

All Solution's Under One Roof

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DATE: 05/10/2023

To,

The Managing Director

Karmayogi Ankushrao Tope

Samarth Sahkari Sakhar Karkhana Limited,

Unit 2 (Sagar), Tirthpuri

Tal - Ghansawangi Dist - Jalana.

Visit Report

Kind Attn.: - Hon'ble Rajesh Tope Sir,

With reference to our Pune circuit house and factory site meeting two times & instruction given by you for overall study, survey and suggestion for improvement in performance, bagasse saving, crushing rate & reducing stoppages for increase in overall profitability of the plant.

Factory Plant capacity -- 2500 TCD Installed and commissioned in 2008 – 2009.

The factory has tremendous cane potential due to Godavari River and dam water.

Existing sugar factory is crushing around 3400 to 3500 MT.

But there is a large scope to increase crushing rate as well as improve results in existing plant with some modification and upgradation work.

Considering the viability of the project nowadays sugar factory must crush minimum 5000 to 5500 TCD as maintenance cost, workers salary and capital investment and loan interest are same for different crushing rates.

As a first step with some improvement and addition, modification we can run this plant on 3800 to 4000 m.t.

We are suggesting you short term and long-term modifications to upgrade and modify this plant for efficiency improvement, and modernization cum expansion of the plant in two phases.

First phase - to run the plant from existing 3800 to 4000 m.t. by increasing 500 m.t. crushing rate per day. And in next phase to increase further 1500 m.t. and run the plant up to 5400 to 5500 m.t. so that we can get total 2,000 m. t. More crushing in existing plant.

As we should do the modernization cum expansion of this existing 2500 m. t. To 4500 m.t. and run the plant with 5500 m.t.

Our efforts for modification, rectification, alteration and addition of the plant will be done considering our ultimate cane crushing capacity in two to three phases.

Phase 1 (Immediate & Urgent)

To increase crushing rate by 500 mt & from 3400 mt to 3900 to 4000 mt. by –

Mill

- a) Installation of Brahmastra unit to increase bulk density of cane, preparatory index, reduce load on preparatory device & milling tandem resulting in increasing crushing rate up to 4000 mt. The Brahmastra unit is designed for achieving ultimate crushing rate of 5500 mt.
- b) Installation of overall plant stabilizer to increase bulk density of prepared cane, reduce fluctuation in cane carrier to provide uniform, consistent, constant, prepared cane feeding to fibrizer & milling tandem and also reducing the boiler load temp. pressure fluctuation & increasing boiler thermal efficiency as well as increasing average steam generation 3 to 4 ton per hour and bagasse saving more than 100 mt. per day.
- c) To do proper setting of ACFC by using our knowledge & experience.
- d) To adopt very strict preventive maintenance schedule with micro planning & commando action plan.

- e) Suggest & do minor changes in mill operation by our experience.
- f) Correction in nitrogen bladder pressure & hydraulic pressure ratios.
- g) Adopting ideas for stopping bacterial growth on mill station.
- h) Collection & recirculation of rotary screen washing hot water as an imbibition water (50 to 60 ton) which was mixing in prepared cane in rake carrier.
- i) To adopt practice to increase roller arcing.
- j) To stop completely careless and laziness of workers to apply cold water in juice tray of mill for avoiding bagasse dilution work in water by hand. So that minimum loss of 75 m.t. crushing & sugar loss of minimum Rs 1,00,000/- per day is avoided.

BOILER

- a) Cold air entry in the boiler will be arrested completely to increase thermal efficiency of boiler.
- b) Proper and perfect thermal insulation and cladding of boiler to avoid radiation losses will be checked and corrected.
- c) For minimum blowdown efforts will be taken.
- d) The loss of temperature in feed water coming from first body, deaerator and Feed tank will be reduced.
- e) For perfect boiler combustion it is necessary to increase 30-degree hot air temperature in existing at below furnace.
- f) All the suit blower and its working condition, maintenance should be corrected and taken in operation.
- g) All boiler draft gauges, pressure gauges and its calibration should be done by using manual manometer.

- h) All boiler data load temperature pressure drafts will be studied for proper capacity sizes and design of boiler to increase thermal efficiency and ultimately bagasse saving.
- i) Boiler thermal efficiency will be increased and load temperature pressure fluctuations will be reduced.
- j) All IBR drawings and furnace volume existing boiler flue gas circulation & heat recovery in superheater, economizer, air heater will be studied for further boiler upgradation work.
- k) All instrumentation and boiler automation should be started to increase thermal efficiency and avoid manual problems by workers.

