Technical proposal for Boiling house

Equipment for expansion of Sugar plant 2500 TCD to 5500 TCD

I N D E X

Sr. No.	PARTICULAR
1	PRAPOSED STEAM AND MASS BALANCE FOR 5500 TCD
2	EXISTING & PRAPOSED EVAPORATOR BODIES + JUICE HEATER ARRANGEMENT
3	MATERIAL BALANCE SHEET
4	EXISTING & PROPOSED EQUIPMENT LIST
5	EXISTING AND PRAPOSED BOILING HOUSE PUMP LIST

01)HEAT MASS BALANCE OF 5500 TCD (240TCH) SUGAR PLANT

Absolute pressure and pressure drop
Exhaust condition: - 2.033 kg/cm2 (120 Deg C)
Last body vacuum: - 0.204 (24''vacuum) kg/cm2
Corresponding pressure/temp. Distribution of quintuple. Total pressure drop = 2.033 –0.204 = 1.828 kg/cm2

1) Pressure drop in 1st body = 11/50 x 1.828 = 0.402 kg/cm2
2) Pressure drop in 2nd body = 10.5/50 x 1.828 =0.384 kg/cm2
3) Pressure drop in 3rd body = 10/50 x 1.828 = 0.366 kg/cm2
4) Pressure drop in 4th body = 9.5/50 x 1.828 = 0.347 kg/cm2
5) Pressure drop in 5th body = 9/50 x 1.828 = 0.329 kg/cm2

Then,

1) Absolute pressure in 1st body = 2.033 -0. 402 = 1.631 kg/cm2
2) Absolute pressure in 2nd body = 1.631 -0.384 = 1.246 kg/cm2
3) Absolute pressure in 3rd body = 1.246 -0.366 = 0.881 kg/cm2
4) Absolute pressure in 4th body = 0.881 -0.347 = 0.533 kg/cm2
5) Absolute pressure in 5th body = 0.533 -0.329 = 0.204 kg/cm2

Corresponding pressure/temp. of quintuple are
I - 1.631 /113.24°C, II -1.246 /105.308°C, III -0.881/95.6°C, IV - 0.533 /82.548°C, V - 0.204 /60.371°C,
Corresponding latent heat are

Exhaust : 538.725 I – 541.117 II -544.128 III -548.109 IV -553.89 V- 564.634

A Massecuite produced = 250 x 28.362/100 = 70.904 T/ Hr =70904 Kg/ Hr.
Vapour required For A Massecuite = 0.45x 70904 =31907 Kg/Hr.

B Massecuite produced = 250 x 12.019 /100 = 30.047 Ton/ Hr = 30047 Kg/ Hr.
Vapour required For B Massecuite = 0.4875 x 30047 = 11718 kg/Hr

C Massecuite produced = 250 x 6.331/100 = 15.827 Ton/ Hr = 15827 Kg/ Hr.

Vapour required For C Massecuite = 0.48 x 15827 = 6647 kg/Hr

Mix juice % cane = 100.079 %
Mix juice produced per hour = 5500/22 = 250 Ton / hr = 250000 kg/hr.
Filtrate % cane = 14.2%
Sulphured juice % cane = 115.929%
Sulphured juice produced = 250 x 1.15929 = 289.824 ton /hr = 289824 kg/hr

A) Vapour required for 1st raw juice heating from 32 deg. to 42deg.
in vapour line juice heater by last body vapour
= 250000 x 09x (42-32) /564.634
= 4041 Kg/Hr

B) Water required for 2nd raw juice heating from 42°C to 55°c by Hot condensate in
Condensate juice heater
= 250000 X 0.9 X (55-42) / (101-60) = 71341 kg/hr =71.34 T/hr

C) Vapour required for 3rd raw juice heating from 55 deg. to 72deg.
in Tubular juice heater by 4th Body vapour
= 250000 X 0.9 X (72-55) / 548.109 = 7076.00 kg / hr

