Temp.Controller in CT fan

Energy saving by installing Temp.Controller in CT fan for Refinery-2

* Before installing of Temp.Controller we observed following: -
Motor HP 7.5, RPM-1440
Motor running 24 Hrs per day
Motor running current: -9.3 Amp.
Power Consumed W = √3 VI Cos ø
= 1.73 x 415 x 9.3 x 0.8
= 5341.5 WH
= 5.3 KWH
Unit consumed per Day: - 5.3 KWH x 24 Hrs = 127 KWH

***** After installing of Temp.Controller we observed following: -
Motor HP 7.5, RPM-1440
Motor running 10 Hrs per day
Motor running current: -9.3 Amp.
Power Consumed W = √3 VI Cos ø
= 1.73 x 415 x 9.3 x 0.8
= 5341.5 WH
= 5.3 KWH
Unit consumed per Day: - 5.3 KWH x 10 Hrs = 53 KWH
Saving: - 127 KWH – 53 KWH = 76 KWH
Saving; - 76 KWH x Rs.5 = Rs.380/- Per Day
Saving: -Rs.380 x 30 Day = Rs.11400/- Per month
Cost of Temp.Controller = Rs.18000/
Pay Back Period = 2 Month

Temp.Controller in CT fan

Energy saving by installing Temp.Controller in CT fan for Refinery-3

* Before installing of Temp.Controller we observed following: -
  Motor HP 12.5, RPM-1440
  Motor running 24 Hrs per day
  Motor running current: -11.6 Amp.
  Power Consumed W = √3 VI Cos ø
  = 1.73 x 415 x 11.6 x 0.8
  = 6662.57 WH
  = 6.6 KWH
  Unit consumed per Day: - 6.6 KWH x 24 Hrs = 158 KWH

* After installing of Temp.Controller we observed following: -
  Motor HP 12.5, RPM-1440
  Motor running 17 Hrs per day
  Motor running current: -11.6 Amp.
  Power Consumed W = √3 VI Cos ø
  = 1.73 x 415 x 11.6 x 0.8
  = 6662.57 WH
  = 6.6 KWH
  Unit consumed per Day: - 6.6 KWH x 17 Hrs = 112 KWH

Saving: -158 KWH – 112 KWH = 46 KWH
Saving; - 46 KWH x Rs.5 = Rs.230/- Per Day
Saving: -Rs.230 x 30 Day = Rs.6900/- Per month
Cost of Temp. Controller = Rs.18000/
Pay Back Period = 2.5 Month

VFD in ID FAN

Energy saving after installing VFD to the ID Fan motor of 12 TPH IBL Boiler

- We have installed a VFD to the ID Fan motor of 12 TPH in IBL Boiler on Date:- 10/09/2004

  * Before Installing VFD we observed following: -
    Motor specification: 37 KW, (50 HP), 1440 RPM, Make: - C.G
    Its current varies between: 40 to 52 Amps.
    So mean current: - 46 Amp.
    Power consumed W = √3 VI Cos Ø
    = 1.73 x 415 x 46 x 0.8
    = 26420.56 WH
    = 26.420 KWH
    Unit Consumed per Day: 26.420 x 24 Hrs = 634 KWH
    Cost per Day: - 634 KWH x RS.5/- = Rs. 3170/-

  * After Installing VFD we observed following :-
    Its current varies between 18 to 40Amp
    So mean current 29 Amp.
    Power consumed W = √3 VI Cos Ø
    = 1.73 x 415 x 29 x 0.95
    = 19779 WH
    = 19.779 KWH
    Unit consumed per day: - 19.779 x 24 Hrs = 474 KWH
    Cost per Day: - 474 KWH x Rs. 5/- = Rs. 2370/-

    Saving = Rs.3170 – Rs.2370 =Rs 800/- Per Day
    Saving = Rs.800 x 30 Day = Rs.24000/- Per Month
    Cost of 50 HP VFD Rs. 103000/-
    Pay Back Period: - 5 Months

    Saving in Capital Investment =26.420 KWH – 19.779 KWH
    = 6.64 KW
    = 11.6 A

1.Saving in D.G = Rs.2600/- x 11.6 A = **Rs.30160/-**

VFD in FD FAN

Energy saving after installing VFD to the FD Fan motor of 12 TPH IBL Boiler

- We have installed a VFD to the FD Fan motor of 12 TPH in IBL Boiler for trial bases.