Thus, we will try to increase minimum 4-to-5-ton steam averagely in boiler right now.

PRDS -- by increasing boiler average steam by 3 to 4 ton per hour & simultaneously by proper DE-superheating, we will increase further 3-to-4-ton steam. Thus, we will try to give minimum 5-to-6-ton steam more for taking 300 to 400 metric ton more crushing rate constantly.

Boiling house

In boiling house PRDS perfect automation and working is important for uniform smooth and consistent process house performance.

- a) We will study all pump details and collect data which is not in I-1 form or received from your side.**
- b) To increase evaporation efficiency of quadruple station -**
 - 1 Proper ammonia removal of body should be checked.
 - 2 Proper condensate removal should be achieved.
 - 3 Constant uniform steam and temperature pressure to the first body is essential.
 - 4 Vibro screen should be properly used to separate the grit from lime to avoid internal scaling.

5 Vacuum equalization connection and its position should be properly checked.

c) Continuous Sulphur Burner

1) Existing two numbers continuous burner of 70 k.g & one number 140 k.g. are sufficient up to 4500 capacity.

d) Clarifier (Dorr)

1) Existing 28 feet 5th compartment clarifier capacity is neck to neck and hence uniform, crushing, consistent, constant crushing and uniform juice going to clarifier is essential so that we can take crushing rate up to 3900 to 4000 metric ton in existing clarifier.

e) In vacuum filter – Existing 10 ' X 20' & 8' X 16' feet long two numbers rotary vacuum filter are sufficient one for crushing rate up to 4500 TCD.

1 For proper A light and A heavy vacuum proper balancing should be done.

2 Proper cake thickness for maximum juice extraction.

3 Proper mixing of mud and bagasillo at mud mixture and below vacuum filter tray.

4 Proper RPM of the vacuum filter to maintain retention time correctly.

5 Minimum 150 % imbibition hot water on mud should be used for reduce mud pole effectively and temperature of hot water should be 70 to 80 degrees.

f) PAN - Existing 80-ton 2 number pans, 40 ton -- 4 nos pans capacity is bottle neck. Three pans have mechanical circulator, but remaining all pants should be installed mechanical circulators for reducing pan curing time and dropping time.

Also Due to B heavy molasses diversion in this existing pan we can take crushing up to 4000 T C D.

1 It is necessary to apply mechanical circulator to other remaining pans.

- 2 Pan syrup and Molasses supply tank height should be increased by 3 feet to avoid syrup jamming.
- 3 For all cut valve hydraulic operated system should be adopted.
- 4 Condenser automation for proper vacuum and reduce load on injection pump should be installed.
- 5 we will try to keep crushing rate constant up to 3800 to 4000 m.t. with small small changes rectification and alteration.

g) Centrifugal Machines

A centripetal machine-- existing 1250 kg batch type centrifugal machine 3 numbers, and 1750 kg machine 1 number are sufficient up to 4500 TCD.

Existing continuous machine 12 ton per hour capacity & 6 numbers are sufficient when we divert be heavy molasses.

Existing Hopper 1500 mm wide is sufficient to take 4500 quintals bag, and when we divert B heavy molasses.

- 1 For continuous machine automatic massecuites thickness controller and transit heater should be adopted for proper purging of molasses
- 2 Transit heater for C massecuites.
- 3 Air cleaning A CF Machine plough system to machine.
- 4 For avoid A massecuites droplets dropping in hopper auto valve system should be adopted.
- 5 We will try to keep delta T of spray pond on higher side for proper vacuum to Pan and quadruple
- 6 To reduce Hopper maintenance our innovative modification will be done to avoid cracking of wooden strips & connecting yoke.
- 7 Existing sugar grader 25 ton per hour is sufficient up to 4500 quintal bagging when we divert B heavy molasses.

Conclusion –

Thus, by installing Brahmastra and stabilizer unit for increasing bulk density, preparatory index and uniform, smooth, consistent, constant crushing, reduce fluctuation in boiler thermal efficiency and increasing bagasse and average steam generation by 3 to 4 ton as well as by adopting some small small changes, our standard practices and some rectification, alteration and modification, we can increase crushing rate up to 400 to 500 metric ton per day. Simultaneously we can increase bagasse saving & results with minimum expenditure.