D) Vapour required for 1st Sulphured juice heating from 70°c to 85°c
by 2nd body vapour in Tubular juice heater
= 289824 X 0.9 X (85-70) /544.128 = 7286 kg / hr

E) Vapour required for 2nd Sulphured juice heating from 85°c to 102°c
by 1st body vapour in Tubular juice heater
= 289824 X 0.9 X (102 -85) / 541.117 = 8303 kg/hr

F) Vapour required for Clear juice heating from 96°c to 103°c by
1st body vapour

= 252324 X 0.9 X (110-96) /541.117 = 2977 kg/hr

G) Vapour required for Clear juice heating from 103^{O}c to 110^{o}c by Exhaust steam

= 252324 X 0.9 X (110-103) /538.725 = 2990 kg/hr

Vapour produced by 5^{th} body = X + 4041

Vapour produced by 4^{th} body = X+ 4041

Vapour produced by 3^{rd} body = X + 4041 + 7076

Vapour produced by 2^{nd} body = X + 4041 + 7076 +7286 + 31907 + 11718

Vapour produced by 1^{st} body = X + 4041 + 7076 +7286 + 31907 + 11718 + 8303 + 2977 + 6647

Total vapour produced = 5 X + 161182

Total evaporation = 252324 (60– 14.42 / 60) = 191673 kg/hr

5 X + 161182 = 191673 X = 6098 kg /hr

1)Vapour produced by 5^{th} body = 10139 Kg/Hr

2)Vapour produced by 4^{th} body = 10139 Kg/Hr

2) Vapour produced by 3^{rd} body = 17215 Kg/Hr

3) Vapour produced by 2^{nd} body = 68127 Kg/Hr

4) Vapour produced by 1^{st} body = 86053 Kg/Hr

Then

A) Heating surface of 1^{st} body –86053/ 27 = 3187 ≈ 3200 m2 approximate

B) Heating surface of 2^{nd} body – 68127/ 22 = 3097 m2 ≈ 3100 m2 approximate

C) Heating surface of 3^{rd} body – 17215/17 = 956 ≈ 1000 m2 approximate

D) Heating surface of 4^{th} body – 10139/ 15 = 676 ≈ 700 m2 approximate

E) Heating surface of 5th body – 10139/15 = 676 ≈ 650 m2 approximate

Steam % cane = (86053/250) x 100
= 34.421%
Consider 2.0 % extra steam required for CJ2 Heating, Pan Body wash,
Seed melting, Soda Boiling, Drain & Line Losses etc.

Steam % on Cane Will be = 36.421 %

Brixes in Quintuple bodies

1. 1st Effect Evaporator Body
   B X J = B1 X J1
   14.422X252.324= B1 X (252.324 – 86.053)

   B1 =21.886

2. 2nd effect Evaporator Body
   B1 X J1 = B2 X J1
   21.886 X 166.27 = B2 X (166.27-68.127)

   B2 = 37.079

3. 3rd Effect Evaporator Body
   B2 X J2 = B3 X J3
   37.079 X 98.144 = B3 X (98.144 -17.215)

