34; (T) 98.8°F; 1.66 psi; 0.05 ACFM
21:01 3A AG ON
21:06 Nutrients in 3A
21:18 Inoc. 2A→3A
2A: (L) 22.9%; pH=6.34 T) 98.8°F; 1.66 psi; 0.05 ACFM
Pre: (L) 19.7; pH=6.33; (T) 96.2°F; 0.08 psi
Post: (L) 22.5%; pH=6.32; (T) 98.6°F; 0.03 psi; 0.5 ACFM
21:34 t=0hr 3A Sample Taken (see above)
21:44 Liq seems to be clogging but reversing the pump isn't helping
21:45 t=0hr pHA Sample (Late)
(L) 25.1%; pH=6.01; (T) 107.7°F; 0.84 psi
22:11 PSF→80%
22:19 PSF→70%
22:31 PSF moved between 70% and 90% for about 15 minutes, looks better now.
22:58 PSF→85%
23:45 t=6hr Liq Tank Sample Taken; 0.62 GPM UV Water Flow
(L) 29.0%; pH=5.02; (T) 122.0°F ;0.60 psi
23:59 PSF→80%

2015-06-04

00:16 WW Pump OFF, rinsed
00:24 PSF→85%
00:29 Liq Pump tripped, reset and reversed
01:42 Flipping Header to Rinse
01:50 Rinse Cycle of 2A/2B
02:37 2A level still wacky during CIP
02:42 WW in Recirc @ 50.1%, ~50 GPM
03:00 t=6hr 3B Sample Taken; 0.5 ACFM
(L) 23.2%; pH=6.33; (T) 98.5°F; 0.01 psi
After 2B is done with Rinse, going to shut down Metso, Liq @ 40.4%
Should have enough to finish.
03:14 Switching to Ferm B Pump, A not keeping up, turned out there was a line open
CLOSED and was OK.
03:30 Metso→Bin
Feed/Steam OFF, Liq Enzyme and Water OFF, Acid OFF
03:32 WW pH=11.6 Cond=2.45 mS/cm
03:45 t=6hr 3A Sample Taken; EtOH=2.3 g/L
(L) 20.6%; pH=6.32; (T) 98.5°F; 0.01 psi
03:49 Handling OFF
03:55 Flipping Header to Caustic
03:58 Caustic Cycle 2A/2B
04:06 No slurry addition at this point.
Adding H_2O to Liq, 1 GPM for 20 minutes (DW a little high) and cooling off to 77°F to slow enzymes.
05:20 Dump Chamber OPEN, clearing plug
05:40 WW→GP; 90.5%
05:45 Upper skid OFF, HP Pump OFF
05:48 Header flipped to UV
05:57 Lower skid, CO_2 Scrubber Pump OFF, Seal Water OFF
06:06 t=12hr Liq Tank Sample Taken; UV OFF
(L) 41.8%; pH=5.00; (T) 103.3°F 2.22 psi
06:53 pHA~33, Level went nuts
06:57 Reversed Liq Pump
07:27 Reversed pHA Pump
07:41 Ferm A Pump OFF, 2A and 2B done
Shift Change
08:55 pHAT Level Sensor rinsed with water line
pAP→40→35%
09:04 pAP→30%
09:06 LP→45%
09:12 LP reversed, slurry→pHAT again
09:15 t=12hr Prop 3B Samples Taken; 0.5 ACFM
(L) 23.5%; pH=6.33; (T) 98.4°F; 0.01 psi
[Ethol]=1.85 g/L
09:22 LP→40%
09:32 LP→35%
09:39 t=12hr Prop 3A Samples Taken; 0.5 ACFM
(L) 23.4%; pH=6.45; (T) 98.3°F; 0.03 psi
09:41 pAP→35%