Total profit sheet considering 500 m.t. more crushing throughout season & we will earn more than 6 crore rupees in one season.

Thus, by installing our new innovative unit Brahmastra and stabilizer and by doing small small changes, alteration, rectification and modification by using our vast experience, knowledge we will increase boiler average steam generation, will reduce stoppages and increase crushing rate up to 400 to 500 m.t.

Simultaneously we will study and present you, the report for next year modernization cum expansion from 2500 to 5000 TCD & enable to crushing 5500 TCD in minimum expenditure along with payback period.

Mill

Cane Carrier - Existing cane carrier width and depth is very less, hence for increasing bulk density and cane preparation and effective utilization of cane carrier it is essential to install Brahmastra in between two feeder tables, near about 65% whole cane will be passed through this Brahmastra and cane preparation and bulk density and capacity of cane carrier will be increased for reducing load on further preparatory device and mills.

Thus, there is no need of replacement of cane carrier, preparatory devices like chopper leveller and Fibrizer. And huge investment around 4 crores for civil foundation and preparatory devices will be avoided.

Chopper -- no change in power. Also, capacity & power is sufficient for future crushing rate.

Leveller -- no need of 2 nos, 500 HP Motors. One motor is sufficient. Another 500 H.P. motor will be diverted for Brahmastra in cane carrier.

Fibrizer --- existing Fibrizer drawing should be checked for assembly, hammer design, anvil plate & its pocket design & hard facing along with setting & proper correction will be done.

It's hammers & anvil plate pockets design & hard facing will be checked and corrected for getting more P.I.

Rotary screen -- 1800 m.m.× 3600 m.m.is sufficient for 4500 plus crushing.

Rake elevator -- it's width and power are sufficient for ultimate final crushing rate 5500 m.t.

All inter rake carriers -- its width and power are sufficient for ultimate cane crushing capacity of 5500 m.t.

Mill ---

Zero -- Existing zero mill 36 × 78 with TRPF and its power is sufficient up to 5500 m.t.

But there is a vast scope to increase juice drainage in conventional mill as well as TRPF to take higher crushing rate, increase primary extraction and ultimately reduce the load on next Mills.

1, 2, 3 mills 30" × 60 " with TRPF and existing powers are sufficient due to increased cane preparatory index, primary extraction, and changes, modification done to increase the juice drainage in all mills.

It will be beneficial if last 30 × 60 mill will be replaced in future by bare 36" × 78" ulka Dewatering mill for Reducing bagasse pole, improve results, reduce power consumption and reduce moisture by 2.5 % to increase the thermal efficiency of boiler and increase bagasse saving to large extent.

Existing bagasse elevator and RBC is sufficient by width and power to take ultimate cane crushing capacity 5500 metric ton.

Boiler -- Existing boiler has tremendous scope to increase its thermal efficiency by minimum 3 to 5%.

By studying the details of running parameters of equipment like Feed pump, ID, FD, SA & spreader fan, it's power and capacity connected to boiler, as well as by studying the IBR pressure Part drawing

We can judge and calculate the possibility of existing boiler upgradation from 60 metric ton to 75 metric ton simultaneously by increasing its efficiency from 66% to 71 % for long life bagasse saving.

Increased crushing rate, reduced steam % cane in boiling house by minimum 8 %, increased boiler efficiency by 4 to 5 % & reduced bagasse moisture by 2.5 % with de watering, moisture reduction ulka mill we can increase bagasse saving further by minimum 50,000 to 60,000 m.t. per season.