   B3= 44.966

4. 4th Effect Evaporator Body

   B3 X J3 = B4 X J4

   44.966 X 80.928 = B4 X (80.928- 10.139)

   B4 = 51.406

5. 5th Effect Evaporator Body

   B4 X J4 = B5 X J5

   51.406 X 70.790 = B5 X (70.790 – 10.139)

   B5 = 60.00

AVERAGE BRIXES IN QUINTUPLE EVAPORATOR BODIES

Raw Juice Brix = 14.422

1. 1st Effect Evaporator Body

$$= \frac{14.422+21.886}{2}$$

B1 = 18.154

2. 2nd effect Evaporator Body

$$= \frac{21.886+37.079}{2}$$

B2 = 29.482

3. 3rd Effect Evaporator Body

$$= \frac{37.079+44.966}{2}$$

B3 = 41.022

4. 4th Effect Evaporator Body

$$= \frac{44.966 + 51.406}{2}$$

B4 = 48.186

5. 5th Effect Evaporator Body

$$= \frac{51.406 + 60}{2}$$

B5 = 55.703

2)EXISTING AND PRAPOSED EVAPORATOR AND JUICE HEATER ARRANGEMENT

Evaporators

EXISTING		PROPOSED		Remark
WORKING	**STANDBY**	**WORKING**	**STANDBY**	
2,800	NIL	2,800	3,800	2New FFE
2,500	NIL	**2,500**		
900	700	900	700+560	Nil
560	560	560	560	Nil
440	440.000	440	440	Nil

JC Heaters

Heating	EXISTING		PROPOSED		New
	WORKING	**STANDBY**	**WORKING**	**STANDBY**	
RJ1	350 M2	350M2	350M2	350M2	**Nil**
RJ2	**NIL**	**NIL**	**170M2**	**170M2**	**Re arrange**
RJ3	170M2	170M2	**170M2**	**350**	**3 x 350 M2 New heaters**
SJ1	170M2		350		
SJ2	170M2		350		
CJ1	170M2	NIL	170M2	**350**	**Re arrange & 1 new 350 M2 heater**
CJ2	NIL	NIL	**170M2**		

3) Material balance sheet

CRUSHING CAPACITY	5,500.00	TCD	250.00	TCH	POL BALANCE		PARTICULARS	SOLIDS(MT)	% BRIX	% PURITY	SOLIDS T/HR	QUANT % CANE
			0.00	TPH	POL IN CANE	13.04	SYRUP	14.84	60.00	84.00	37.11	24.74
Recovery% Cane	10.90				POL IN MJ	12.34	A MASSECUITE	25.81	91.00	88.00	64.52	**28.36**
					POL IN BAGASSE	0.70	A HEAVY	11.58	80.00	74.00	28.96	14.48
Material	**Purity**	**Material**	**Purity**		POL IN FC	0.10	A LIGHT	0.60	75.00	88.00	1.49	0.80
Syrup	84.00	Raw Sugar			POL IN FM	1.26	A SUGAR	13.63	99.98	99.90	34.07	13.63
White Sugar	99.90				POL UNDETERR	0.10	AFW SUGAR	14.23	99.40	99.40	35.56	14.31
A Massecuite	88.00	A Heavy Molasses	74.00		TOTAL LOSS	**2.16**	B MASSECUITE	11.30	94.00	75.00	28.24	**12.02**
B Massecuite	75.00	A Light Molasses	88.00				B HEAVY	5.09	80.00	53.00	12.73	6.37
C Massecuite	55.00	B Heavy Molasses	53.00		**RECOVERY**	**10.90**	B SUGAR	5.92	90.00	95.00	14.79	6.58
AFW	99.40	C light	60.00				C MASSECUITE	6.33	100.00	55.00	15.83	**6.33**
B Sugar	95.00	Final Molasses	35.00				C LIGHT	0.95	78.00	60.00	2.38	1.22
CFW	82.00						FINAL MOLASSES	3.64	88.00	35.00	9.09	4.13
CAW	94.00						CFW SUGAR	2.69	96.00	82.00	6.73	2.81
							CAW SUGAR	1.74	95.00	94.00	4.36	1.83
							DRY SEED	2.42	90.00	-	6.05	2.69
Solid in Syrup		**14.84**					MELT	13.04	65.00	95.00	32.60	20.06
Total Solids in Syrup		**37.11**					**Total Massecute% Cane**					**46.71**