  * Before Installing VFD we observed following: -
    Motor specification: 55 KW, (75 HP), 2900 RPM, Make: - Siemens
    Its current varies between: 80 to 85 Amps.
    So mean current: - 83 Amp.
    Power consumed W = √3 VI Cos Ø
    = 1.73 x 415 x 83 x 0.8
    = 47.671 WH
    = 48 KWH
    Unit Consumed per Day: 48 KWH x 24 Hrs = 1152 KWH
    Cost per Day: - 1152 KWH x RS.5/- = Rs. 5760/-

  * After Installing VFD we observed following: -

    Power consumed KW = 36
    (Above KW is displayed on VFD itself)
    Unit consumed per day: - 36 x 24 Hrs = 864 KWH
    Cost per Day: - 864 KWH x Rs. 5/- = Rs. 4320/-

    Saving = Rs.5760 – Rs.4320 =Rs 1440/- Per Day
    Saving = Rs.1440x 30 Day = Rs.43200/- Per Month
    Cost of 75 HP VFD Rs. 105000/-
    Pay Back Period: - 2.4 Months

VFD in the Barometric Water pump

Energy saving after installing a VFD to the Barometric Water pump of Refinery-3

- We have installed VFD to the Barometric water Pump of refinery-3 on Date:- 22/11/2004

  * Before Installing VFD we observed following:`
    Motor run on full RPM with pump discharge line valve controlled for getting required Flow & Pressure
    Motor Specification: - 90 KW, (120 HP), 2900 RPM, Make:- Siemens
    Running Current of Motor: - 105 Amp.
    Power consumed W =√3 VI Cos Ø
    = 1.73 x 415 x 105 x 0.8
    = 60.307 KWH
    Unit consumed Per Day: - 60.307 x 24 Hrs. = 1447 KWH
    Cost Per Day: - 1447 KWH x Rs. 5/- = Rs. 7235/-

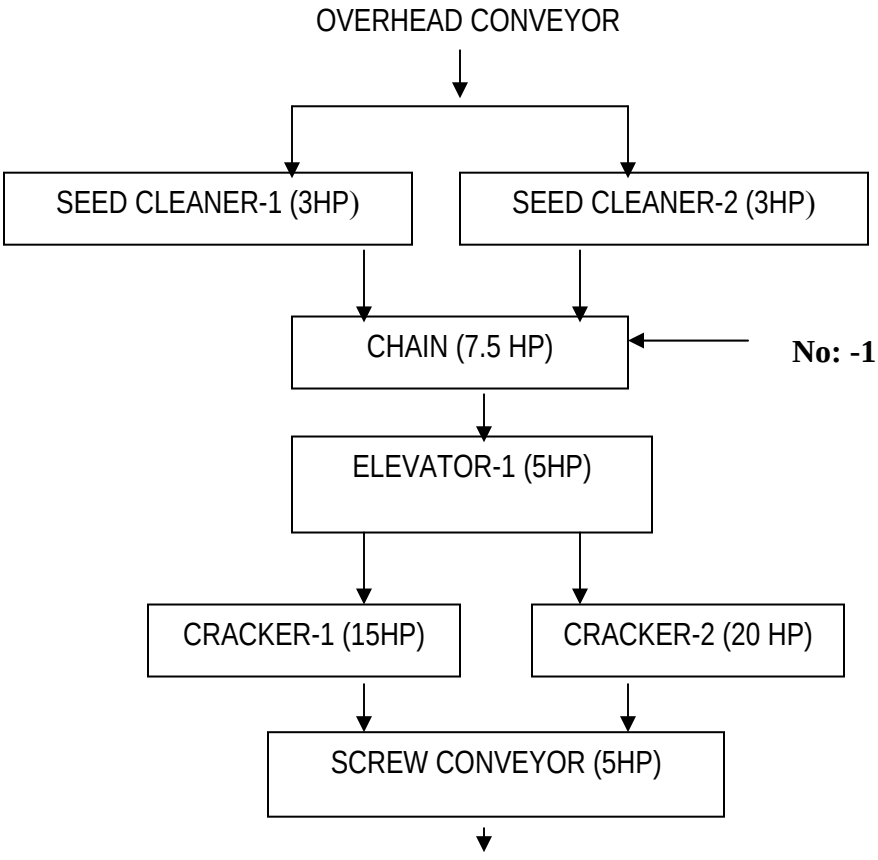
  * After installing VFD we observed following: -
    After installing VFD Motor run on 2100 RPM with all valve fully open getting Required Flow & Pressure
    Running Current of Motor: - 65 Amp.
    Power Consumed W=√3 VI Cos Ø
    = 1.73 x0 .288 x 65 x 0.8
    = 26 KWH
    Unit Consumed per Day: - 26 KWH x 24 Hrs = 624 KWH
    Cost Per Day: - 624 KWH x Rs. 5/- = Rs. 3120/-