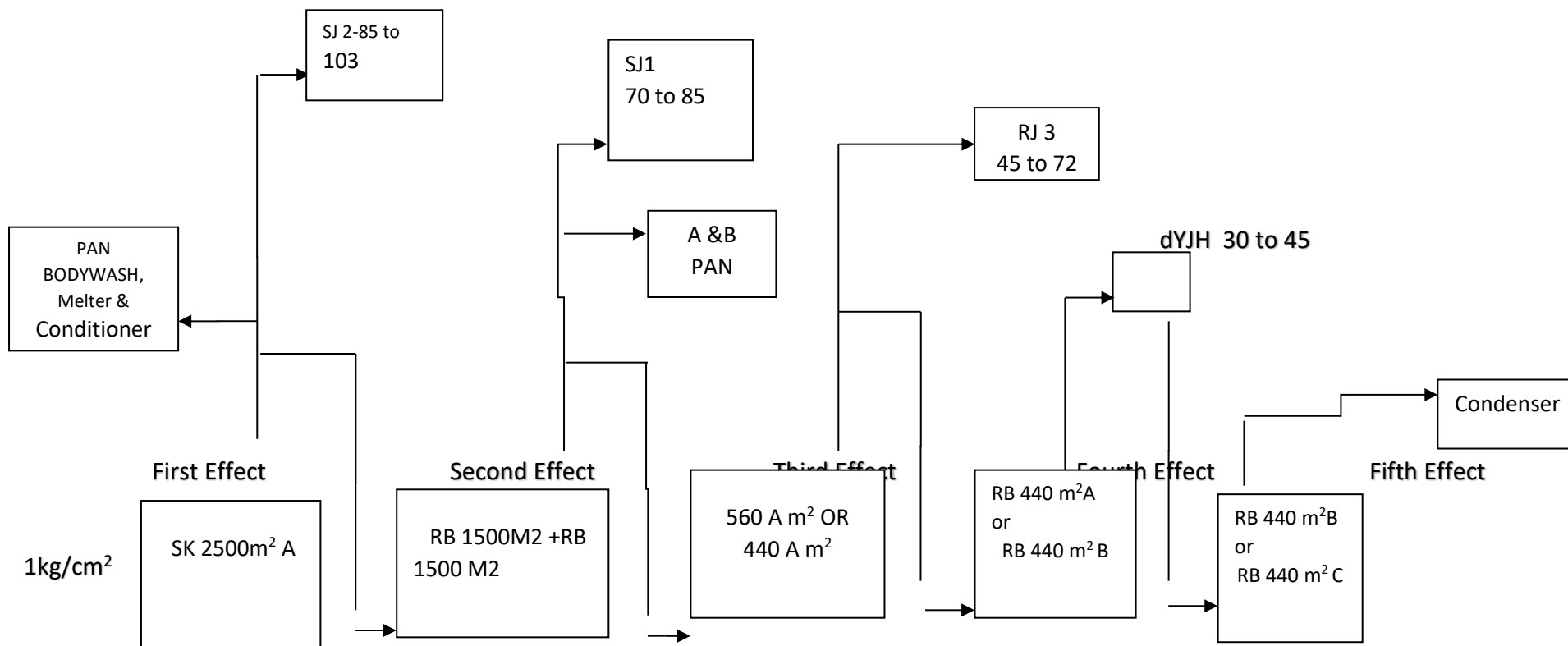
We can run ethanol plant in off-season further by minimum 2 to 3 months due to increased B heavy production & bagasse saving.

Increased bagasse saving can run distillery for more than 4 months in offseason with increased capacity due to saved bagasse as well as extra b heavy molasses generated Due to higher crushing.

Power house turbines --

Existing 3 m.w. 2 nos power house turbines are sufficient to take ultimate cane crushing capacity electric load.

Technical proposal for Boiling house Equipment for expansion of Sugar plant 2500 TCD to 3800 TCD



	I Effect	II effect	III Effect	IV Effect	V Effect
Case i	SK2500 M2	RB 1500 M2 +RB 1500 M2	560 M2B	440M2 A	440M2 B
Case ii	SK2500 M2	RB 1500 M2 +RB 1500 M2	440 M2 A	440M2 B	440M2 C

Existing & proposed Evaporator bodies & juice heaters requirement for 3800TCD

JC Heaters					
Heating	EXISTING		PROPOSED		Remark
	WORKING	STANDBY	WORKING	STANDBY	
RJ1	300 M2	270 m2	300 M2	270 m2	No change
RJ2	170 M2	NIL	270M2		170M2 Bottle neck
SJ1	270 M2	NIL	270M2		No standby heater available
SJ2	270M2		270M2		
CJ	250M2	NIL			No standby heater available

Evaporators			
EXISTING evp bodies		PROPOSED Set 1	
WORKING	STANDBY	WORKING	STANDBY
SK 2500	NIL	2,200	NIL
RB 1500 RB+1500		18000+850	
560	440	560 m2	440 M2
440	440	440 m2	
		440 m2	
Boiling house expansion proposal from 2500 TCD to 3800 TCD			