4)EXISTING & PROPOSED EQUIPMENT LIST

Sr. No	Equipment particulars	Existing		Required as per 5500 TCD		REMARK
		Working	Spare	**Working**	**Spare**	
1	Juice Flow Stabilization	Not Mentioned		one Set		
2	Raw Juice receiving tank	Not Mentioned				
3	**Mass Flow meter**	350T/HR	Nil	**350T/HR**	**No Need**	
4	**Imbibition water tank**	Not Mentioned		**17M3 Tank**		
5	**Juice heaters**					
	1) VLJH (Tubular)	350 M2 x1No's	350 M2 x1No's	**350 M2 x1No's**	**350 M2 x1No's**	
	2) Condensate R.JC heater (Duplex heater)	Nill	Nill	**170M2 x1 No's**	**170M2 x 1 No's**	Existing JH re arranged
	3) R.JC 3rd heating (Tubular)	170M2 x1 No's	170M2 x1 No's	**170M2 x1 No's**	**350M2**	350M2 x 3 No's New Heaters used for a RJ3/SJ1/SJ2 heating
	S.JC 1st heating (Tubular)	170M2 x1 No's		**350M2**		
	S.JC 2nd heating (Tubular)	170M2 x1 No's		**350M2**		
	Cl.Juice heater (Tubular)	170M2 x1 No's	Nil	**170M2 x1 No's**	**350M2 x1 No's**	Spare 350M2 heater used for CJ1/CJ2 heating
	Cl Jc 2nd Heating	Not Mentioned	Not available	**170M2 x1 No's**		
6	**Juice sulphitor**	300 HL		**300HL**		Existing is Suitable
7	**Juice sulphitor Auto pH control system**	Not Mentioned		**Single loop Auotamtion with Suitable capacity required**		
8	**Sulphured Juice Receiving Tank**	Not Mentioned		**45 M3 Capacity tank required**		
9	**Sulphur Burners**					
	Juice side	140Kg/Hr	140Kg/Hr	**200**	**140 Kg/Hr**	New 200 kg/hr FTSB required

	Syrup side	70 Kg/Hr	70 Kg/Hr	70 Kg/Hr	70 Kg/Hr	
10	**Air Blowers**					
	Juice side	846 M3/Hr		**924 M3/Hr**		New 1200M3/Hr Blower required
	Syrup side	600 M3/Hr x 2		**630 M3/Hr**	**630 M3/Hr**	Existing is Suitable
11	**Lime Slacker Unit**	1200 Kg/Hr		**1200 Kg/Hr**		Existing is Suitable
	Lime cyclone	Not Mentioned				SUITABLE FOR SLAKER CAPACITY required
	Lime classifier	Not Mentioned				
	MOL Screening	Not Mentioned		Suitable to screen 26M3/Hr MOL vibro x 2 No's needed		
	MOL receiving tanks	15 M3 x 2 no's				Existing is Suitable
	Screened MOL Receiving tank	Not Mentioned		**15 M2 x 1 No's tank required**		
12	**Juice clarifier**	410 M3	250M3			Existing is Suitable
		444 Type	444 Type			
13	**Clear Juice Receiving tank**	Not Mentioned		**32M3 X 1 No's Tank required**		
14	**Vacuum filter Filtering area**	236				
	Vacuum filter	8' X 16' = 36				Existing is Suitable
		10' x 20' = 56				
		16' x 32' = 144				
	Mud tank	Not Mentioned				
	Filtrate tank	Not Mentioned				
	Filtrate pump	Not Mentioned				

	Cake wash tank	Not Mentioned				
	Cake wash pump	Not Mentioned				
	Mud Mixer	Not Mentioned				
	Bagacillo blower	Not Mentioned				
	Bagacillo cyclone	Not Mentioned				
	Inter connecting pipeline	Not Mentioned				
	Mud Pump	Not Mentioned				
	Barometric condenser	Not Mentioned				
	Vacuum pump	Not Mentioned				
15	**Evaporator bodies**					
	SK vessel	2800 M2		3600		New 2No's x 3600M2 FFE Body as a 1st /2nd Effect required
	1st/ 2nd Vessel	2500 M2		3600/2800		
	2nd vessel			3600/2500		
	3rd A vessel	950		950		
	3rd B vessel	700		700+560		
	4th A vessel	560		560		
	4th B vessel	560		560		
	Vth A Vessel	440		440		
	Vth B Vessel	440		440		
16	**Un Sulphured syrup Receiving tank**			**3.14 M3 Reciever required**		
17	**Ev.set Multijet condenser**	Single entry x 2 No;s				Existing is Suitable
18	**Syrup Sulphitor**	120HL				Existing is Suitable
19	**Sulphured Syrup receiving tank**	Not Mentioned		**3.14 M3 Reciever required**		
20	**Syrup + molasses supply tanks**					

