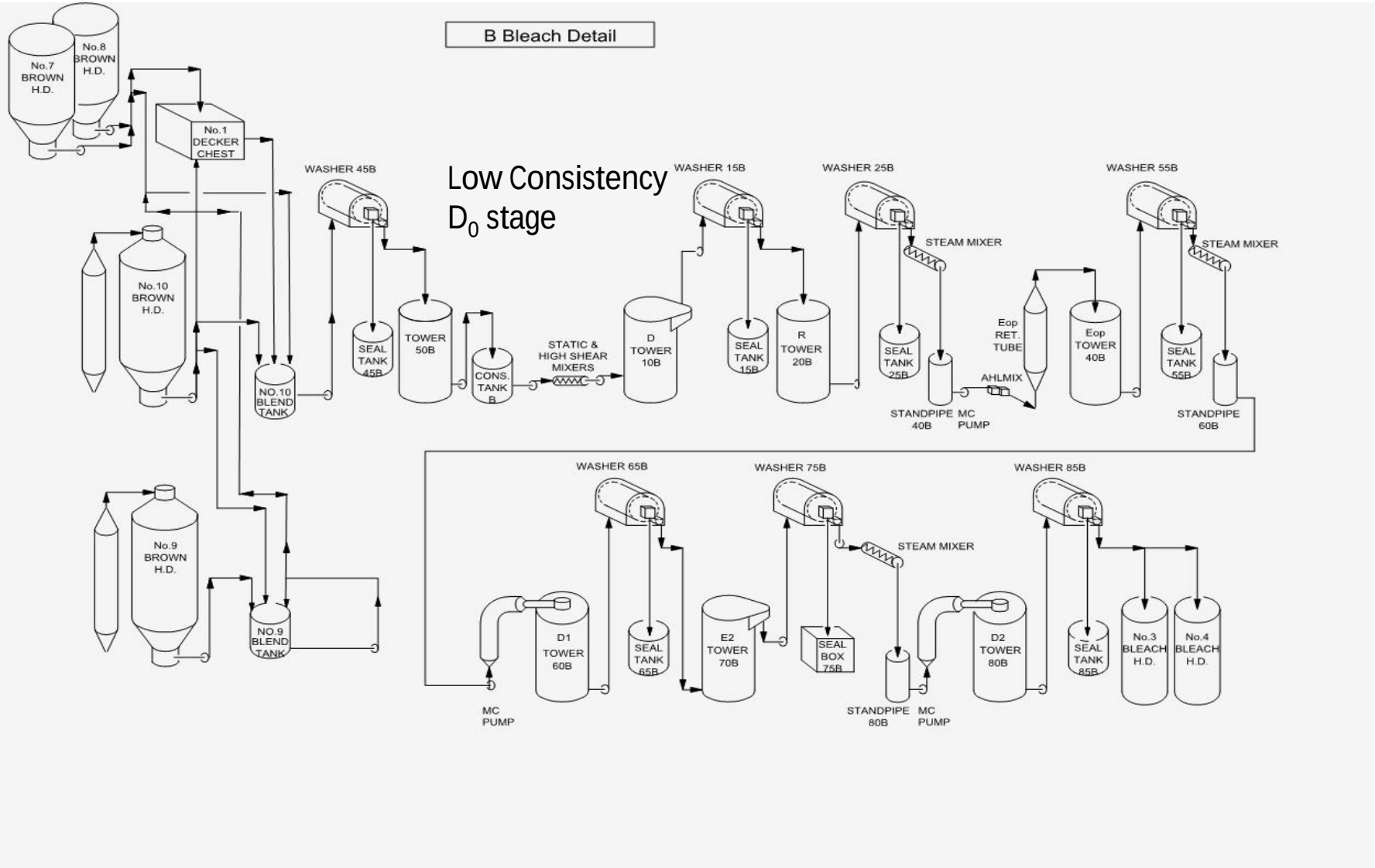
D_0 Conversion

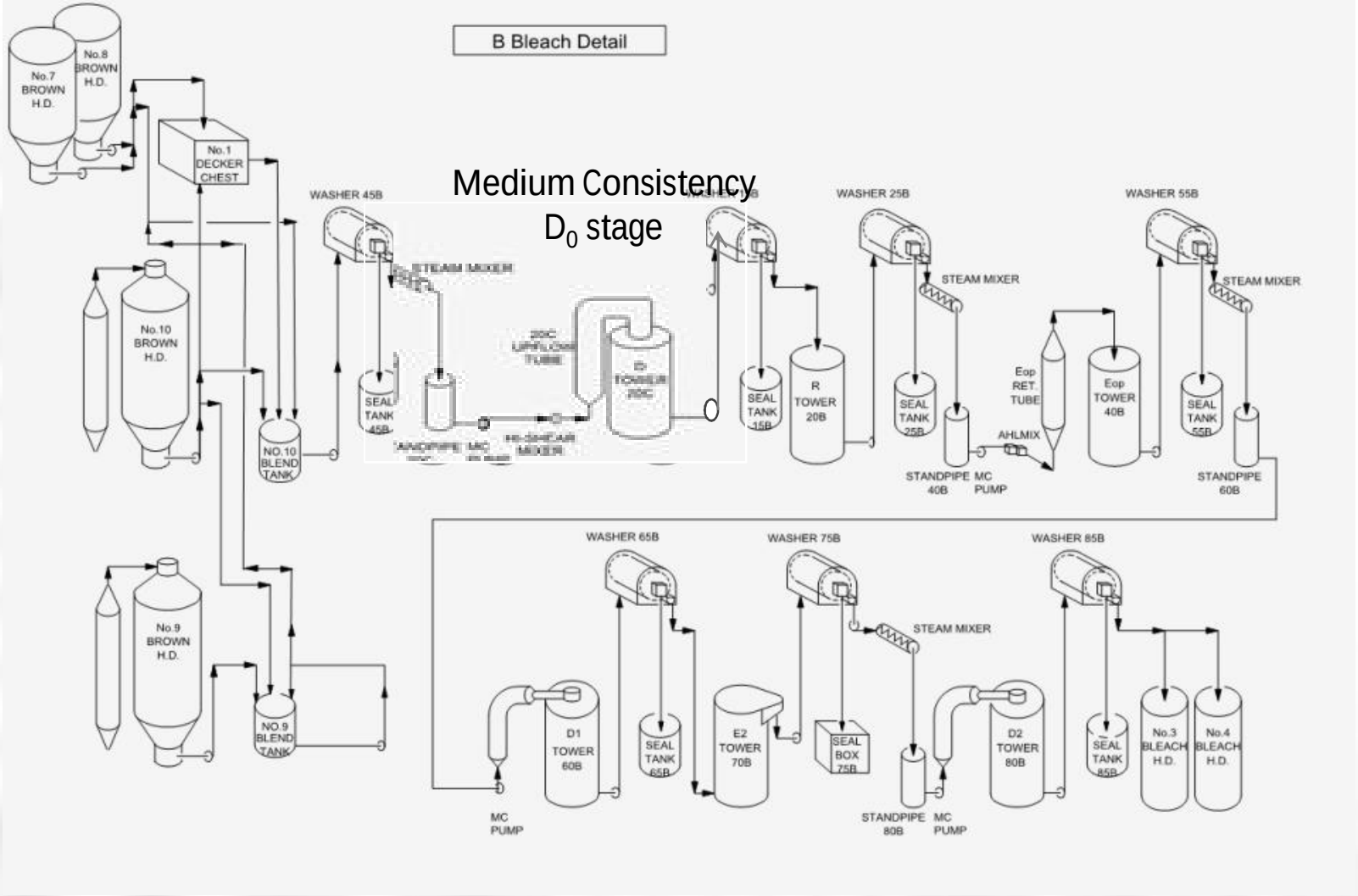
PAPTAC Bleaching Committee

October 2014

B Bleach


B Bleach Detail
Low Consistency
D_0 stage
No.7 BROWN H.D.
No.8 BROWN H.D.
No.1 DECKER CHEST
No.10 BROWN H.D.
NO.10 BLEND TANK
No.9 BROWN H.D.
NO.9 BLEND TANK
WASHER 45B
SEAL TANK 45B
TOWER 50B
CONS. TANK B
STATIC & HIGH SHEAR MIXERS
D TOWER 10B
WASHER 15B
SEAL TANK 15B
R TOWER 20B
WASHER 25B
STEAM MIXER
SEAL TANK 25B
STANDPIPE 40B
MC PUMP
Eop RET. TUBE
AHLMIX
Eop TOWER 40B
WASHER 55B
STEAM MIXER
SEAL TANK 55B
STANDPIPE 60B
WASHER 65B
D1 TOWER 60B
SEAL TANK 65B
MC PUMP
E2 TOWER 70B
WASHER 75B
SEAL BOX 75B
STEAM MIXER
STANDPIPE 80B
MC PUMP
D2 TOWER 80B
WASHER 85B
SEAL TANK 85B
No.3 BLEACH H.D.
No.4 BLEACH H.D.

B Bleach


B Bleach Detail
Medium Consistency
D_0 stage
No.7 BROWN H.D.
No.8 BROWN H.D.
No.1 DECKER CHEST
No.10 BROWN H.D.
NO.10 BLEND TANK
No.9 BROWN H.D.
NO.9 BLEND TANK
WASHER 45B
STEAM MIXER
SEAL TANK 45B
WASHER 15B
R TOWER 20B
WASHER 25B
STEAM MIXER
SEAL TANK 25B
STANDPIPE 40B
MC PUMP
Eop RET. TUBE
AHLMIX
Eop TOWER 40B
WASHER 55B
STEAM MIXER
SEAL TANK 55B
STANDPIPE 60B
WASHER 65B
D1 TOWER 60B
SEAL TANK 65B
MC PUMP
WASHER 75B
STEAM MIXER
E2 TOWER 70B
SEAL BOX 75B
STANDPIPE 80B
MC PUMP
WASHER 85B
D2 TOWER 80B
SEAL TANK 85B
No.3 BLEACH H.D.
No.4 BLEACH H.D.

