



NAINI PAPERS LIMITED

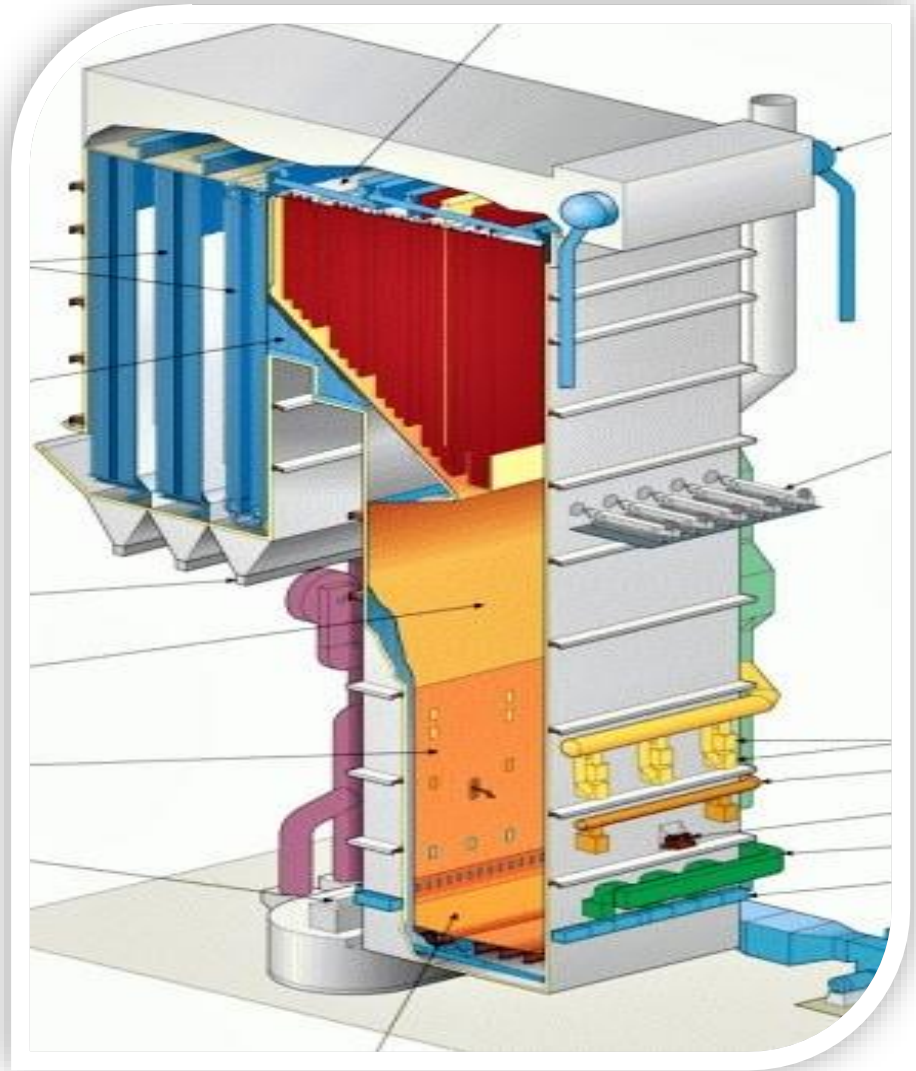
*Ethically Firm.
Environmentally Strong.*

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BEST PRACTICES ADOPTED IN CHEMICAL RECOVERY

INITIATIVE

- ❖ Power Saving
- ❖ Steam Saving
- ❖ Water Saving
- ❖ Environment



POWER , STEAM & WATER SAVING

S.No.	Power Saving Initiative	Implemented	Power Saving Per day (KWh)	Financial Gain Lac/Annum
1	VFD trial done on Evaporator Vacuum Pump For Power saving.	Oct-2023	720	18.9
2	SIR installation in Recovery boiler ESP-	June -24	500	12.60

S.No.	Steam Saving Initiative	Implemented	Steam Saving Per day (MT)	Financial Gain Lac/ Annum
1	Recovery Boiler MP Steam PRV valve provision was done to save steam.	Jan-2023	3	14.2
2	Recovery Boiler Condensate Recovery improved from 65 % to 69 %.	Sept-2023	5	42.9