    Saving: - Rs 7235 – Rs 3120 = Rs 4115 /- Per Day
    Saving: - Rs 4115 x 30 Day = Rs 123450/- Per Months
    Cost of 120 HP VFD Rs. 200000/-
    Pay Back Period: - 2 Months

Elevator Location Changed

1 no chain is installed at outlet of two Nos. Vibrating Machine. If we install Vibrating (Seed Cleaning) machine at height & will feed Soya been direct in to Elevator. By gravity we can save 1 No. Motors operation for 7.5 HP OR by changing location of Elevator

PROCESS CHART



ELEVATOR (5HP)

Note: -By direct feeding system by gravity we can save energy of Motor No:-1

CHAIN

Motor No: -1 (7.5 HP)
Motor running current:-7.7 Amp
So, Power Consumed = 4.4 KWH
Unit consumed per Day: - 4.4 KWH x 24 Hrs = 105.6 KWH
Saving = 105.6 KWH x Rs5/- =Rs 528/- Per Day
= Rs.528/- x 30 day = Rs.15840/- per Months
Saving in Capital Investment: -

1.Saving in D.G = Rs.2600/- x 7.7 A		= Rs.20020/-
2 Motor Cost	= Rs.1200/- x 7.5 HP	= Rs.9000/-
3 Chain cost		= Rs.25000/-
	Total	= Rs.54020/-

Installation of Flash Vessels

8. **Energy saving in Unit Consumption after installing Flash Vessels for Condensate water at export-2nd plant**

❖ We have installed Flash vessels for condense water on Date: -25/12/2004

* Before Installing Flash Vessels we observed following: -
Motor specification: 5 HP, 2900 RPM
Running current of motor: - 7 Amp.
Power consumed W = √3 VI Cos Ø
= 1.73 x 415 x 7 x 0.8
= 4020.52 WH
= 4.02 KWH
Unit Consumed per Day: 4.02 x 24 Hrs = 96 KWH
Cost per Day: - 96 KWH x RS.5/- = Rs. 480/-

* After Installing Flash Vessels we observed following: -
Pump& Motor Disconnected
So Saving = Rs.480/- Per Day

Installation of lower HP motor

10. Energy Saving by installing 15 HP motor in place of 22.5 HP motor in Refinery-1st, D.O Pump-1

❖ We have installing 15 HP motor in Refinery-1st, D.O.Pump-1 on Date:- 09/01/2005

* Before Installing 15 HP motor we observed following: -
Motor 22.5 HP, 2900 RPM
Motor running current: -15 Amp.
Power consumed W =√3 VI Cos Ø
=1.73 x 415 x 15 x 0.8
= 8615.4 WH
= 8.6 KWH
Unit Consumed per Day: - 8.6 KWH x 24 Hrs = 206 KWH
Cost per Day: - 206 KWH x Rs. 5/- = Rs. 1030/-

* After installing 15HP Motor we observed following:-
Motor 15 HP, 2900 RPM
Motor running current: -11.5 Amp.