09:50 t=12hr Prop 3A [Ethol]=5.6 g/L
09:51 pAP→40→45→50%
09:58 pAP→75%, level reported to have not changed.
10:08 Prop 3B pH Sensor not reading same as lab again
Prop 3B pH @ 6.5
10:12 pAP→80%
10:22 pHAT TC ON (so valve can start opening up for Hot Water flow)
10:27 WW Pump OFF, rinsed out and valve closed
10:28 pAP OFF, pHAT pHC ON
10:35 Prop 3A Target Level and Volume=28.7% and 300 gallons
10:40 pAP ON @ 80%; pHAT→Prop 3A
10:44 LP→45%, pAP→50%
10:49 Nutrients added to Prop 3A
10:59 pHAT→LT, Prop 3A~28.7% Level
pHAT pHC and TC OFF
11:02 pAP→60%
11:03 Post-Add Prop 3A Samples Taken; EtOH=4.8 g/L
(L) 29.2%; pH=6.32; (T) 98.2°F; 0.22 psi
11:10 pAP→75%
11:22 pAP→65%
11:43 pAP→60%
11:53 pAP→55%
12:00 t=18hr Liq Tank Sample Taken
(L) 40.0%; pH=5.11; (T) 78.6°F; 1.44 psi
13:39 LP OFF, replacing hoses
13:45 LP ON @ 85%
13:47 LP→75%
14:08 LP→55→45%
14:24 LP→40%
14:59 t=18hr Prop 3B Samples Taken; 0.54 ACFM
(L) 23.4%; pH=6.45; (T) 98.3°F 0.03 psi
pAP→50%
15:11 pAP→45%
15:32 pAP→48%
t=18hr Prop 3B [Ethol]=2.18 g/L
(L) 33.2%; pH=5.12; (T) 77.5°F; 0.89 psi
20:50 Hot H_2O tank overflowing @ 91.2%, draining some to floor
15:35 t=18hr Prop 3A Samples Taken; 0.5 ACFM
(L) 29.2%; pH=6.32; (T) 98.2°F; 0.22 psi
15:46 t=18hr Prop 3A [Ethol]=8.3 g/L
16:35 pAP→40%
16:49 pAP→45%
17:17 pAP→48%
18:03 pAP→42%
18:09 t=24hr Liq Tank Sample Taken
(L) 41.4%; pH=5.13; (T) 76.7°F; 1.59 psi
18:10 LP→45%
18:19 LP→55%

18:32 LP→50%
19:26 pAP→44%
19:36 pAP→40%
Shift Change
20:43 t=24hr pHA Sample (In Recirc with Liq)
(L) 33.2%; pH=5.12; (T) 77.5°F; 0.89 psi
20:50 Hot H_2O tank overflowing @ 91.2%, draining some to floor
21:06 t=24hr Prop 3B Samples Taken; 2.55 g/L
(L) 23.6%; pH=6.44; (T) 98.2°F; 0.01 psi; 0.52 ACFM
21:33 t=24hr Prop 3A Samples Taken; 12.0 g/L
(L) 29.1%; pH=6.32; (T) 97.7°F; 0.10 psi; 0.52 ACFM
21:46 pHA pump OFF, TC and pHC ON
22:21 pHA→3A
22:52 pHA→3A complete, TC and pHC OFF pHA
21:33 Post-Add Prop 3A Samples Taken; 9.91 g/L
(L) 37.8%; pH=6.31; (T) 98.3°F; 0.12 psi; 0.5 ACFM
23:04 Bumped 3A Base Pump from 40→45%
23:55 Apparent plug between Liq and pHA

2015-06-05
00:00 Liq and pHA pumps OFF to clear lines
00:06 t=30hr Liq Tank Sample Taken
(L) 36.5%; pH=5.20; (T) 76.5°F; 1.72 psi
00:13 Clog blown out with UV, Recirc restarted
01:35 So far Liq Pump has tripped once and pHA twice without warning (no pressure increases)
02:39 BBP#7 back to 40%
03:08 t=6hr 3B Sample Taken; 3.42 g/L
(L) 23.7%; pH=6.45; (T) 97.4°F; 0.01 psi; 0.5 ACFM
03:35 3B called done, pumping Liq→DFT.
AAP#1 and 3 OFF, pHC and TC OFF Liq
03:44 pHA pumped back to Liq, pump and AG OFF
03:40 t=54hr Prop 3A Samples Taken; 13.9 g/L
(L) 37.5%; pH=6.32; (T) 98.5°F; 0.15 psi; 0.5 ACFM
03:53 pHA drained, solids rinsed out
04:45 Lost Liq Level
04:53 Dec AG ON
05:10 Liq Pump/AG OFF, no more rise in Decanter
05:34 WW in Recirc, 46.9%
05:37 Rinsing transfer lines pHA/Liq, enzyme, etc.
06:11 Sprayballs pHA
06:28 Sprayball Liq #1
06:55 WW pH=9.0 Cond=1.70 mS/cm
06:59 WW→GP
07:16 Liq Sprayball #2
07:32 Rinse down (7%) until refill starts
07:41 RevScr ON FORWARD, rinsing to Liq Tank
07:44 Rinse Pump ON
Shift Change