S.No.	Water Saving Initiative	Implemented	Steam Saving Per day (MT)	Financial Gain Lac/ Annum
1	ODF wwl washing started in place of Hot water.	Feb-2024	150	1
2	Recovered Fiber line, SWAS panel & Sampling steam Condensate	Sept-2023	45	7.2

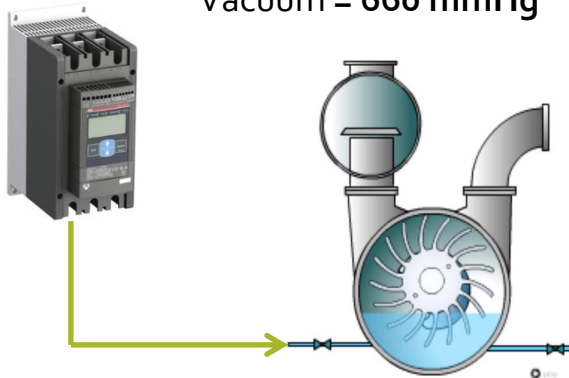
IMPROVEMENT

BEFORE

- ❖ Vacuum Pump was run by Soft Starter.
- ❖ Motor run at full RPM.
- ❖ Power consumption was 70 Kw/Hr.

Soft Stator

Vacuum = 660 mmHg



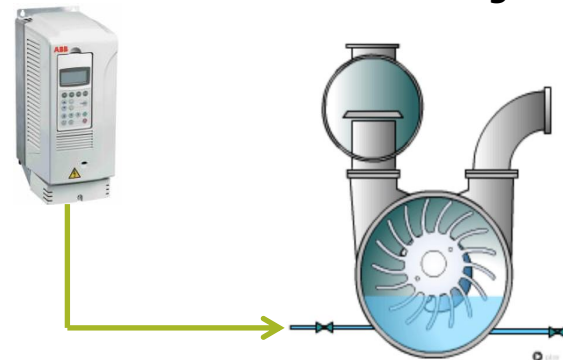
Power Consumption =
70 Kw/Hr.
RPM = **1440 RPM**

AFTER

- ❖ Vacuum Pump run by VFD.
- ❖ Motor RPM reduced 25% to achieve same vacuum (650-660 mmHg).
- ❖ Power Saved 720 Kw/day

VFD

Vacuum = 660 mmHg



Power Consumption =
40 Kw/Hr.
RPM = **1100 RPM**

ACHIEVEMENT

EXPENSES OF VFD INSTALLATION IN VACUUM PUMP

- Cost of VFD - Rs 2.50 Lac,
- Installation Cost- Rs 0.02Lac,
- Total Cost - Rs 2.52 Lac

SAVINGS

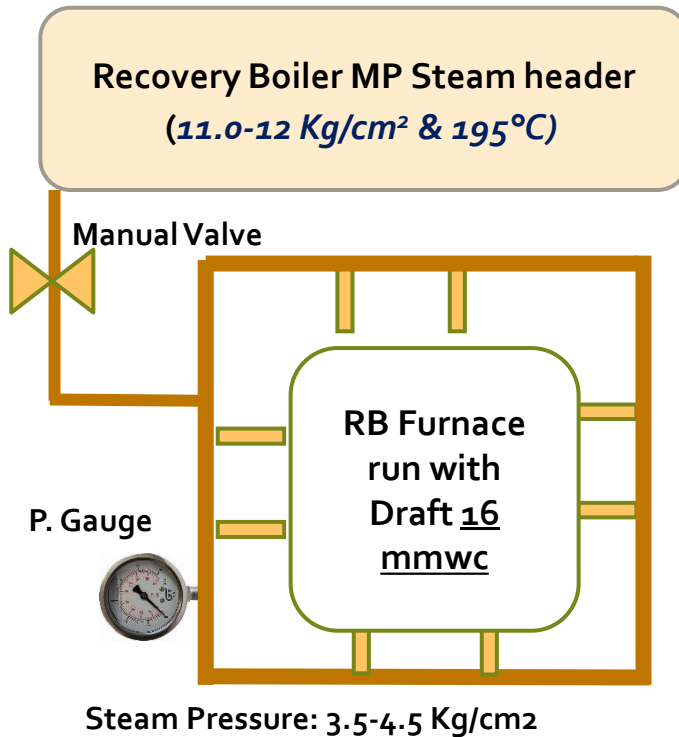
- Power saving = 30 Kw/Hrs.
- Cost of power = 6.0 Rs/Kwh
- Cost Saving = 4320 Rs/ Day
= 129600 Rs/ Month
= 15.55 Rs,Lac/annum