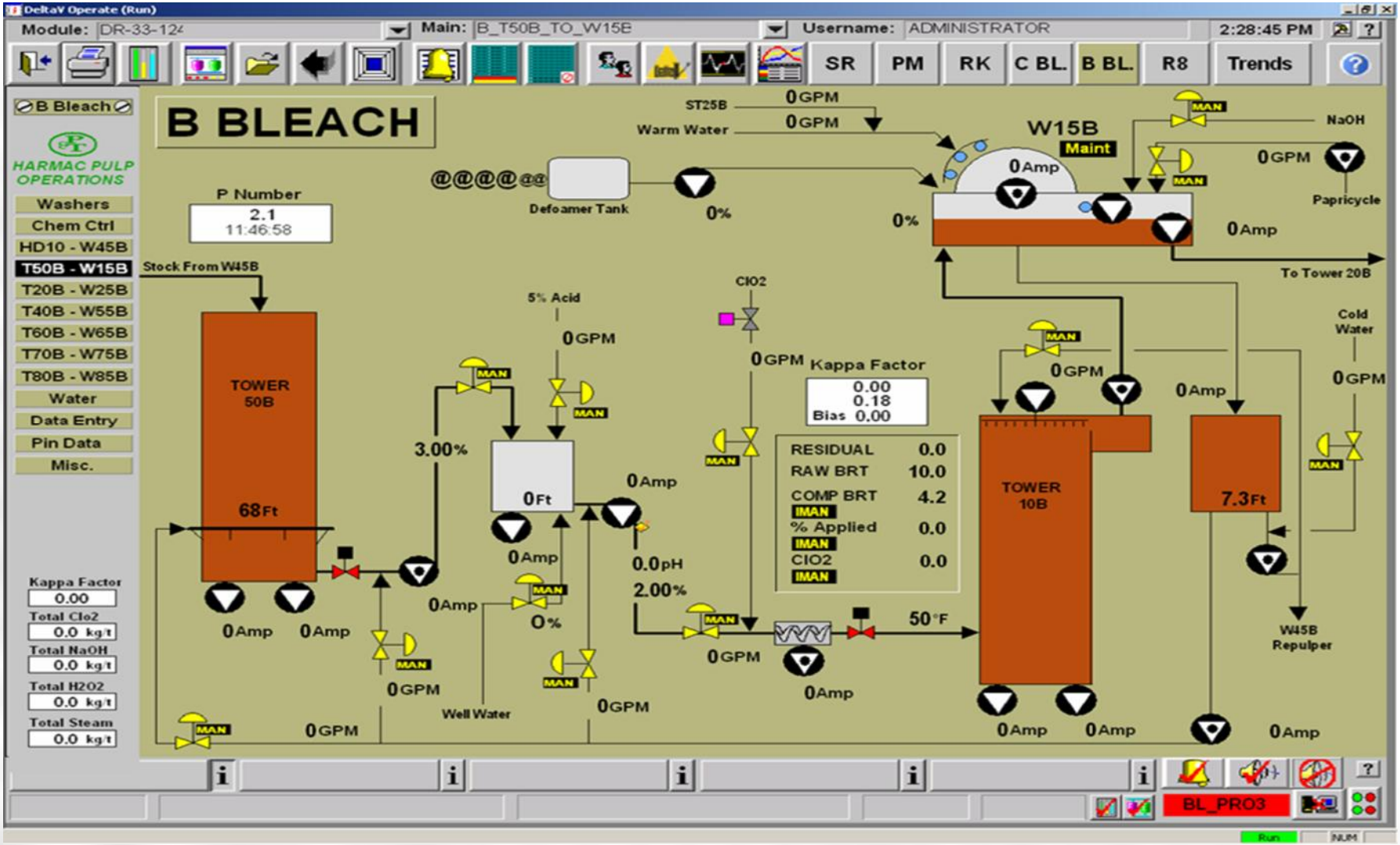
Objectives

- Increase stock consistency and retention time at D_0
- Reduce filtrate volume, reduce bleach plant COD
- Reducing ClO2 consumption in the overall bleaching process
- Increase storage capacity in B bleach
- Reduce installed horsepower in process
- Improve process temperature with reducing water dilution dependence and adding a steam mixer to medium consistency stock

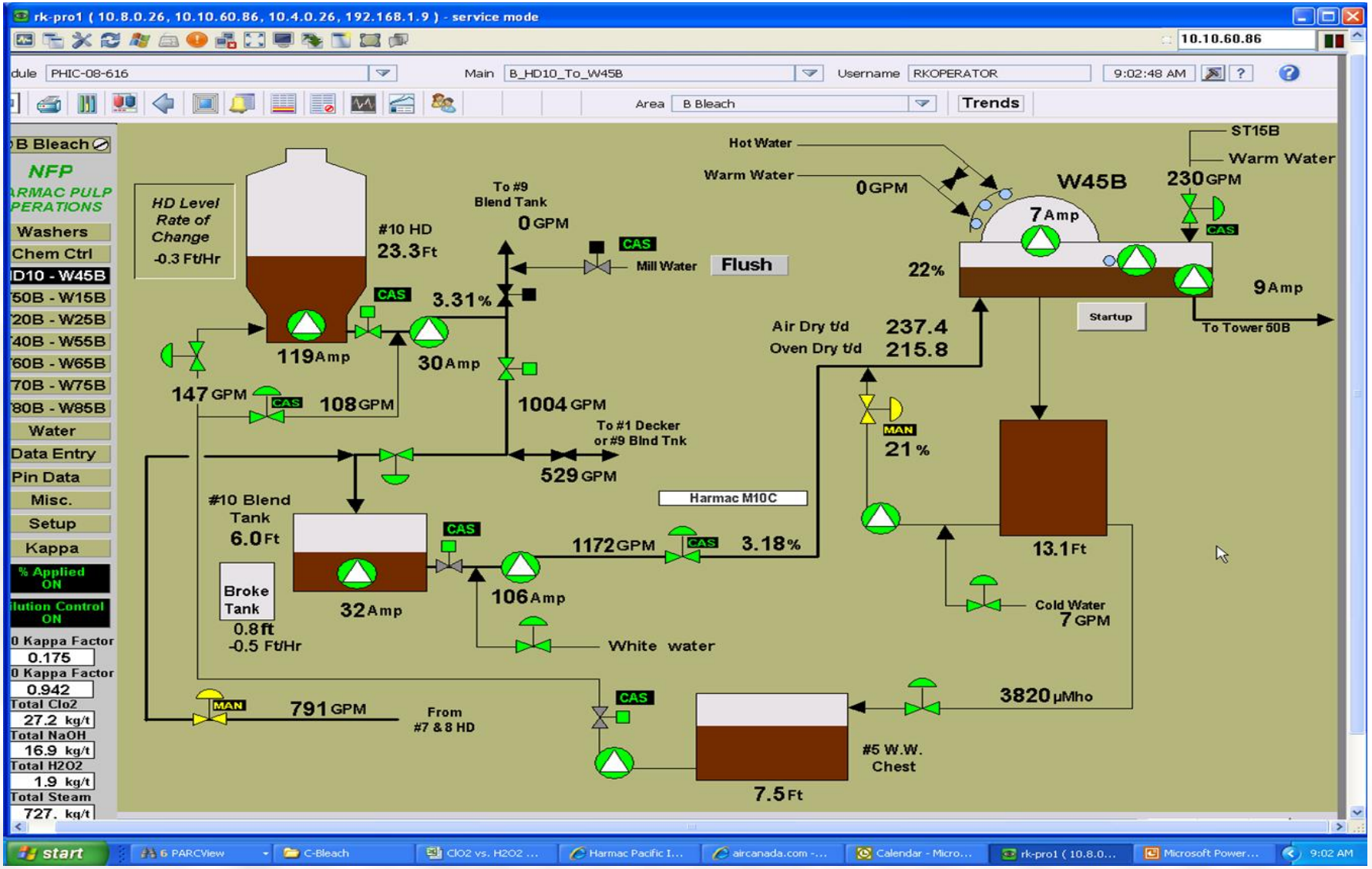
Scope

- Remove steam mixer from T40A and recondition. Install steam mixer below washer 45B
- Install drop chute to basement MC chute. Install MC chute and pump
- Install SS piping on discharge of MC Pump to ClO_2 mixer

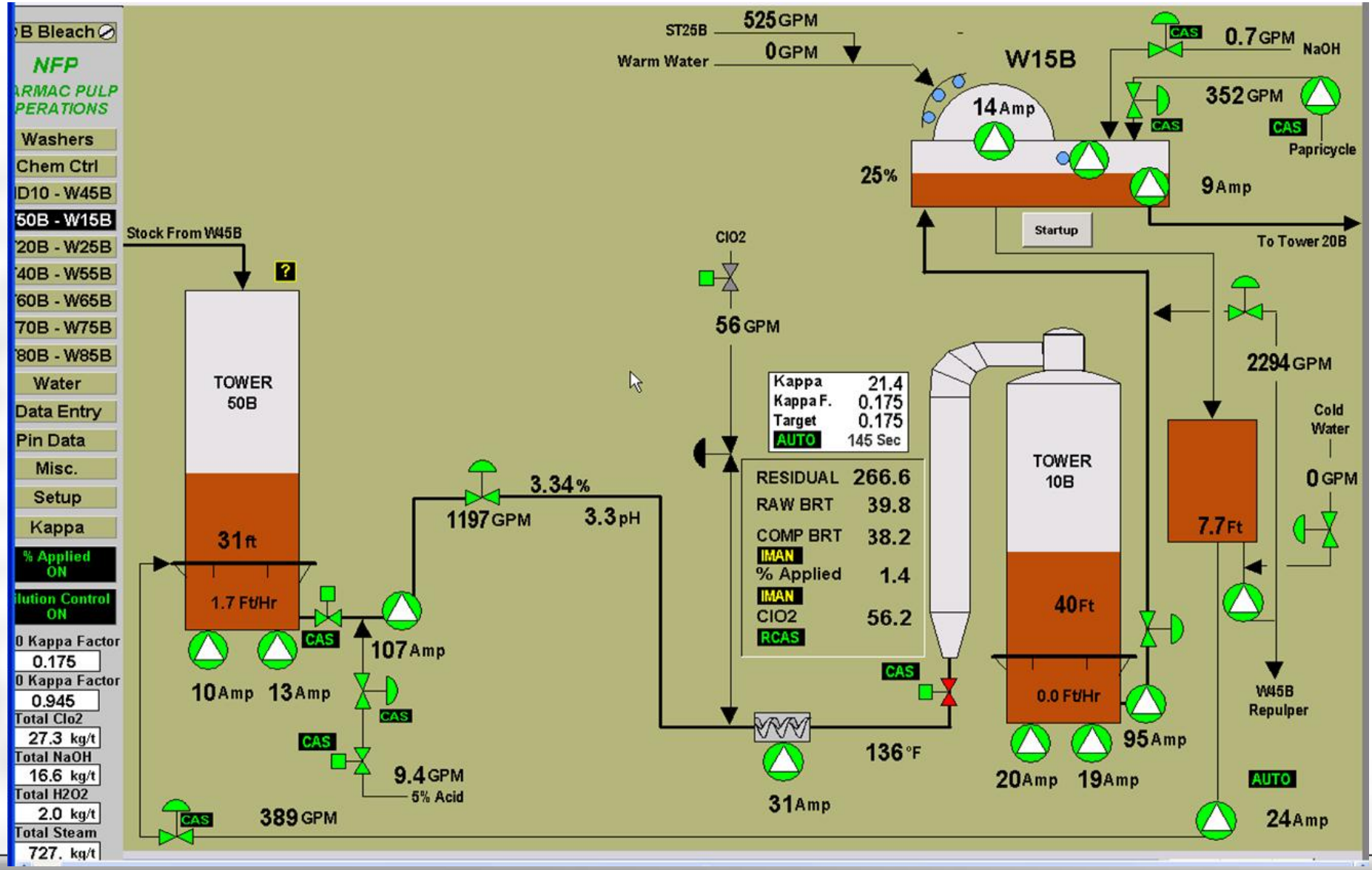
Old LC D_0


DeltaV Operate (Run)
Module: DR-33-12
Main: B_T50B_TO_W15B
Username: ADMINISTRATOR
2:28:45 PM
SR
PM
RK
C BL.
B BL.
R8
Trends
B Bleach
B BLEACH
HARMAC PULP OPERATIONS
Washers
Chem Ctrl
HD10 - W45B
T50B - W15B
T20B - W25B
T40B - W55B
T60B - W65B
T70B - W75B
T80B - W85B
Water
Data Entry
Pin Data
Misc.
P Number
2.1
11:46:58
ST25B
Warm Water
0GPM
W15B
Maint
NaOH
Papricycle
Defoamer Tank
To Tower 20B
Stock From W45B
TOWER 50B
68Ft
5% Acid
ClO2
Kappa Factor
0.00
0.18
Bias 0.00
RESIDUAL 0.0
RAW BRT 10.0
COMP BRT 4.2
% Applied 0.0
ClO2 0.0
IMAN
3.00%
0Ft
0.0pH
2.00%
50°F
TOWER 10B
7.3Ft
Cold Water
W45B Repulper
Well Water
Kappa Factor 0.00
Total Clo2 0.0 kg/t
Total NaOH 0.0 kg/t
Total H2O2 0.0 kg/t
Total Steam 0.0 kg/t
BL_PRO3
Run
NUM