Power Consumed W=√3 VI Cos Ø
= 1.73 x 415 x 11.5 x 0.8
= 6605.1 WH
= 6.6 KWH
Unit Consumed Per Day: - 6.6 KWH x 24 Hrs = 158 KWH
Cost Per Day: -158 KWH x Rs. 5/- = Rs 790/-

Saving: - Rs. 1030 – Rs.790 = <u>Rs. 240/- Per Day</u>

Saving in Capital Investment =8.6 KWH – 6.6 KWH
= 2 KW
= 3.5 A
1.Saving in D.G = Rs.2600/- x 3.5 A = Rs**.**9100/-
2 Motor Cost = Rs.1200/- x 7.5 HP = Rs.9000/-
Total =Rs.18100/-

CFL Lights

- In solvent plant's extractor for vessels lighting we are using 100 watts GLS lamp. we have implement 11 WATT CFL tube lights in recupresser vessel of Exp2.lighting result found satisfactory in case of CFL tube also. Power Consumption of 100-Watt Lamp = 100 Watt x 24 Hrs
= 2400 Watt/ Day
= 2.4 KWH /Day
= 2.4 Unit/Day
= 2.4 Unit x Rs. 5/- = Rs. 12/- Day

* By Using CFL tube per day consumption is = 11Watt x 24 Hours
= 264 Watt
= 0.264 Unit x Rs.5
= Rs.1.32/ Day

- **Per Day Saving is Rs. 12- 1.32= Rs. 10.68/-**

- **We** have replaced CFL lamps as per required wattage in place of 100-Watts lamp in plant building lighting & Vessels lighting. Saving per day in various CFL lamps are as per follow.

Sr.No	CFL lamp	Operating Hours	Saving per Day	Qty. (Nos)	Total Saving
1	11 watt	24 Hours	Rs.10.68	28	Rs.299
2	11 watt	12 Hours	Rs.5.40	00	-
3	15 watt	24 Hours	Rs.10.20	05	Rs.51
4	15 watt	12 Hours	Rs.6.10	03	Rs.18.3
5	20 watt	24 Hours	Rs.9.6	10	Rs.96
6	20 watt	12 Hours	Rs.4.8	40	Rs.192
			Total	86	Rs.656.3

Total saving per day = Rs.656.3/-

Total Cost of CFL Lamp

11 watt – 28 nos x Rs.90/- =Rs.2520/-
15 watt - 08 nos x Rs.120/- =Rs.960/-
20 watt - 50 nos x Rs.145/- =Rs.7250/-
Total – 86 Nos =Rs.10730/-

Pay back period =17 Days

VFD in R.O.Plant

❖ Energy saving by installing VFD in R.O.Plant High pressure water pump-1&2
Specification of Motor: -
15 HP, 2900 RPM, Make- Grandfos
Full load current – 21 Amp.

❖ Before installing of VFD we observed following: -
Flow rate – 10 KL/hour, Motor speed – 2900 RPM]
Flow control method – Throttling valve
Motor running load – 16 amps.
So power consumption = $\sqrt{3}$ VI Cos ø
= 1.73 x 0.415 x 16 x 0.85
= 10 KW
For 2 nos. pump = 10KW x 2 = 20KW

- After installing VFD we observed following: -
  Flow rate – 10 KL/hour, Motor speed – 2340 RPM
  Flow control method – Speed control of motor
  Motor running load – 12 amps.
  So power consumption = √3 VI Cos ø
  = 1.73 x 0.338 x 12 x 0.85
  = 6 KW
  For 2 nos pump=6 KW x 2 = 12 KW
  Saving = 20 KW – 12 KW = 8 KW/Hrs
  Saving per Day = 8 KW x 24 Hrs = 192 KW
  Saving in cost = 192 KW x Rs.5/- = Rs.960/- per day

- Payback period
  Cost of 2 nos. 15 hp VFD Drive: - Rs.88000/-
  So, payback period: - 3 month.

- Saving in capital investment = 20 KWH - 12 KWH
  = 8 KWH
  Saving in D.G.= Rs.2600/- x 14 amp = Rs.36400/-

VFD in D.O. Outlet Pump

- Energy saving by installing VFD in Refinery-II (D.O. Outlet pump)
  Specification of Motor: -
  10 HP, 2900 RPM, Make- Crompton
  Full load current - 14 Amp.