Payback - Less than 2 month

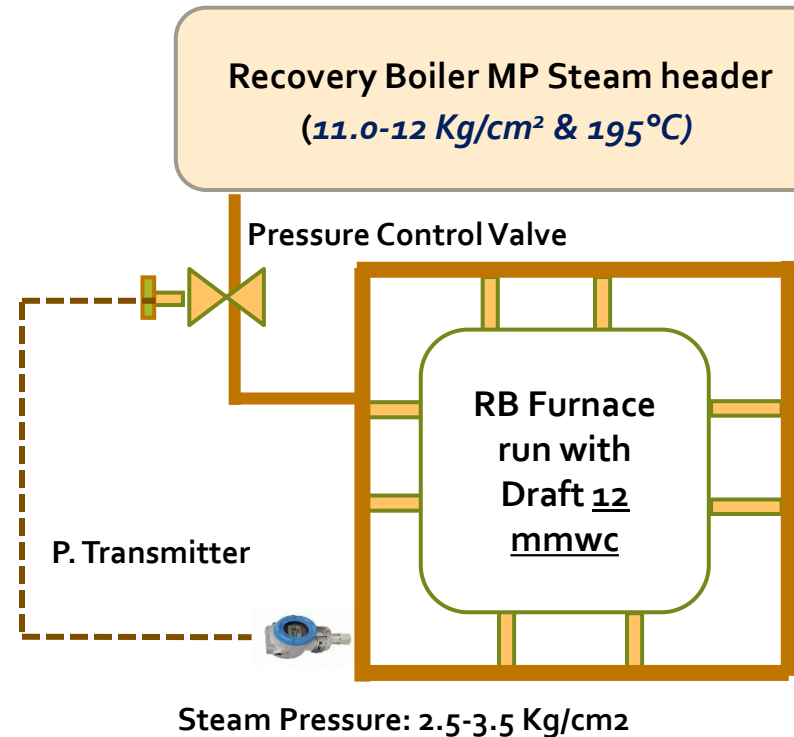
AFTER IMPROVEMENT

- New 1.5" Control valve provide with pressure control loop (11.0 Kg/cm² to 3.5 Kg/cm²) in Black liquor firing window shuttering line.

Before



After



ACHIEVEMENT

Payback - Less than one month

EXPENSES

- Control valve Size: 1.5" (Cost-0.90Lac),
- One Pressure transmitter (Cost-0.52 Lac),
- Installation (Cost-0.05Lac)
- Total Investment Cost = Rs 1.47 Lac (Approx.)

SAVINGS

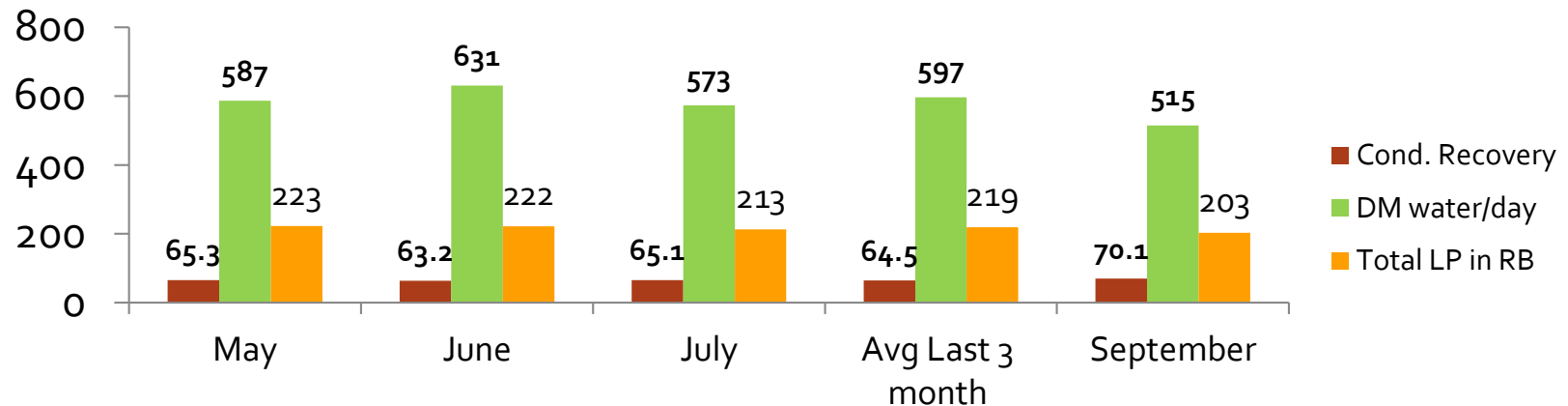
- MP Steam Saved = 4 Ton per day (Approx.)
- MP Steam cost = 1350 per Ton (Boiler no.4)
- Total Saved Cost = 4 Ton x @1350 = Rs.5400/Day
- Total Saved Cost = Rs.5400 x 30 = Rs.1,62000/Month