	For Syrup	18.75 M3 x 6 No's		**Additional 40 M3 x 2 Nos required**		
	For A-Heavy Molasses	8.24 M3 x 15 No's				
	For B-Heavy Molasses					
	For C-Light Molasses					
21	**Molasses conditioners**					
22	**Vacuum pans**					
	A Pan	40 T x 1 No's		**50T x 3 No's + 80 T x 2 Nos**		Existing pan rearranged
		50 T x 3 No's				
	B Grain Pan	40 T x 1 No's				Existing is Suitable
	B Pan	15 Mt/Hr		**15Mt/Hr x 1 nos + 40Mt x 1 no's**		
	C Grain Pan	80 T x 1 No's				Existing is Suitable
	C Pan	80 T x 1 No's		**New 15Mt/Hr Continuous Pan required**		
23	**Pan Condensate tank**	Not Mentioned		**6.0 M MS Tank required**		
24	**Pan Condensate pump**	Not Mentioned		**72T/Hr Pump x 2 No's Required**		
25	**Dry seed Crystallizer**	22M3		**One new 40 MT D.Cry required**		
26	**B seed Crystallizer**	18M3				**Both Existing D & B Cry used**
27	**A VC**	54.44 MT				Existing is Suitable
28	**B VC**	25.87 T + 22.68 T				Existing is Suitable
29	**C VC**	33 MT				Existing is Suitable

30	**Molasses Conditioner**					
	A Heavy	4.62 Mt capacity		**Suitable capacity DCH Heater**		
	B Heavy	9.4 Mt Capacity		**Suitable capacity DCH Heater**		
	C Light	9.4 Mt Capacity		**Suitable capacity DCH Heater**		
31	**Condenser**			**Suitable for Exisitng Pans**		New Single entry condenser for new 15Mt/Her Conti pan
32	**Air cooled receiving crystallizers**					
	For A-Masscuite receiving	90 x 1 No's +55 x 2 No's		**80 x 2no's New crystalizers required**		
	For B-Massecuite receiving	30 x 4 No's + 150Mt MVC		30 x 4 No's + 150Mt MVC		
	For C-Massecuite receiving	30 x 2 No's + 200Mt MVC +120MVC		**Existing 150Mt C VC to be used for B M/C & 120Mt VC use for C M/C**		
33	**Centrifugal machines**					
	A Pugmill	Not Mentioned				
	Batch Machines For A M/C	750kg/Cycle x 5 No's + 1750Kg/Cysl x 1 No's		**Machine capacity not mentioned properly**		
	A Heavy Run off Tank	Not Mentioned				
	A Light Run off tank	Not Mentioned				
	A Heavy Run off Pump	Not Mentioned				
	A Light Run off pump	Not Mentioned				
	Continuous C/F	Not Mentioned				

	Machines					
	B Pugmill	Dimension need				
	For B Massecuite	8 Mt x 2 No's		**One new 15Mt capacity machine to be install**		
	Bh Run off Tank	Not Mentioned				
	BH Pump	Not Mentioned				
	B Seed pump	Not Mentioned				
	For CFW	6Mt x 3 No's				
	For CAW / B Massecuite			**One new 15Mt capacity machine to be install**		
	CFW Seed Pump	Not Mentioned				
	Magma mixer	Dimension need				
	For CFW magma	6Mt x 2 No's		**One new 15Mt capacity machine to be install**		
	CAW Pump	Not Mentioned				
	For CAW + B-Magma with partion plate	Dimension need				
34	**Melter capcity**	15Mt		**To be modify to handle 40 Mt/Hr melt load**		
35	**Rori melter**	15 MT				Existing is Suitable
36	**Air Compressor**	2Nos x 1.43M3/Min capacity				
37	**Final Molasses Transfer Pump**	Not Mentioned				
38	**Sugar Hopper A**	4 No's x 1.5 mtr width				Existing is Suitable
39	**Hot Blower for A set**	5550 CFM				
40	**Cold Blower for A set**	5550 CFM				