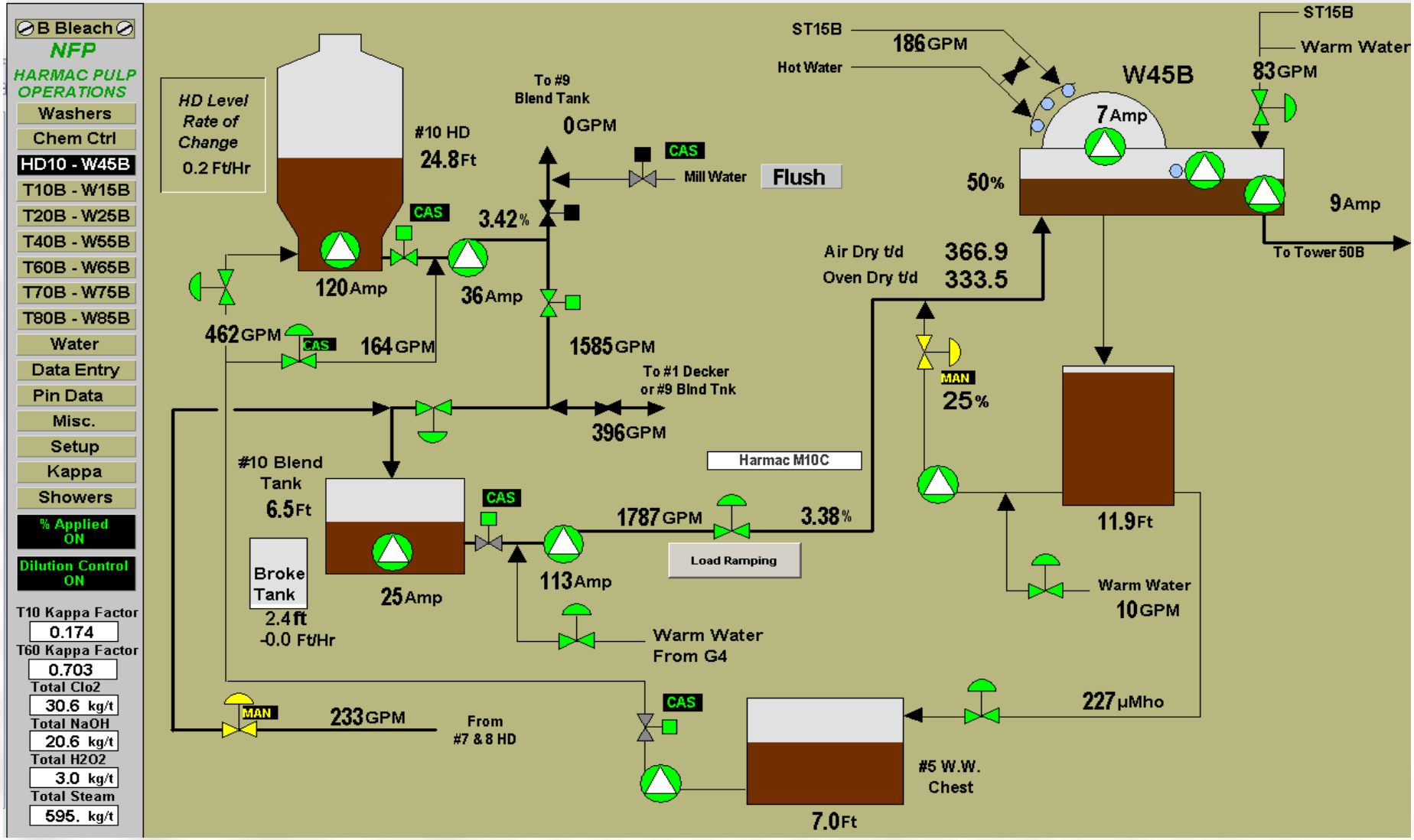
Interim LC D_0



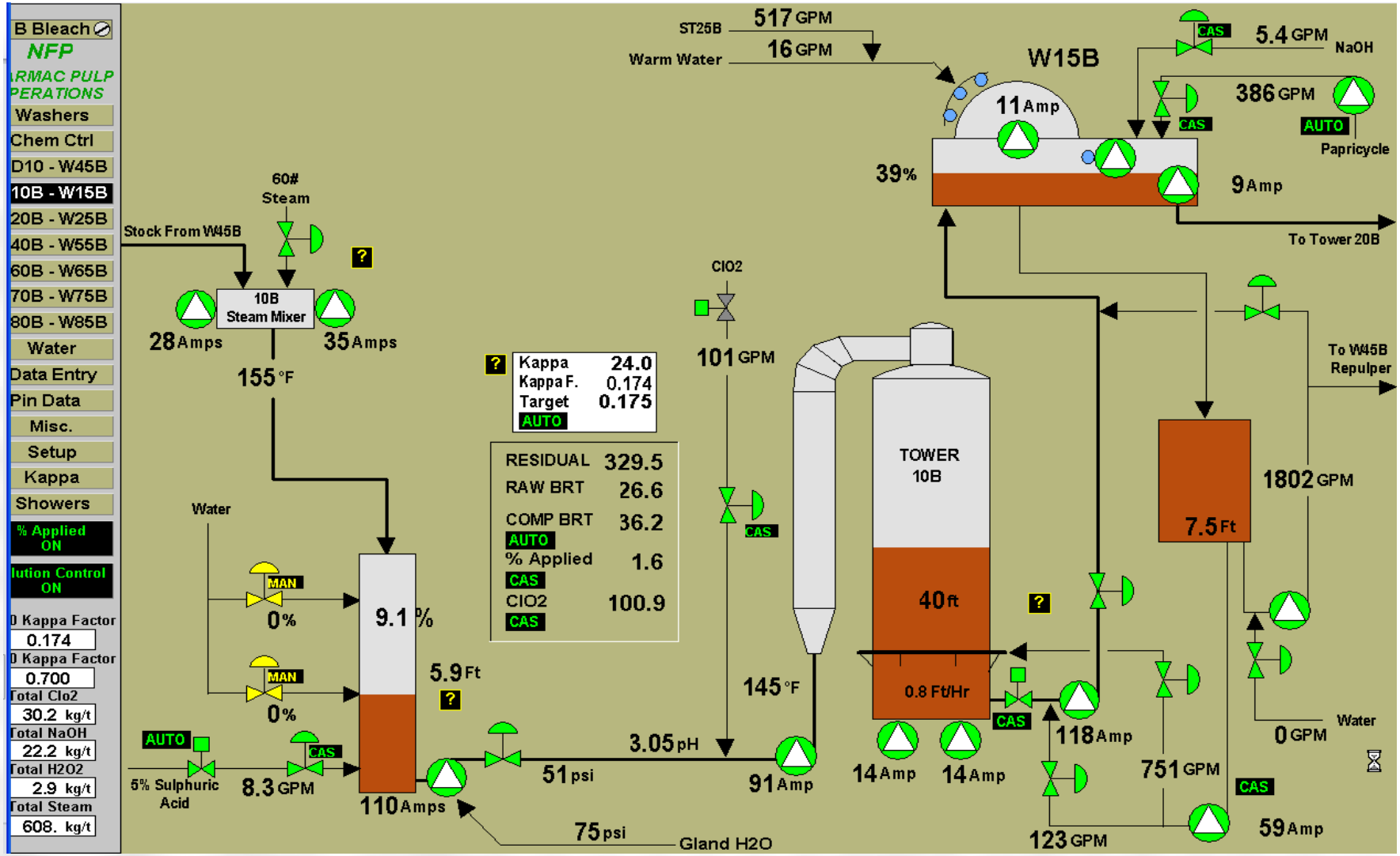
Interim LC D_0

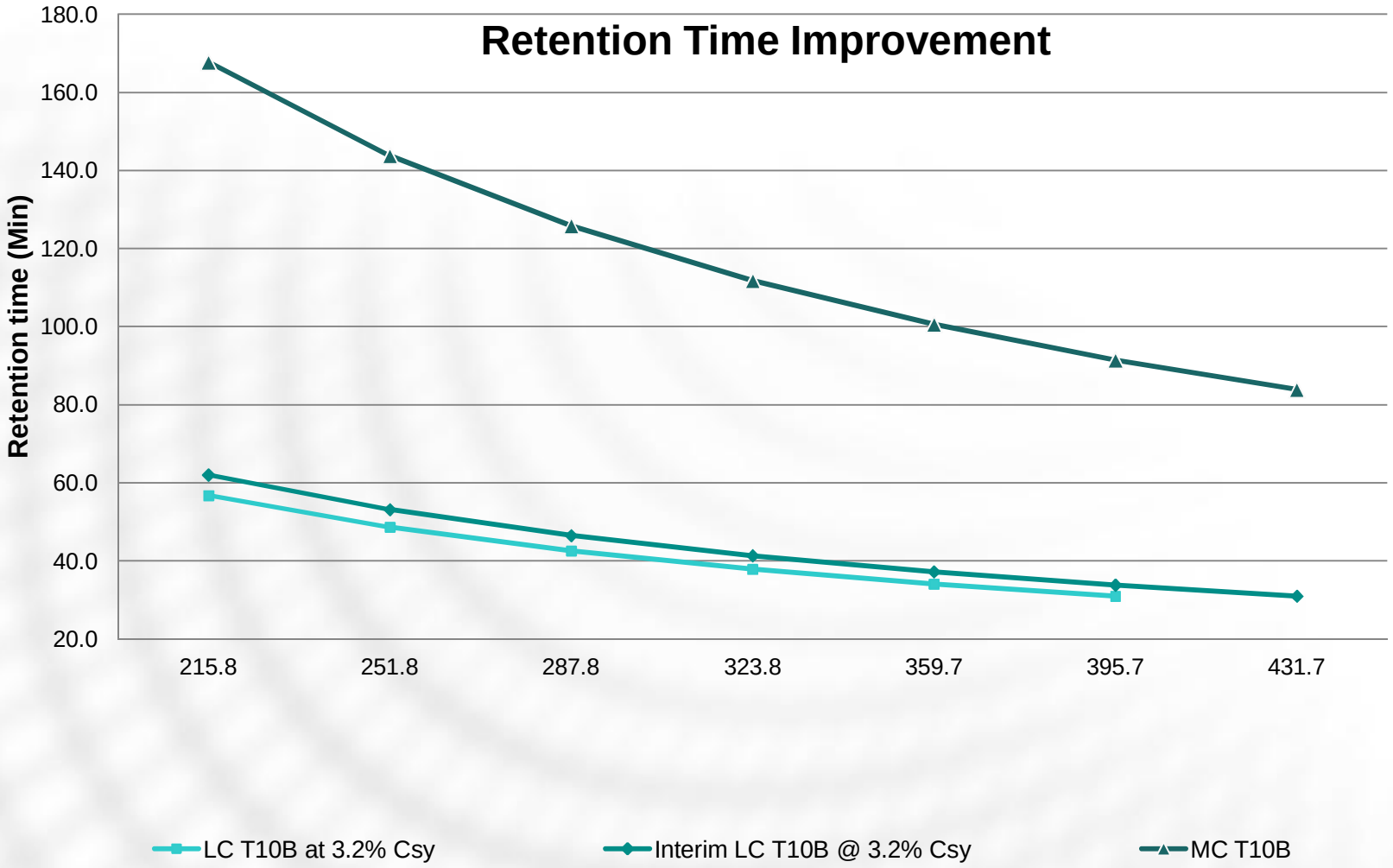


Final MC D_0 Stage



Final MC D_0 Stage

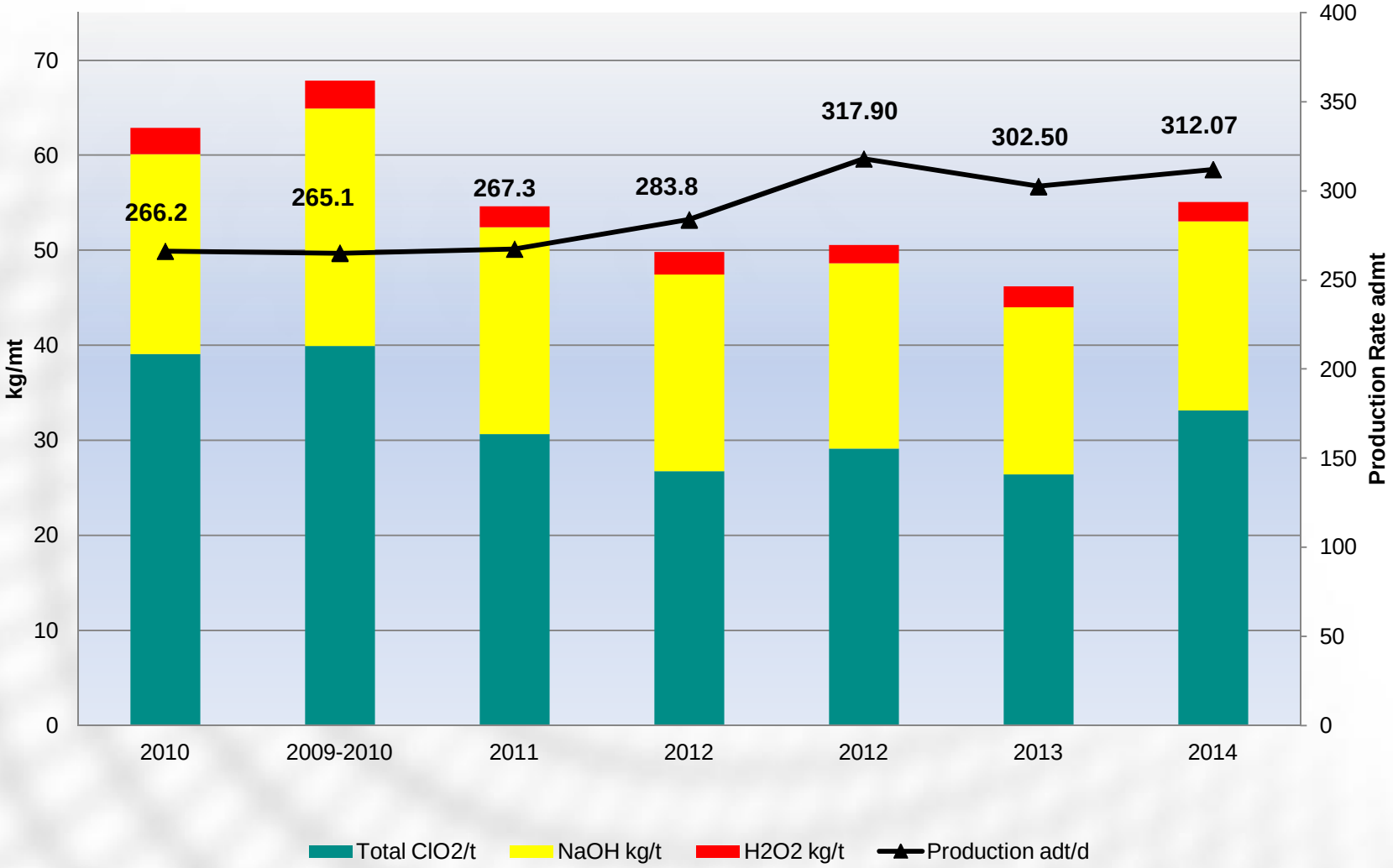



Retention Time Improvement
Retention time (Min)
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
215.8
251.8
287.8
323.8
359.7
395.7
431.7
LC T10B at 3.2% Csy
Interim LC T10B @ 3.2% Csy
MC T10B

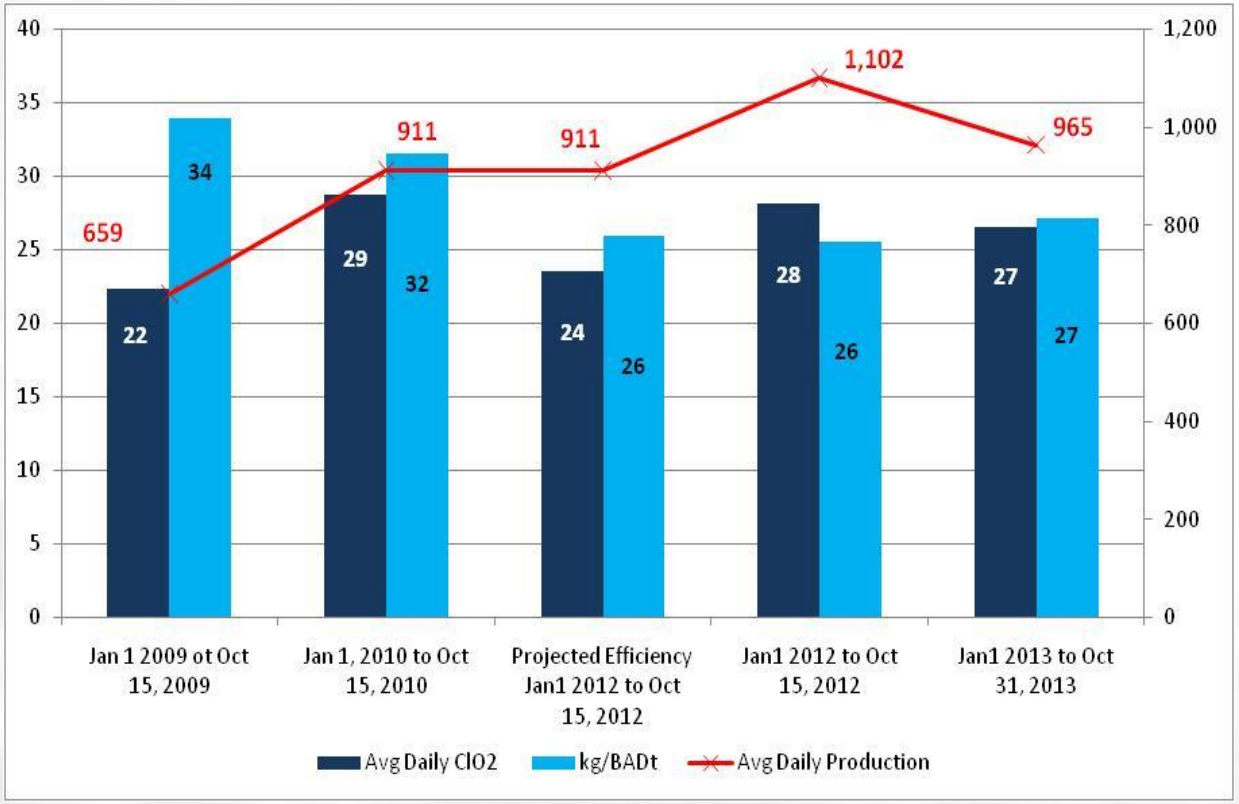
Condition and results @ Avg. 255admt/d

	Consist (%)	Retention Time (min)	Temp. (˚ C)	D_0 Kappa Factor	Brightness D_0 (EOP)	D1 Kappa Factor
LC D_0	3.2	48.7	43.3	0.17	46.6	0.95
Interim LC D_0	3.4	56.5	53.3	0.17	49.1	0.83
MC D_0	10.0	143.8	58.9	0.17	54.5	0.77

B Bleach Chemical Usage Results



Energy Savings		
NaClO3 to ClO2 Conversion Factor	1.67	
NaClO3 Conversion to ClO2 efficiency	93.70%	
Total NaClO3 Savings	2,030	Tonnes