DM water & LP steam saving

❑ LP steam consumption reduced 13 MT/day.

❑ Steps taken

1. Evaporator steam condensate sampling water optimised
2. RB SWAS Panel sampling water diverted to DM water tank
3. Fiber line steam condensate recovered



- DM water saved/day = $597 - 515 = 82$ m³/day
- DM water cost/m³ = INR 25
- Total Amount saved in DM water = $25 * 82 * 350 = 7.17$ Lac/annum

- LP Steam saved/day = $219 - 203 = 16.0$ MT
- LP Steam cost/MT = INR 1350
- Total Amount saved in LP Steam = $16 * 1350 * 350 = 75.6$ Lac/annum

Total Saving:- INR 82.8 Lac per annum

REDUCTION OF LP STEAM IN CAUSTICIZING

Causticizing LP Steam Cons. (Stage 1 & 2)

Month	No. of Days (Operational)	Total WL Prod (in MT)	Avg. WL Prod. (TPD)	Total LP Steam Cons. (in MT)	Avg. LP Steam Cons. (TPD)	Specific LP Steam Cons. (MT/MT)
Before Process sequence changeover						
Jan-23	28	3766.41	134.51	3228	115.29	0.857
Feb-23	28	3650.46	130.37	3086	110.21	0.845
Mar-23	31	3974.35	128.20	3543	114.29	0.891
After Process sequence changeover						
Apr-23	30	4125.64	137.52	3089	102.97	0.749
May-23	31	4195.09	135.33	2514	81.10	0.599
Jun-23	15	2069.70	137.98	1225	81.67	0.592

Average WL Production per month	3942.39	MT/Month
LP steam consumption before process sequence changeover	3285.67	MT/Month
LP steam consumption after process sequence changeover	2801.50	MT/Month
Reduction in LP steam consumption	484.17	MT/Month