41	**Sugar Hopper B**	3 No's x 2.0 mtr width				
42	**Hot Blower for A set**	6550 CFM				
43	**Cold Blower for A set**	6550 CFM				
44	**Sugar Elevator A**	30Mt/Hr				Existing is Suitable
45	**Sugar Elevator B**	40Mt/Hr				Existing is Suitable
46	**Sugar Grader A**	40Mt/Hr				
47	**Sugar Grader B**	10Mt/Hr		**1 No's 6 Dec 35 MT Grader is required**		
48	**Sugar Silo capacity**	Not Mentioned				
49	**Sugar Weighing Machine**	2 No's				Capacity not mentioned
50	**Sugar Bag Stiching machine**	2 No's of capacity 100 bag/Min				Speed to be rectify
51	**Cold Water Overhead tank capacity**	8.49	M3			
52	**Service water pump capacity**	Not Mentioned				
53	**Hot Water Overhead tank capacity**	11.64	M3			Existing is Suitable
54	**Hot Water Overhead tank capacity**	11.68	M3			Existing is Suitable

5) EXISTING AND PRAPOSED BOILING HOUSE PUMP LIST

Expansion from 2500 TCD to 5500TCD

	CANE – Tons	5500/ 250		Colour codes : Yellow - New Pumps to be procured									
				Green - Existing pumps used									
				Red - Points to be discussed									
			EXISTING PUMPS					RE ARRANGEMENT FOR 200 TCH					
Sl.No	**DESCRIPTION OF THE PUMP**	**Make**	**NO. OF PUMPS**	**CAPACITY IN M^3 / Hr**	**HEAD**	**HP**	**RPM**	**NO. OF PUMPS**	**CAPACITY IN M3/Hr**	**HEAD**	**HP**	**RPM**	**REMARKS**
1	Screened RJuice Pumps	PSP	2	250	45	100	1485	2	280	70	Suitable to pump capacity		New Pumps required
2	Exhaust Condensate Pumps For (2800 M2)	Sintech	2	80	40	30	1460	2	80	40	30	1460	New FFE 3600M2 Condensate coneection to both 1&2 body condensate
3	2500 M2 body	Wilo	2	100	30	20	1460	2	100	30	20	1460	
4	3600M2 FFE Circulation pump							4	750	30			4 No's new pump required
5	900 M2 body	KPD	1	80	30	10	1455	1	80	30	10	1455	

6	700 M2 body	Wilo	1	10	25	3	1450	1	10	25	3	1450	560M2 body condensate connection to be given to 700M2 body condensate mond
7	4A Body	KPD	1	55	25	20	1450	1	55	25	20	1450	
8	4B Body	KPD	1	55	25	15	1450	1	55	25	15	1450	
9	5A Body	KPD	1	55	25	15	1450	1	55	25	15	1450	
10	5B Body	KPD	1	55	25	10	1450	1	55	25	10	1450	
11	VLJH Condensate pump			Not Given									If avaialble exisitng used
12	JH No 01 Condensate	Wilo	1	10	25	3	1455						
13	JH No 02 Condensate	Wilo	1	10	25	3	1455						NA Since used as a Cond Heater
14	JH No 03 Condensate	KPD	1	55	25	10	1455	1	55	25	10	1455	Used for RJ3 rd Heating
15	JH No 04 Condensate	KPD	1	55	25	5	1455	1	55	25	5	1455	
16	JH No 05 Condensate	Wilo	1	10	25	3	1455	1	10	25	3	1455	Used for CJ1/2 Heating