NaClO3 Electrical Energy Input	5,175	Kw-hr/tonne
Total Electrical Energy Savings	10,503,278	Kw-hr
Total Electrical Energy Savings	**37,812**	GJ



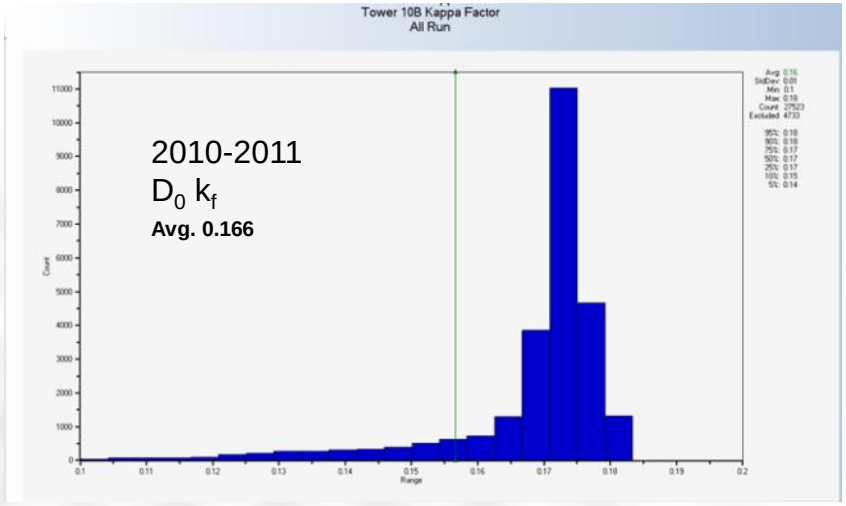
ClO2 Efficiency						
	ClO2 Generation (tonnes)	Avg Daily ClO2	Production (ADMT)	Avg Daily Production	Tonnes Pulp/Tonne ClO2	kg/BADt
Jan 1 2009 ot Oct 15, 2009	6,420	22	189,062	659	29	34.0
Jan 1, 2010 to Oct 15, 2010	8,261	29	261,527	911	32	31.6
Jan1 2013 to Oct 31, 2013	7,939	26.6	292,272	965	36	27.2
Projected Efficiency and ClO2 Savings- 2012:						
Projected Efficiency Jan1 2012 to Oct 15, 2012	6,800	24	261,527	911	39	**26.0**
Projected Annual Savings - Tonnes of ClO2 (340,000 TPY)	2,735					
Factor by 0.4	**1,094**				32.5	
Achieved Efficiency and ClO2 Savings- 2012:						
Jan1 2012 to Oct 15, 2012	8,121	28	317,456	1,102	39	**25.6**
Annual Savings - Tonnes of ClO2 (340,000 TPY)	2,847					
Factor by 0.4	**1,139**				32.7	