Sr. No	Equipment particulars	Existing	Required as per 3800 TCD	REMARK
		Working	Working	
1	Raw Juice receiving tank	13M3		No change
2	Mass Flow meter	200T/HR	200T/HR	No change
3	Juice heaters			
4	1) VLJH/Dy JH (Tubular)	270M2 & 300 M2	270M2	No change
6	3) R. JC 2nd heating (Tubular)	170M2 x1 No's or 270M2 x 1 No's	270M2 x2 No's	170M2 JH is under capacity
7	S. JC 1st & 2nd heating (Tubular)	270M2 x2 No's	270M2 x3 No's	There is no spare heater for cleaning
8	Cl. Juice heater	250M2 x1 No's	250M2 x2 No's	There is no heater to heat C. JC in 2 stages & for existing there is no spare for cleaning
9	Juice sulphitor	175 HL	225HL	IF possible existing to be modify
10	Juice sulphitor Auto pH control system		Automation needed	Single loop Automation with Suitable capacity required
11	Sulphured Juice Receiving Tank		20 M3 Capacity tank required	Tank to be modify to suit requirement
12	Sulphur Burners			
	Juice side	140 Kg/Hr x 1 Nos	140 Kg/Hr x 1 Nos	Existing is Suitable but proper heat recovery system to be install
	Syrup side	70 Kg/Hr x 2 Nos	70 Kg/Hr x 2 Nos	
13	Air Blowers			
	Juice side	800 M3/Hr	900 M3/Hr	Existing is Suitable
	Syrup side	600 M3/Hr x 2	630 M3/Hr	Existing is Suitable

14	Lime Slacker Unit	200 Kg/Hr	200 Kg/Hr	Existing is Suitable
15	Lime cyclone	lime clarifier with screw type grit separator		
	Lime classifier			
16	MOL Screening	Not available	Suitable to screen 20M3/Hr MOL vibro x 2 No's needed	
17	MOL receiving tanks	1 No's x 15 M3 & 2 No's x 7 M3	15 M2 x 2 No's tank required	Existing is Suitable
18	Juice clarifier	4360HL	4360HL	Existing is Suitable
		555 Type		
19	Clear Juice Receiving tank	Not Mentioned	28 M3 X 1 No's Tank required	
20	Vacuum filter Filtering area	92M2	103M2	
21	Vacuum filter	8' X 16' = 36		Existing is Suitable
		10' x 20' = 56		
22	Vacuum pump			
23	Evaporator bodies			
	SK vessel	2500 M2	2500 M2 SK	There is no spare body for cleaning of bodies
	2nd Vessel	1500 M2 + 1500 M2	3000M2	
	3rd vessel	560/440	560	Existing bodies to be rearrange to quintauple set
	4th vessel	440/440	440	
	Vth Vessel	440	440	
24	Ev. set MultiJet condenser			
25	Syrup Sulphitor	45HL	85HL	

26	Syrup + molasses supply tanks			
27	For Syrup	20Mt x 5 No's	120 MT total holding capacity	Existing is Suitable
	For A Light + melt	10 M3 x 4 No's		Existing is Suitable
28	For A-Heavy Molasses	10 M3 x 9 No's	80M3 holding capacity for A heavy	Existing is Suitable
29	For B-Heavy Molasses			
30	For C-Light Molasses			
31	Molasses conditioners			
	AH Diluter		Suitable DCH type	
	BH/CL Diluter		Suitable DCH type	
32	Vacuum pans			
	A Pan	80 T x 1 No's		Existing is Suitable
		40 T x 3 No's		
	B Grain Pan	40 T x 1 No's		Existing A pan to be used for B grain
	B Pan	80 Mt x 1 No's + 40Mt x 1 No's		Existing is Suitable
33	Pan Condensate tank	Not given		
34	Dry seed Crystallizer	20MT		Existing is under capacity
35	B seed Crystallizer	20MT		Existing is under capacity
36	A VC	NIL		B VC to be use for A M/C
37	B VC	207 T + 20 T		C VC to be use for B M/C
38	C VC	30 MT		
39	Air cooled receiving crystallizers			
40	For A-Massecuite receiving	(40t x 6 No's +90t x 1 No's)	Total 380 Mt capacity	Existing 90t x 2 No's B crystallizer to be use for A massecuite