07:50 Refilling and Reheating Rinse Tank.
08:06 ScPr ON, RevScr→REVERSE
08:26 ScPr and RevScr OFF
09:16 Started 2nd Rinse CIP of Liq Tank through sprayballs for 5 minutes
Rinse Pump→85%
09:21 Finished 2nd Rinse CIP of Liq Tank. Rinse Pump→55%
09:40 Flipping CIPP Header to Caustic.
09:45 Rinse Systems OFF.
09:47 Caustic CIP of pHAT and LT lines.
10:49 Began Caustic CIP of Liq Tank through sprayballs for 15 minutes.
Caustic Pump→85%
10:51 t=42hr Prop 3A/B Samples Taken; 0.5/0.5 ACFM
3A: (L) 37.5%; pH=6.32; (T) 98.4°F; 0.14 psi
3B: (L) 23.9%; pH=6.45; (T) 98.3°F; 0.01 psi
11:20 Finished Caustic CIP of LT. Caustic Pump→55%
11:51 Began Caustic CIP of pHAT through sprayball for 15 minutes.
Caustic Pump→85%
12:07 WW Pump OFF. Pump rinsed and valve closed
12:10 Finished Caustic CIP of pHAT.
Caustic Pump→55%
14:03 Caustic Systems OFF
14:11 Flipping CIP Header to UV Rinse
14:25 UV Rinse of pHAT and LT lines
14:42 Began UV Rinse of pHAT through sprayball for 20 minutes
14:54 Popping Base line→pHAT. AAP#3 ON and OFF.
14:56 pHAT SV→50% and CLOSED
15:04 t=37hr Prop 3A/B Samples Taken; 0.5/0.5 ACFM
3A: (L) 37.0%; pH=6.32; (T) 98.7°F; 0.14 psi
3B: (L) 23.5%; pH=6.45; (T) 98.3°F; 0.01 psi
15:15 Finished UV Rinse of pHAT
15:59 Began UV Rinse of LT through sprayballs for 20 minutes
16:17 Lab pH for Prop 3B=6.22 for 42hr sample
16:30 LT SV→50% and CLOSED
16:46 Prop 3B pH set @ 6.60
Lab beaker sample of Prop 3B pH=6.23
18:06 Finished UV Rinse of LT
Shift Change
21:19 t=48hr Prop 3B Samples Taken; 5.3 g/L
(L) 23.6%; pH=6.55; (T) 98.4°F 0.01 psi
21:35 t=48hr Prop 3A Samples Taken; 18.3 g/L
(L) 37.4%; pH=6.32; (T) 98.2°F; 0.13 psi

2015-06-06
03:10 t=54hr Prop 3B Samples Taken; 5.7 g/L
(L) 23.5%; pH=6.44; (T) 98.3°F; 0.00 psi; 0.5 ACFM
03:40 t=54hr Prop 3A Samples Taken; 17.4 g/L
(L) 37.2%; pH=6.32; (T) 98.3°F; 0.14 psi; 0.5 ACFM
3B Sample: Lab pH=6.32; Ours=6.44

Shift Change

09:08 t=60hr Prop 3A/B Samples Taken; 0.5/0.5 ACFM
3A: (L) 36.9%; pH=6.32; (T) 98.8°F; 0.11 psi
3B: (L) 23.3%; pH=6.44; (T) 98.6°F; 0.01 psi
11:22 Prop 3A/B pHCs OFF, TCs set @ 140°F
11:29 Rinse Systems ON, heating up tank
12:37 Prop 3B @ 140°F. Began 3hr timer
13:29 Prop 3A @ 140°F. Began 3hr timer
15:30 WW Pump ON in Recirc @ 51.7% Level
15:38 Prop 3B kill timer done. Prop 3B TC OFF
16:03 Ferm A Pump ON, transferring
Prop 3B→DFT
16:09 Prop 3B AG OFF
16:20 Ferm A Pump OFF. Transfer complete
16:30 Finished Prop 3A Kill. Prop 3A TC OFF
16:45 Began transferring
Prop 3A→DFT
Ferm A Pump ON
16:54 Hot and Cooling Water Pumps ON
16:55 Chiller OFF
16:56 Prop 3A AG OFF
17:11 Transfer complete, flushing UV Water
17:13 Ferm A Pump OFF
17:16 WW pH=9.83; Cond=2.11 mS/cm; Level @ 53.0%
17:27 Ferm A Pump ON, Rinse CIP of Prop 3A/B lines
17:35 Sending out WW @ 60.2%, Flow~28-29 GPM
17:48 Finished Rinse CIP of Prop 3B. Rinse Pump→55%
17:52 Began Rinse CIP of Prop 3A through sprayballs for 15 minutes
Rinse Pump→85%
18:08 Finished Rinse CIP of Prop 3A. Rinse Pump→55%
18:09 Rinse Systems OFF
18:16 UV Water Pump OFF
18:21 Ferm A Pump and Scrubbers OFF
18:35 WW Pump OFF
18:45 Everything except for Potable Water Pump and DFT AG OFF
18:48 Potable Water Pump 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