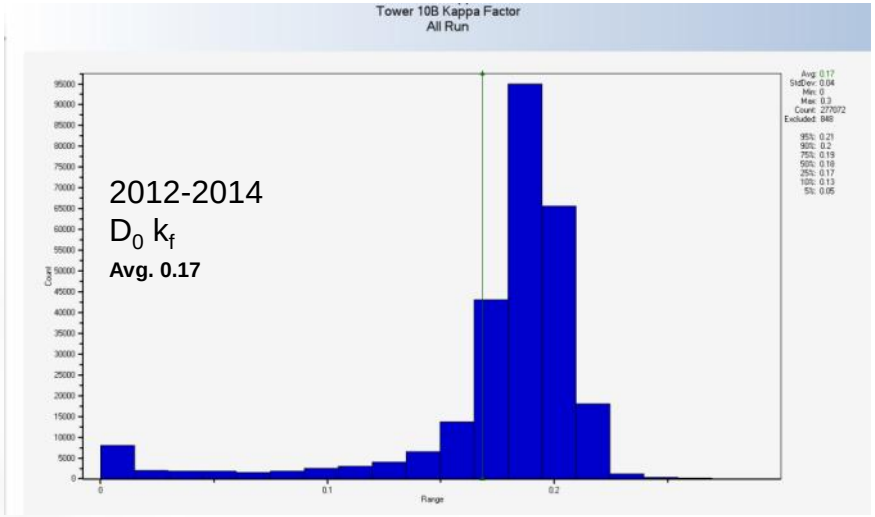
Achieved Benefits

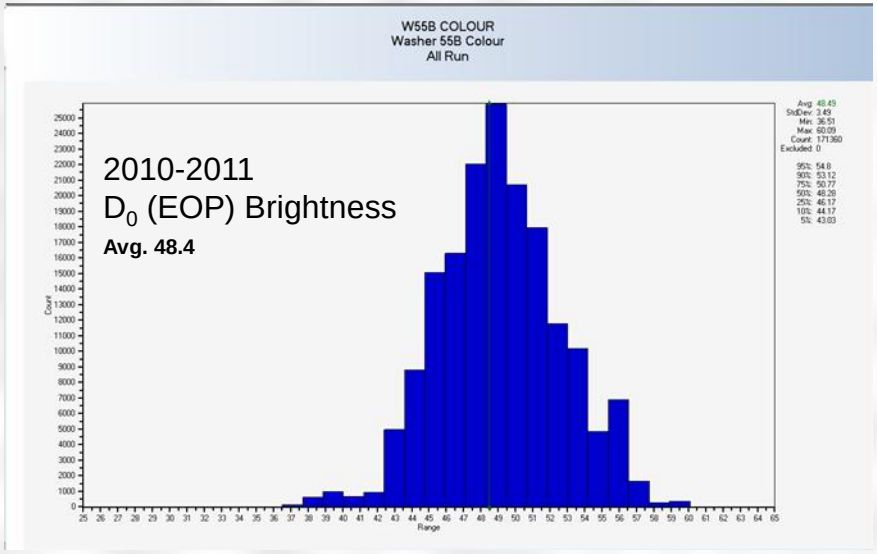
- Overall ClO2 usage improvement in B bleach
- B Bleach D_0 maintenance cost reduction
- 200hp power usage reduction
- Storage capacity increase in B bleach
- 10% total chemical cost reduction

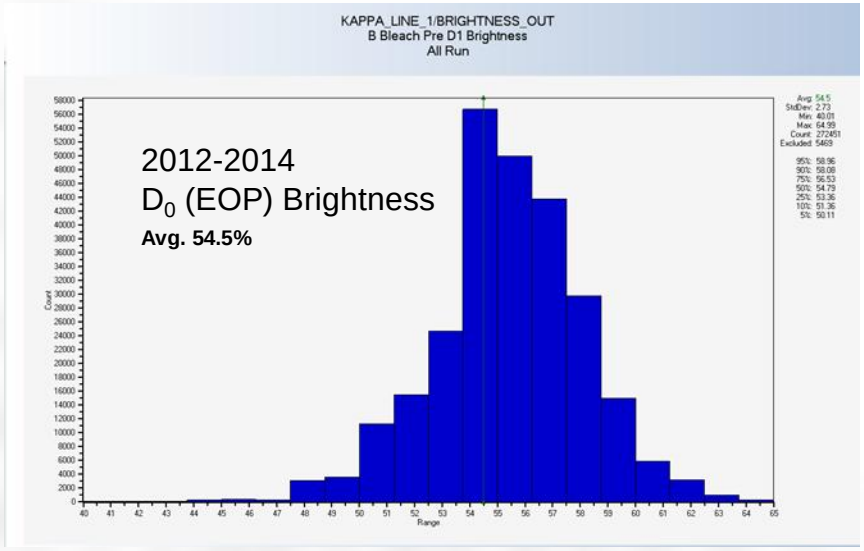
Thank You


Harmac.MANUAL.BBIchTower10BTowerTmp/Plot
File
Display
Windows
Help
Tag
Description
Min
Max
Current
TIC-76-906/PID1
Tower 10B Inlet Temperature
32
212
144.2
Name
Avg
Std Dev.
Min
Max
TIC-76-906/PID1/PV.F_
106.0
12.8
62.5
125.6
212
176
140
104
68
32
10/5/09
10/13/09
10/21/09
10/29/09
11/6/09
11/14/09
11/22/09
11/30/09
12/8/09
12/16/09
12/24/09
1/1/10
1/9/10
1/17/10
1/25/10
9/28/09
127D
2/2/10
Tag
Description
Min
Max
Current
TI-76-509/AI1/PV
T10B Temp (Cormec)
50
200
145.3
Name
Avg
Std Dev.
Min
Max
TI-76-509/AI1/PV.F_CV
127.3
28.8
-13.0
151.1
200
170
140
110
80
50
8/10
10/10
12/10
2/11
4/11
6/11
8/11
10/11
12/11
2/12
6/17/10
615.4D
2/22/12
Tag
Description
Min
Max
Current
TIC-76-906/PID1
Tower 10B Inlet Temperature
32
212
144.2
Name
Avg
Std Dev.
Min
Max
TIC-76-906/PID1/PV.F_
138.0
15.0
0.0
157.7
212
176
140
104
68
32
8/12
10/12
12/12
2/13
4/13
6/13
8/13
10/13
12/13
2/14
7/17/12
585.4D
2/22/14