17	JH No 06 Condensate	KPD	1	55	25			3	10	25	Suitable	Used for RJ3/SJ1/SJ2 Heater
18	Pan Cond Pump	KPD	3	55	25	Not given		3	55	25	Not given	IF HP suitable then exisitng used
19	Sulphured Juice	PSP	1	200	32	75	1475	2	300	60	75 1440	New 2 Pumps are required
		PSP	1	250	45	100	1480					
20	Clear Juice	KPD	2	175	30	75	1475	2	300	60	Suitable	New 2 Pumps are required
21	Filtrate Pump	KSB	2	150		10	1440	2	50	20	10 1440	Exisitng used IF Head Suit
22	Mud Pump	SHD	1	55	25	12.5	1440	2	55	25	12.5 1440	One Spare Pump of same capaciity required
23	Pan Injection pump	KPD	1	1300	20	150	1478					Exisitng pumps used
		Sintech	1	1300	20	150	1478		5500	20		
		Sintech	2	2500	20	220	990					
24	Quadrauple Injection Pump	KPD	2	680	22	75	1480	2	680	22	75 1480	
25	Spray Pump	Sintech	2	2500	12	150	985	2	2500	12	150 985	2000M3/Hr 1 new pump required
			1	2000	12	150	985	2	2000	12	150 985	
26	Unsulphured Syrup	PSP	1	200	32	30	1460	1	200	32	30 1460	Exisitng pumps used
		PSP	1	200	32	25	1400	1	200	32	25 1400	
27	Sul Syrup Pump	Sintech	2	60	30	15	1450	2	60	30	15 1450	Exisitng pumps used
		SHD	1	55	25	15	1450	1	55	25	15 1450	

28	Lime Pump			Not Given				3	12	20	7.5	1440	New pumps required
29	Service Pump	KPD	3	NA				2	150	30	30	1480	If exisitng suitable use existing
30	A Massecuite pump	INDO	2	60	30	25	1440	2	60	30	25	1440	Exisitng pumps used
		PSP	1	50	30	25	1440	1	50	30	25	1440	
31	B Massecuite pump	PSP	2	20	30	15	1440	2	20	30	15	1440	Exisitng pumps used
		PSP	2	40	30			2	40	30			
32	C Massecuite		2	40	30	20	1440	2	40	30	20	1440	Exisitng pumps used
													For New pan suitable capacity pump is required with all accessories
33	B seed	PSP	1	30	30	15	1440	1	30	30	15	1440	Exisitng pumps used
			1	40	30	20	1440	1	40	30	20	1440	
34	CAW	PSP	1	30	30	15	1440	2	30	30	15	1440	one new pump of same capacity required
35	CFW	PSP	1	20	30	10	1440	2	20	30	10	1440	one new pump of same capacity required
36	C MVC Pump	PSP	1	20	30	15	1440	1	20	30	15	1440	Exisitng pumps used
37	B MVC Pump	PSP	1	20	30	15	1440	1	20	30	15	1440	Exisitng pumps used

38	A Heavy Pump	Hiflow	1	40	40	15	1440	1	40	40	15	1440	one new pump of same capacity required
39	A Light Pump	Hiflow	1	40	40	15	1440	1	40	40	15	1440	one new pump of same capacity required
40	B Heavy Pump	Hiflow	2	40	40	20	1440	2	40	40	20	1440	Exisitng pumps used
41	C Light Pump	Hiflow	1	40	40			1	40	40			Exisitng pumps used
42	Final Molasses	Hiflow	1	40	40			1	40	40			Exisitng pumps used
43	B Grain Feeding pump			Not Given									If Suitble capacity pump then exisitng used
44	Filter cake wash pump			Not Given				2	20	20	3	2850	

R B PATIL
TECHNICAL DIRECTOR
R B PATIL & ASSOCIATES