- Before installing of VFD we observed following: -
  Flow rate – 5 KL/hour, Motor speed – 2900 RPM
  Flow control method – continuous Throttling of pump outlet valve through
  Automatic pneumatic level control system.
  Motor running load – 10 amps.
  So power consumption = √3 VI Cos ø

= 1.73 x 0.432 x 10 x 0.85
= 6.35 KW

- After installing VFD we observed following: -
  Flow rate – 5 KL/hour, Motor speed – 2100 RPM
  Flow control method – Speed control of motor
  Motor running load – 6.0 amps.
  So power consumption = √3 VI Cos ø
  = 1.73 x 0.290 x 6 x 0.8
  =2.4 Kw
  Saving = 6.35 KW – 2.4 KW = 4 KW/Hrs
  Saving per Day = 4 KW x 24 Hrs = 96 KWH
  Saving in cost = 96 KW x Rs.5/- = Rs.480/- per day

- Payback period
  Cost of 1 nos. 10 hp VFD Drive: - Rs.35000/-
  So, payback period: - 2.5 month.

- Saving in capital investment = 6.35 KWH – 2.4 KWH
  = 4 KWH
  Saving in D.G.= Rs.2600/- x 7 amp = Rs.18200/-

VFD in D.O. Inlet Pump

- Energy saving by installing VFD in Refinery (D.O. Inlet pump)
  Specification of Motor: -
  12.5 HP, 2900 RPM, Make- Crompton
  Full load current – 16.5 Amp.

- Before installing of VFD we observed following: -
  Flow rate – 5 KL/hour, Motor speed – 2900 RPM
  Flow control method - Throttling of pump outlet valve
  Motor running load - 11 amps.
  So power consumption = √3 VI Cos ø
  = 1.73 x 0.437 x 11 x 0.85
  =7 KW

- After installing VFD we observed following: -
  Flow rate – 5 KL/hour, Motor speed – 1500 RPM
  Flow control method – Speed control of motor
  Motor running load –6.0 amps.
  So power consumption = √3 VI Cos ø
  = 1.73 x 0.216 x 6 x 0.8
  =1.7 Kw
  Saving = 7 KW – 1.7 KW = 5.3 KW/Hrs
  Saving per Day = 5.3 KW x 24 Hrs = 127 KWH
  Saving in cost = 127 KW x Rs.5/- = Rs.635/- per day

- Payback period
  Cost of 1 nos. 10 hp VFD Drive: - Rs.35000/-
  So, payback period: - 2 month.

- Saving in capital investment = 7 KWH – 1.7 KWH
  = 5.3 KWH

Saving in D.G.= Rs.2600/- x 9.2 Amp = Rs.23920/-

- BOREWELL-1

- EXISTING BORE WELL

Per Hour Water Discharge = 22 KL
Per Hour Power Consumption = 30 Units
Same Power Consumption & Discharge is in Bore well
Export – 1st Bore well = per Day 235 KL Consumption
Discharge = 15 KL / Hour
Running Hour = 15.66 Hrs.
Power Consumption = 360 Units, i.e. Per Hrs. 23 Units.

- Our Requirement is 1000 KL Water per Day

Bore well –1	235 KL	15.66 Hrs.	360 Units
Borwell – 2 and 3	765 KL	34.7 Hrs.	1041 Units
Total	1000 KL		1401 Units

- ❖ We installed 41HP KSB make motor – pump set in existing Borewell-1 in place of 33 HP motor, Motor takes 47 Amps load.

So power consumption = $\sqrt{3}$ V I Cos ϕ
= 1.73 X 415 X 47 X 0.9
= 30 Unit / Hour

. Per Hour Water Discharge = 32 KL (From Alankar Flow Meter)

- ❖ Our Requirement is around 1000 KL Water per Day

New 41 HP Pump (Alankar) bore well	768 KL	24 Hrs.	720 Units
Borwell –2	232 KL	10.5 Hrs.	315 Units
Total	1000 KL		1035 Units

In compare to existing Borewell operation for 1000 KL Water
Power saving = 1401 Unit - 1035 Unit
= 366 Units x Rs. 5
= Rs. 1830 saving per day.