41	For B-Massecuite receiving	90t x 2 No's	300 Mt capacity	Existing 55 mt x 3 Nos + 300mt MVC to be used for B massecuite
42	For C-Massecuite receiving	55 x 3 No's + 300MVC	No need	
43	Centrifugal machines			
44	A Pugmill	Not given		
45	Batch Machines for A M/C	1250Kg/Cysl x 2 No's	1250 kg/cycle x 4 No's	Existing machines are under capacity
46	A Heavy Run off Tank	Not given		
47	A Light Run off tank	Not given		
48	B Pugmill	Not given		
49	Machine For B Massecuite	NK1100 x 6 No's		Existing is Suitable
50	Bh Run off Tank	Not given		
51	B seed magma Mixer	Not given		
52	CFW Pugmill	Not given		
53	Melter capacity	Not given	25 Mt /Hr Melter	
54	Rori Melter	Not given		
55	Air Compressor	1Nos x 125 CFM, 1 No's 100 CFM	225 CFM x 2 No's	
56	Sugar Hopper	1 No's x 1.5 mtr width ST +2 no's x 1.5 mtr width MT	1.8Mtr width hopper	Existing hopper is bottle neck for 3800 TCD
	Hot Blower	Not given		
	Cold Blower	Not given		

57	Sugar Elevator	25Mt/Hr	35Mt/Hr	Existing elevator is bottle neck for 3800 TCD
58	Sugar Grader	25Mt/Hr	1 No's 6 Dec 35 MT Grader is required	Existing grader is bottle neck for 3800 TCD
59	Sugar Silo capacity	50Mt x 4 No's		Existing is Suitable
60	Sugar Weighing Machine	2 No's Duplex machines		Existing is Suitable
61	Sugar Bag Stitching machine	1 No's of capacity 1200 bag/hr		Existing is Suitable
62	Cold Water Overhead tank capacity	Not given		
63	Hot Water Overhead tank capacity	Not given		
64	Spray pond	210 Nozzles		Existing capacity to be rectify

EXISTING AND PRAPOSED BOILING HOUSE PUMP LIST													
Expansion from 2500 TCD to 3800TCD													
	CANE – Tons	3900											
			EXISTING PUMPS					RE ARRANGEMENT FOR 175 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 R Juice Pumps							2	200	70	Suitable	
2	Exhaust Condensate Pumps							2	65	40	Suitable	
4	1500 M2 body							2	50	30	Suitable	
5	560 M2 body							1	20	25	Suitable	
6	4th Body							1	10	25	Suitable	
8	5th Body							1	10	25	Suitable	
10	VLJH Condensate pump							1	5	25	Suitable	
11	JH No 01 Condensate							1	10	25	Suitable	
12	JH No 02 Condensate							1	10	25	Suitable	
13	JH No 03 Condensate							1	10	25	Suitable	
14	JH No 04 Condensate							1	10	25	Suitable	
15	JH No 05 Condensate							1	10	25	Suitable	
17	Pan Cond Pump							2	40	25	Suitable	

18	Sulphured Juice							2	225	60	Suitable	
19	Clear Juice							2	200	50	Suitable	
20	Filtrate Pump							2	30	25	Suitable	
21	Mud Pump							2	30	25	Suitable	
22	Pan Injection pump							3	2000	25	Suitable	
23	Quadruple Injection Pump											
24	Spray Pump							3	2500	15	Suitable	
25	Unsulphured Syrup							2	50	30	Suitable	
26	Sul Syrup Pump							2	50	30	Suitable	
27	Lime Pump							2	12	30	Suitable	
28	Service Pump							2	150	30	30	1480
30	B Masecuite pump							2	25	30	Suitable	

31	B seed							2	15	30	Suitable	
32	B MVC Pump							1	25	30	Suitable	
33	A Heavy Pump							2	40	40	Suitable	
34	A Light Pump							2	40	40	Suitable	
35	B Heavy Pump							2	15	40	Suitable	
36	B Grain Feeding pump							2	10	30	Suitable	
37	Filter cake wash pump							2	15	30	Suitable	

Thus, we have submitted you primary inspection & visit report as per your data provided & instruction given by you during your meeting.

Now we request you to consider our organization to be the right choice for providing consultancy services & do detail final engineering, workout, heat mass balance, steam balance, power balance, solid balance, pole balance & project report for increasing the profitability of your sugar complex.

Assuring you our best confident, perfect & fastest services with result orientation.

R B PATIL
TECHNICAL DIRECTOR