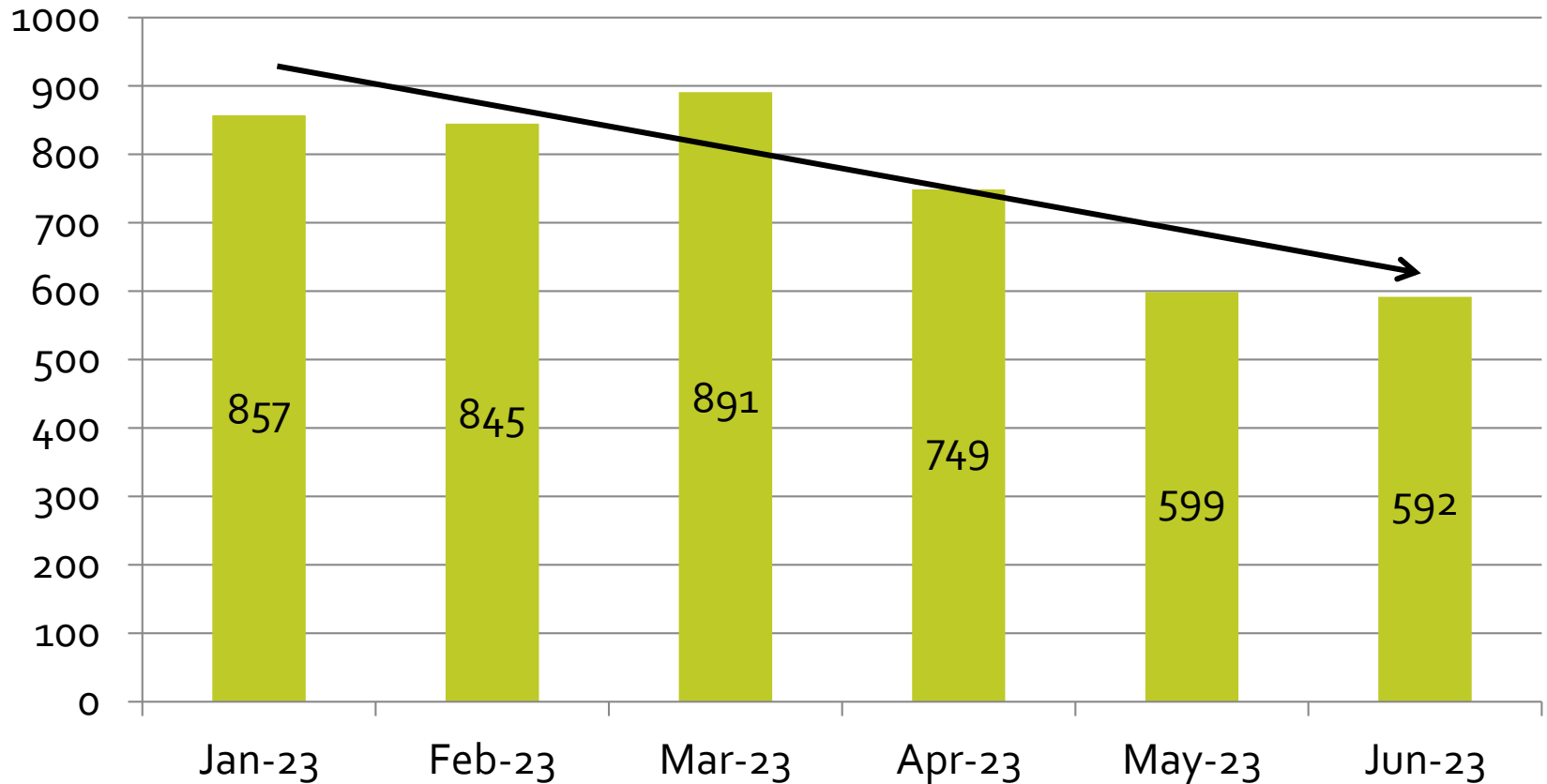
Cost of LP steam	1450	Rs/MT
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Cost saved due to reduction in LP steam	7,02,042	Rs/Month
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Annual saving	84,24,500	Rs/Annum
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STEAM REDUCTION TREND

LP Steam Consumption (Kg/MT - WL)