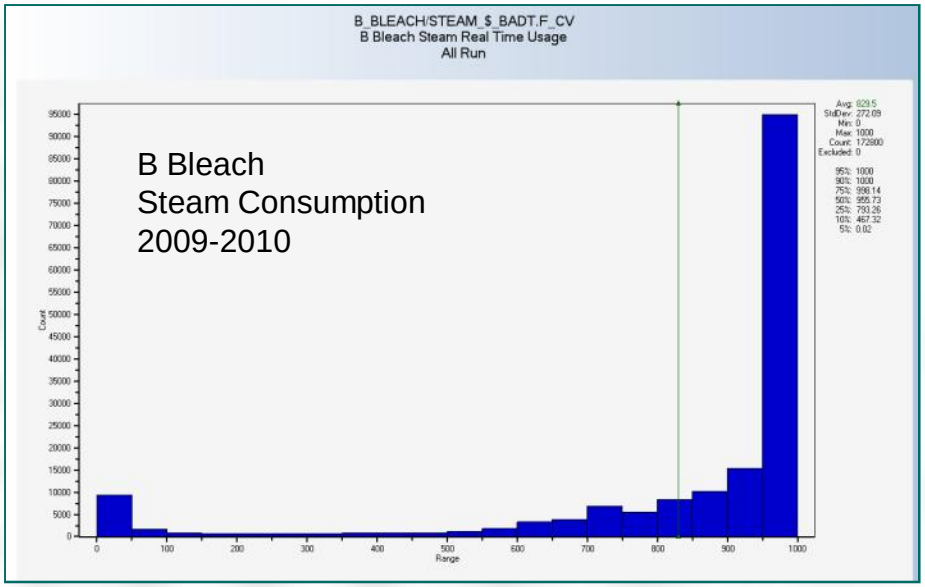

Tower 10B Kappa Factor
All Run
2010-2011
D_0 k_f
Avg. 0.166

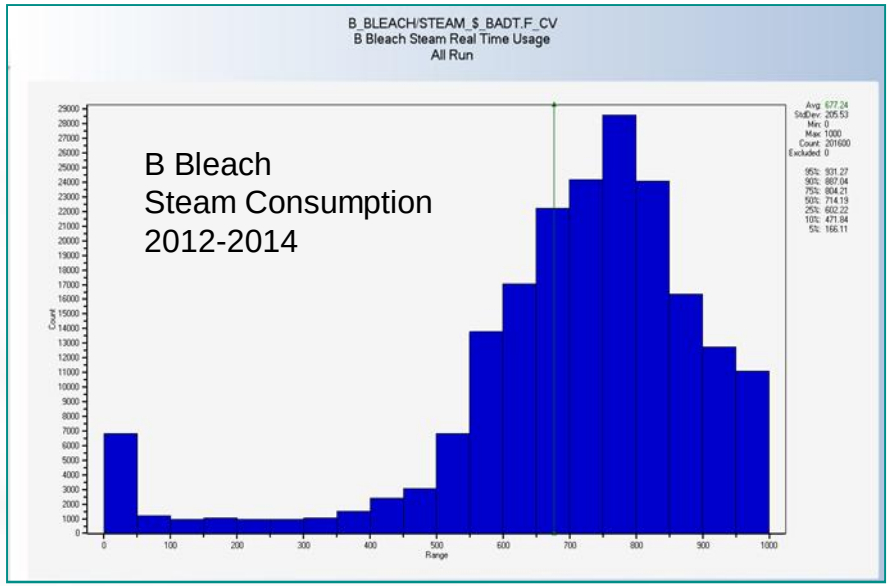

Tower 10B Kappa Factor
All Run
2012-2014
D_0 k_f
Avg. 0.17


W55B COLOUR
Washer 55B Colour
All Run
2010-2011
D_0 (EOP) Brightness
Avg. 48.4

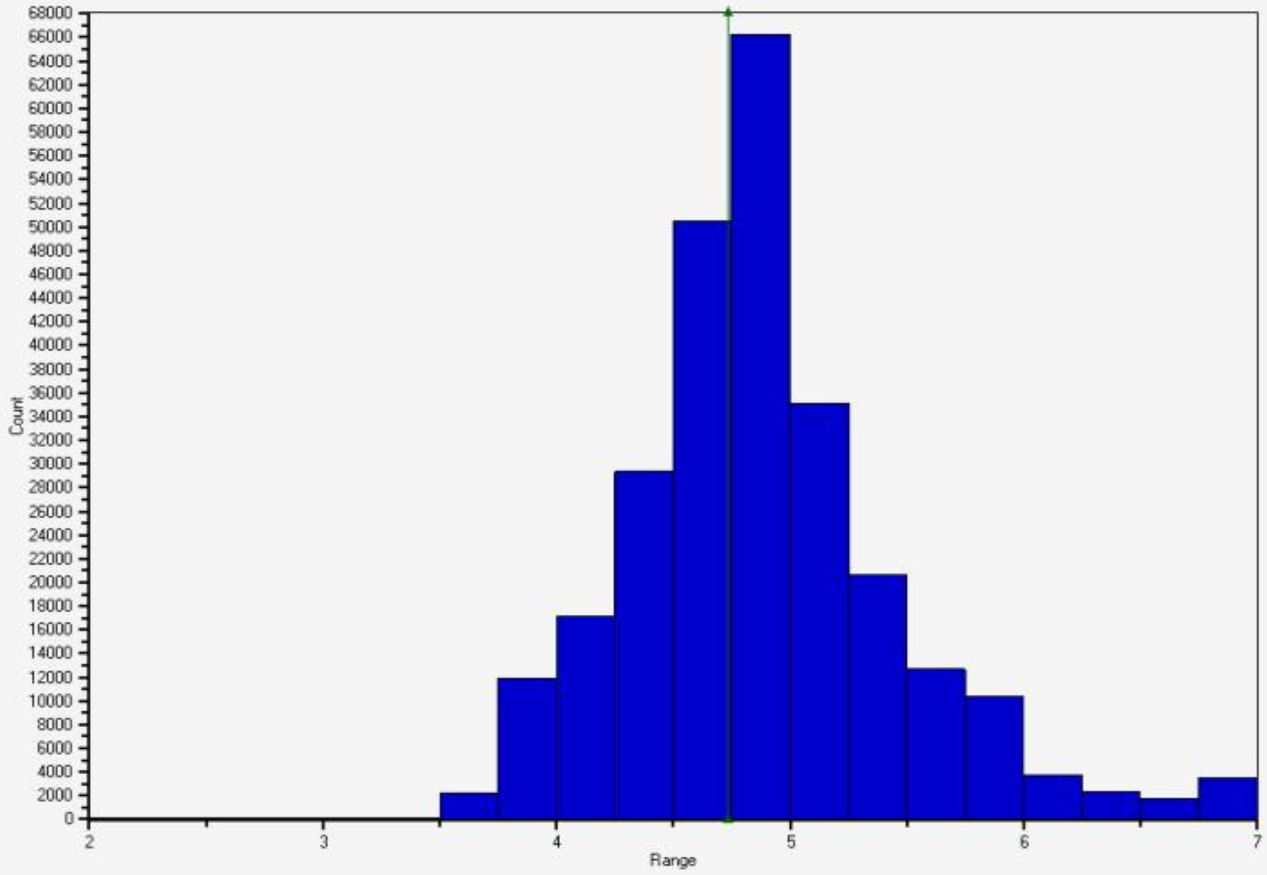

KAPPA_LINE_1/BRIGHTNESS_OUT
B Bleach Pre D1 Brightness
All Run
2012-2014
D_0 (EOP) Brightness
Avg. 54.5%

B Bleach Steam





B-KAPPA-60/T60B_KAPPA.F_CV
Tower 40B Kappa
All Run

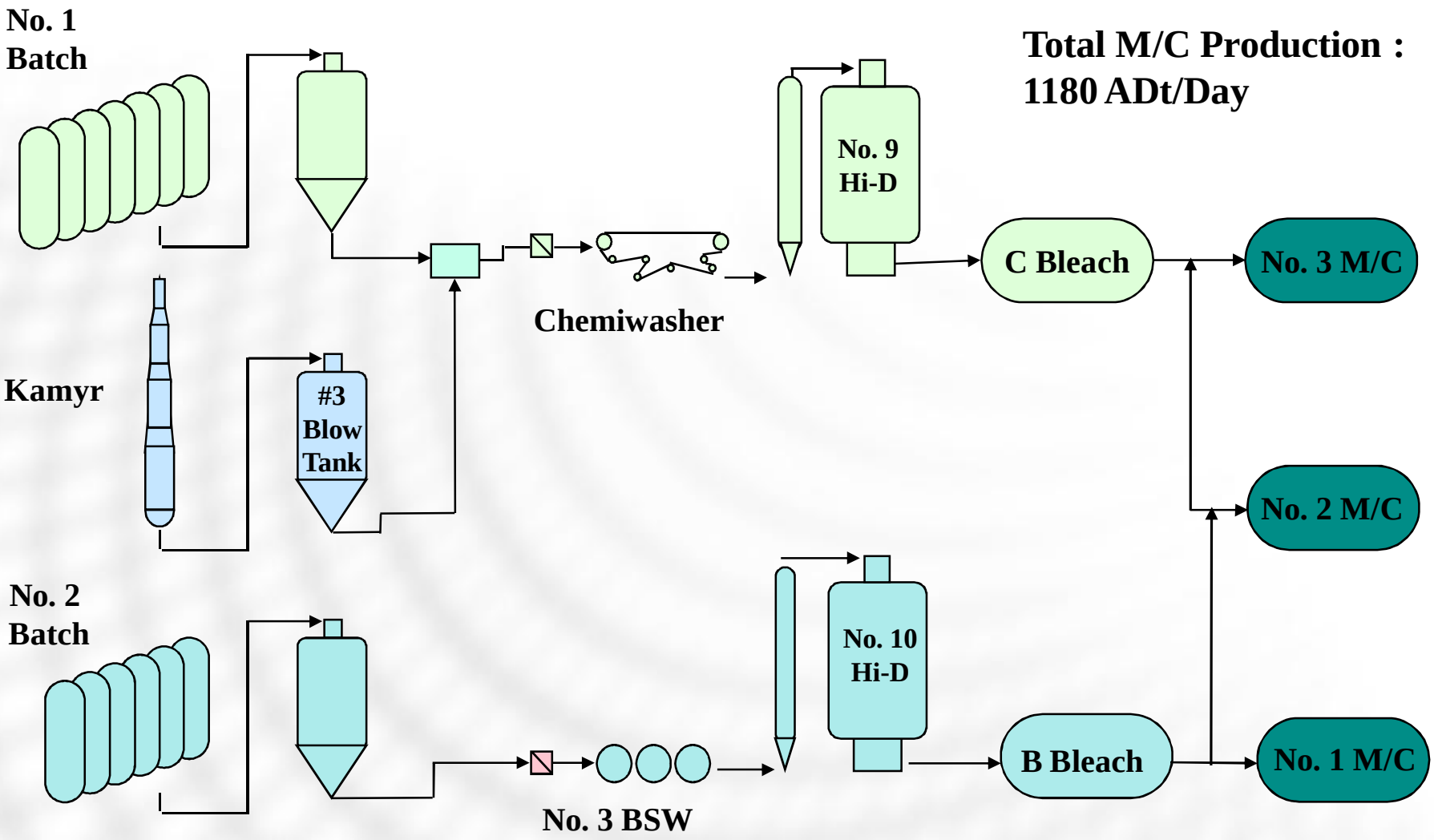


Avg: 4.73
StdDev: 0.6
Min: 2
Max: 7
Count: 275942
Excluded: 1978

95%: 5.8
90%: 5.51
75%: 5.02
50%: 4.71
25%: 4.41
10%: 4.06
5%: 3.84

	B Bleach Production Rate, usgpm				2200						
	B Bleach Production Rate, BADt/d				396						
			Working	*Working*	*Working*	*Theoret*	*Working*	*Working*			
		ID	*Height*	*Volume*	*Volume*	*Volume*	*Volume*	*Volume*	*Consist*		*Retention*
		feet	*feet*	*cubic ft*	*usgallons*	*usgallons*	*litres*	*m^3*	*%BD*		*minutes*
OLD	*T10B*	15.00	52.00	9189	68740	71855	260179	260	3.2%		31.0
Interim	*T80A up*	8.00	60.00	3112	23281		88119	88	3.2%		10.5
T10B	*T80A dwn*	14.00	45.00	6927	51819	70550	196135	196	3.2%		23.3
											33.8
Final	*T60A up*	8.00	60.00	3112	23281		88119	88	9.0%		29.5
T10B	*T50B*	16.00	30.00	6032	45121	100900	170784	171	9.0%		57.2
											86.7

Harmac Pacific Pulp Operations



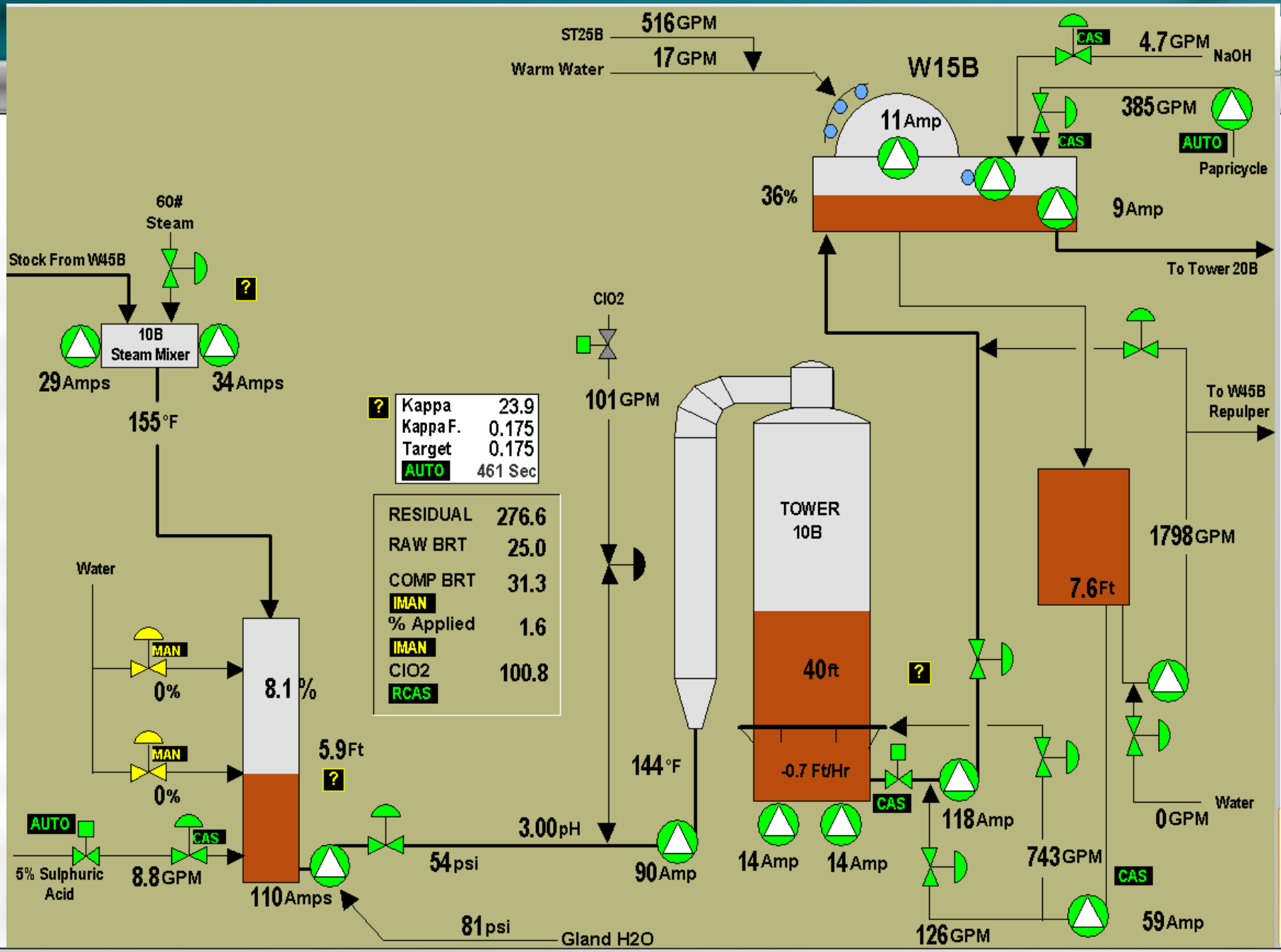
Scope

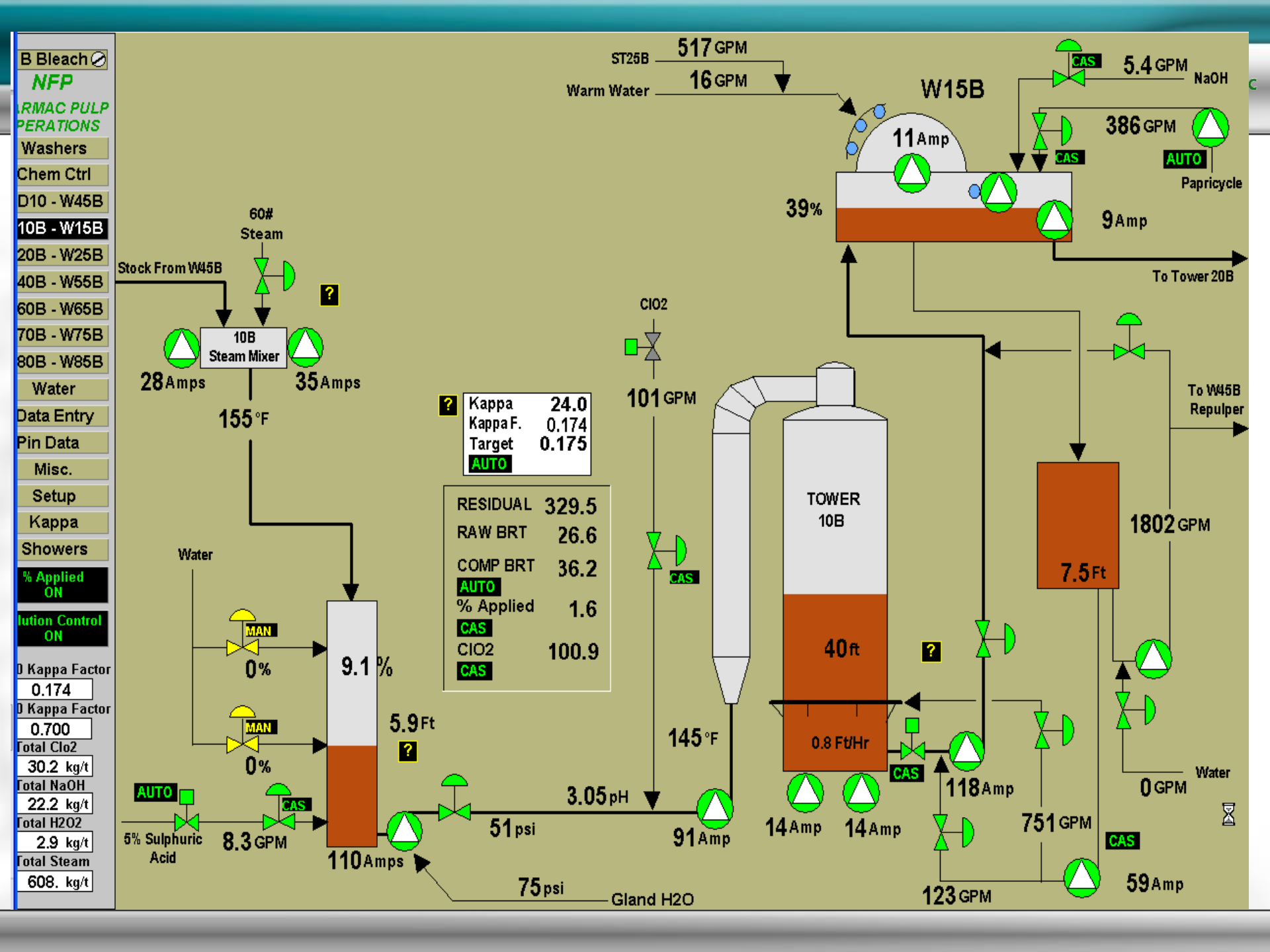
Remove steam mixer from T40A and recondition. Install steam mixer below washer 45B.

Install drop chute to basement MC chute. Install MC chute and pump.

Install SS piping on discharge of MC Pump to ClO_2 mixer.

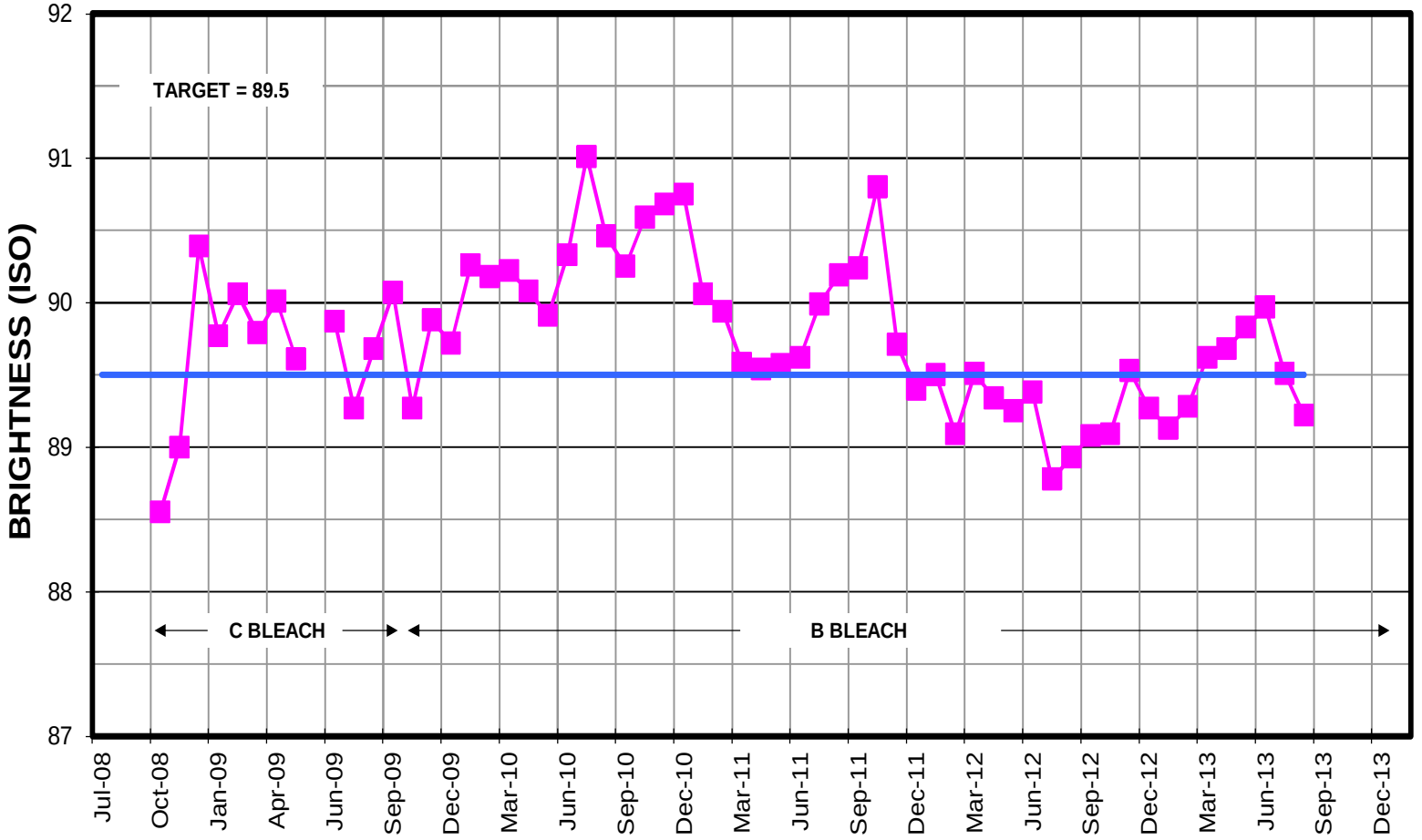
MC pump is controlled so that all stock falling into the drop leg is pumped further at the higher possible consistency. Pulp level in the drop leg will be measured. The flow rate through the pump can be adjusted by a control valve (it could be considered to combine the control valve strategy by changing the speed of the pump).