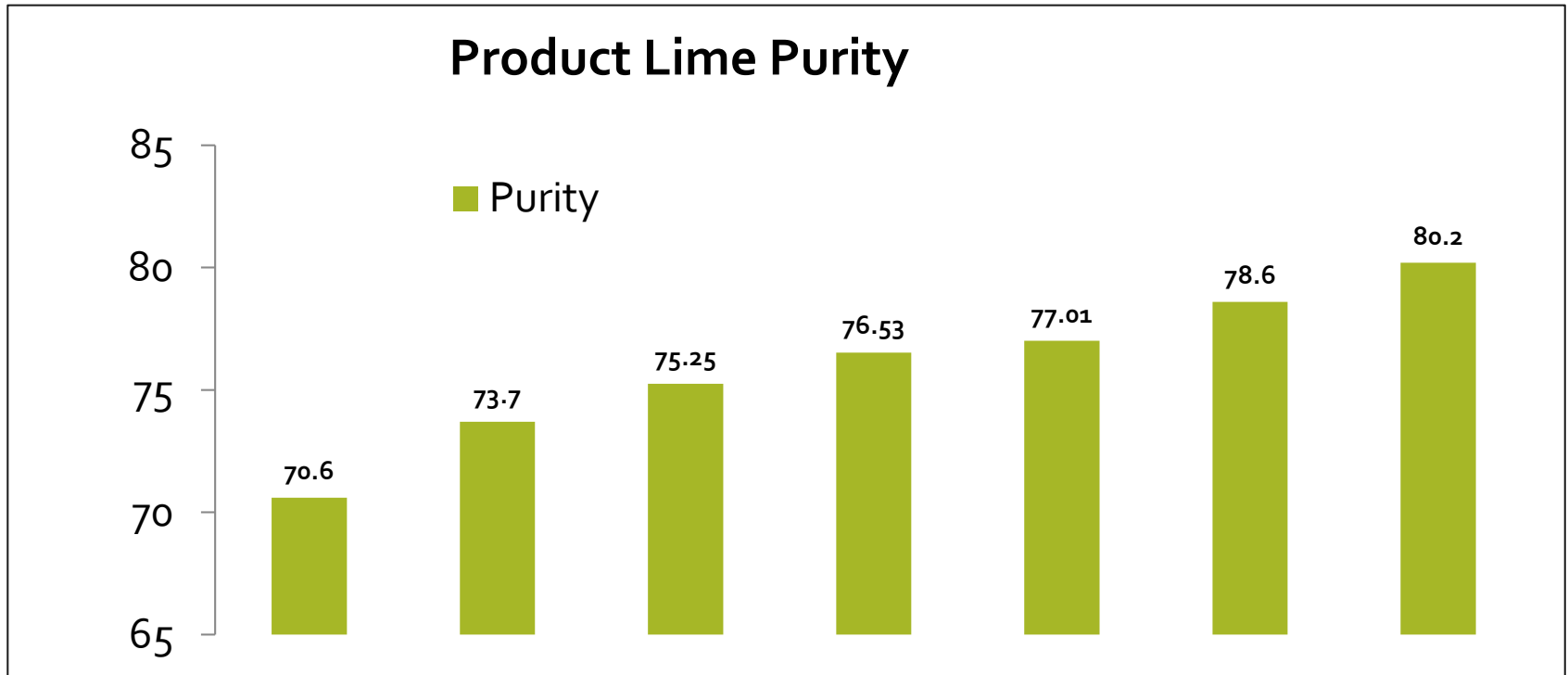
PROCESS IMPROVEMENT

1. OPTI DISC FILTER PERFORMANCE

What	Target	Actual	How
Sector cloth changed of ODF filter after 2.5 Years	8 months	2.5 years	<ol style="list-style-type: none"> 1. Reduced Acid Washing Sequence 2. Optimised pressure inside filter 3. Maintained minimum differential pressure as required
White liquor Conversion Yield %	92.0	94.0	<ol style="list-style-type: none"> 1. Optimization filtration parameters 2. Improvement in washing sequence 3. Reduction of silica % in input CGL
ODF quality performance > 200% at 100% MCR	< 20 ppm	< 10 ppm	<ol style="list-style-type: none"> 1. Reduction of carbonate in 1st stage 2. Effective Dregs removal by Filter press. 3. Retention time improved in Slacking & Causticizing.

2. ROTARY LIME KILN PERFORMANCE

- Selection of Fuel Ratio (FO: Natural Gas)
- Effective control of feed rate.
- Improve mud dryness more than 72%
- Mud Purity improved as CaCO_3 more than 90%
- Product Lime LOI less than 2.2%



- Achieve Burnt Lime Purity Average >80%

ENVIRONMENTAL MEASURES

Implemented Dust collection system near lime crusher

- Reduce Air Pollution
- Collect the lime dust which scattered in environment during lime crushing

Implemented the Fume Reduction system

- Reduce Air Pollution
- Condense of Flue gas Water vapour @ $10\text{m}^3/\text{Hr}$.
- Reduction in Flue gas Volumetric discharge($16000\text{m}^3/\text{Hr}$.)

Installed SIR system in Recovery Boiler ESP

- Improved Collection Efficiency more than 99.5%.
- Reduced spark rate.
- Compact design.
- Reduction in Power Consumption

INNOVATION:- DESILICATION

- Spurger System develop to carryout Desilication of Green Liquor.
- Causticizer taken in line to enhance retention time for pH dropped.
- Desilicated Green Liquor stored in separate clarifier for precipitation of silica.
- Installed New reactor tank to start batch process of de-silicate Green Liquor.

	Unit	Before Desilication	After Desilication
Mud Cake Purity (As CaCO₃)	%	86	90
Mud Cake Dryness	%	64.5	66
Burnt Lime Silica	%	6.8	4.25
Burnt Lime Purity	%	65.9	76.9
Mud Cake Silica	%	6	3.9

Achievement:-

Silica Reduction – 60% (By Weight)



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Thank You