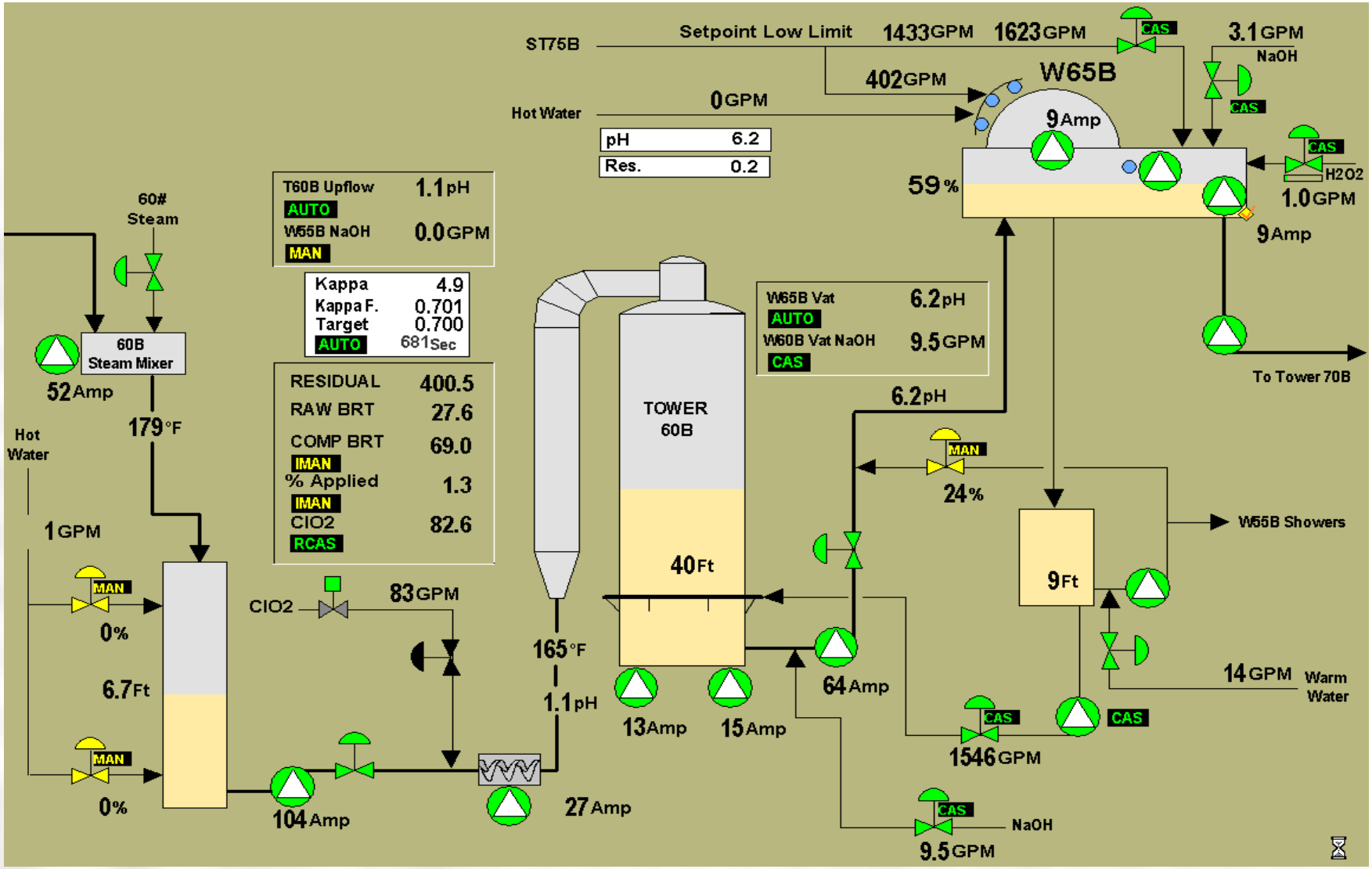

516 GPM
ST25B
17 GPM
Warm Water
W15B
CAS
4.7 GPM
NaOH
11 Amp
385 GPM
AUTO
Papricycle
CAS
36%
9 Amp
To Tower 20B
60#
Steam
Stock From W45B
?
10B
Steam Mixer
29 Amps
34 Amps
155 °F
ClO2
101 GPM
To W45B
Repulper
Kappa 23.9
Kappa F. 0.175
Target 0.175
AUTO 461 Sec
RESIDUAL 276.6
RAW BRT 25.0
COMP BRT 31.3
IMAN
% Applied 1.6
IMAN
ClO2 100.8
RCAS
TOWER
10B
7.6 Ft
1798 GPM
Water
MAN
0%
MAN
0%
8.1 %
40 ft
?
5.9 Ft
?
144 °F
-0.7 Ft/Hr
CAS
118 Amp
AUTO
CAS
5% Sulphuric
Acid
8.8 GPM
3.00 pH
54 psi
90 Amp
14 Amp
14 Amp
743 GPM
0 GPM
Water
CAS
110 Amps
81 psi
Gland H2O
126 GPM
59 Amp


B Bleach
NFP
RMAC PULP
PERATIONS
Washers
Chem Ctrl
D10 - W45B
10B - W15B
20B - W25B
40B - W55B
60B - W65B
70B - W75B
80B - W85B
Water
Data Entry
Pin Data
Misc.
Setup
Kappa
Showers
% Applied ON
lution Control ON
D Kappa Factor
0.174
D Kappa Factor
0.700
Total Clo2
30.2 kg/t
Total NaOH
22.2 kg/t
Total H2O2
2.9 kg/t
Total Steam
608. kg/t
ST25B
517 GPM
Warm Water
16 GPM
W15B
11 Amp
5.4 GPM
NaOH
386 GPM
AUTO
Papricycle
39%
9 Amp
To Tower 20B
60#
Steam
Stock From W45B
10B
Steam Mixer
28 Amps
35 Amps
155 °F
ClO2
101 GPM
Kappa 24.0
Kappa F. 0.174
Target 0.175
AUTO
RESIDUAL 329.5
RAW BRT 26.6
COMP BRT 36.2
AUTO
% Applied 1.6
CAS
ClO2 100.9
CAS
TOWER
10B
40ft
0.8 Ft/Hr
7.5Ft
1802 GPM
To W45B
Repulper
Water
MAN
0%
MAN
0%
9.1 %
5.9Ft
AUTO
5% Sulphuric Acid
8.3 GPM
CAS
110Amps
3.05 pH
51 psi
145 °F
91Amp
14Amp
14Amp
118Amp
751 GPM
123 GPM
59Amp
0 GPM
Water
75 psi
Gland H2O

NO. 1 MACHINE BRIGHTNESS

ALL FB GRADES (B LINE SINCE SEP 2009)




ST75B
Setpoint Low Limit
1433GPM
1623GPM
CAS
3.1GPM
NaOH
CAS
402GPM
W65B
Hot Water
0GPM
9Amp
pH 6.2
Res. 0.2
59%
CAS
H2O2
1.0GPM
9Amp
T60B Upflow 1.1pH
AUTO
W55B NaOH 0.0GPM
MAN
Kappa 4.9
Kappa F. 0.701
Target 0.700
AUTO 681Sec
60#
Steam
60B
Steam Mixer
52Amp
179°F
Hot
Water
1GPM
RESIDUAL 400.5
RAW BRT 27.6
COMP BRT 69.0
IMAN
% Applied 1.3
IMAN
ClO2 82.6
RCAS
TOWER
60B
W65B Vat 6.2pH
AUTO
W60B Vat NaOH 9.5GPM
CAS
To Tower 70B
6.2pH
MAN
24%
W55B Showers
9Ft
40Ft
MAN
0%
6.7Ft
MAN
0%
ClO2
83GPM
165°F
1.1pH
13Amp
15Amp
64Amp
14GPM
Warm
Water
CAS
CAS
1546GPM
104Amp
27Amp
CAS
NaOH
9.5GPM

Overview | Kappa | Brightness | Consistency | Models

2&3 BSW Channel A

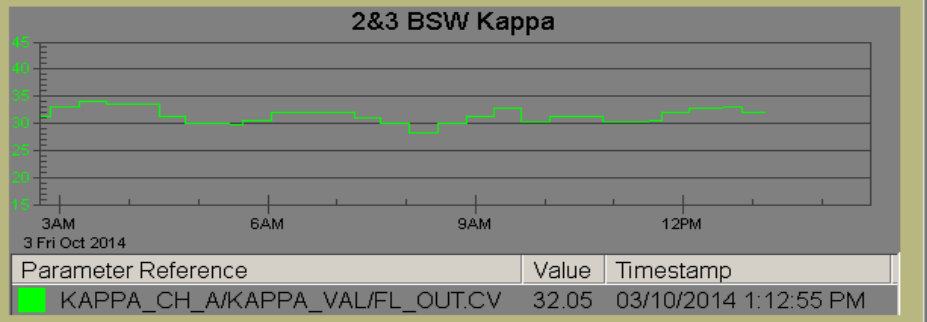
Status **Adjusting consistency to 0.2%**

Kappa 32.05 Kappa (Avg. of last 5 samples) 32.09

Last Sample 12:50

(•) Cedar Grades
( ) Hem/Fir Grades

Channel Enable Sampler ON



Parameter Reference	Value	Timestamp
KAPPA_CH_A/KAPPA_VAL/FL_OUT.CV	32.05	03/10/2014 1:12:55 PM

T10B Channel B

Status **Standby (Waiting)**

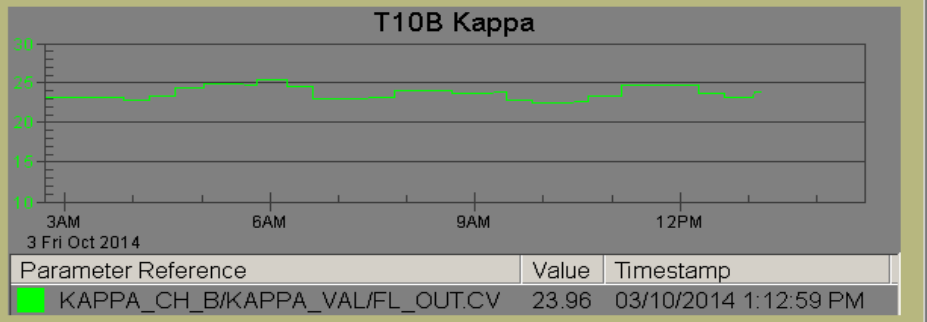
Kappa 23.96 Kappa (Avg. of last 5 samples) 23.57

Kappa Tolerance HI 35.0 LO 11.0

Last Sample 13:4

(•) Cedar Grades
( ) Hem/Fir Grades

Channel Enable Sampler ON



Parameter Reference	Value	Timestamp
KAPPA_CH_B/KAPPA_VAL/FL_OUT.CV	23.96	03/10/2014 1:12:59 PM

T60B Pre D1 [KappaQ Line 1]

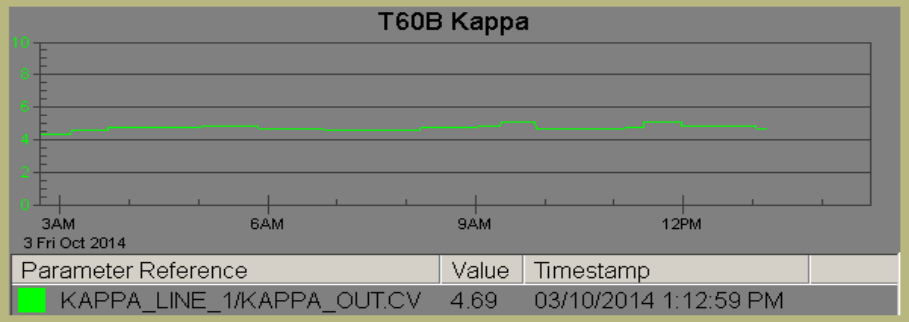
Status **Waiting...**

Kappa 4.69

Kappa Tolerance HI 7.2 LO 3.5

Last Sample 12:52

Line Enable Sampler ON



Parameter Reference	Value	Timestamp
KAPPA_LINE_1/KAPPA_OUT.CV	4.69	03/10/2014 1:12:59 PM

Chlorate & Caustic: Bleach Plant