Payback period :-

Pump & Motor Cost = Rs.86312/-
Cable Cost = Rs.32350/-
Total Cost = Rs.118662/-
Payback period = Rs.118662 / Rs.1830
= 64.8 Days
= 2.16 Months

* Same calculation and saving for borwell –2

WINDMILL

During the year 2005 the company has installed windmill of a total capacity of 1.3 MW at Gujarat seashore with a total project cost of Rs.800 Lacs.

Eco Ventilators

- Energy Saving by installing Eco ventilators on Plant and godown roof.

    - Nos. of Eco Ventilator installed: - 20 Nos.
    - Investment for Eco ventilators: - Rs. 1.6 Lacs.

- Unit consumption in lighting and Exhaust fan = 6 Unit / Day [200 watt (24 hr.) for exhaust fan and 100 watt (12 hr.) for lightings]
- Total unit consumption: - 20 x 6 = 120 Unit / Day

- After installing Eco ventilators, savings in Unit against Lighting and Exhaust fan = 20 x 6 x 300 = 36000 KWH

*** Savings = 36000 KWH X Rs.5 = 1.80 Lacs. Per Year**

VFD in Oil mill

- Energy saving by installing VFD in Oil Mill (Expeller No -6)
  Specification of Motor: -
  120 HP, 1480 RPM, Make- C.G
  Full load current – 147 Amp.

- Before installing of VFD we observed following: -
  Motor Running 50 Hz (1480 RPM)

Motor Running Load – 100 Amps.
Power Consumption = 1.73 x 415 x 100 x 0.85 / 1000
= 61 KW

- After installing VFD we observed following: -
  Motor Running 30 Hz
  So power consumption = 30 KW
  Saving = 61 KW – 30 KW = 31 KW/Hrs

  Saving Per Day = 31 KW x 24 Hrs = 744 KWH

- Saving In Cost = 744 KW x Rs.5/- = Rs. 3720 /- per day

- Payback period

  Cost of 1 nos. 120 HP VFD Drive: - Rs.200000 / -

  So, payback period = 1.8 Months (For 24 Hours Running)
  = 3.6 Months (For 12 Hours Running)

- Saving in capital investment = 61 KWH – 30 KWH
  = 30 KWH

  Saving in D.G.= Rs.2600/- x 52 amp = Rs.135200 /-

Installation of F.O.set

- Energy saving by installing Furnace oil set in place of Diesel Generator Set.
- We were using diesel generator set for our power requirement in may 2006.we have installed 1.9 MW furnace oil based engine set in our company. From May 2006 to till date we have generated 91.5 Lacs. Units from this set.

- Unit cost during diesel genset comes Rs. 6.50/ unit
- Unit cost during F.O.set: - Rs. 4 /unit

So, per unit saving compare to diesel engine set = Rs. 6.50 - Rs.5 = Rs. 1.5 / unit.

So, till date we have saved Rs. 1,37,000 /-

Changes in motor rating

- We have replaced following higher rating motors HP with lower rating motors by modifying machine.

Sr.No.	Machine Name	Old HP	New HP	Diff. HP
1	Cracker 1 & 2	2 x 12.5 HP	2 X 10 HP	5

2	Flacker Conv.(machine disconnected.)	7.5 HP	-	7.5
3	Separator Pump	5	3	2
4	Transfer Pump	5	3	2
5	Rinsing Pump	5	3	2
6	D.O.C Conveyor	10	5	5
	Total	57.5	34	23.5

By replacing above motors over all 15 Amps Current decreased.

So, saving = 200 Unit per day.

Annual saving = 6000 Unit (Rs. 30000/-)

Installation of chilling unit for Hexane Recovery System in Exp 1st plant

A. 1) Average Soyabean process — 40000 MT/ Year
2) Present Hexane loss — 160 KL (4 Ltr per MT)/ Year
3) Expected Hexane loss after installation of Proposed system — 120 KL (3 Ltr per MT)/ Year
4) Expected Hexane Recovery — 40 KL (1 Ltr per MT)/ Year
5) Expected Saving — 40000 Ltr X Rs.36/-
Rs.1440000/- per Year

B. 1) Equipment cost for above system (Already installed) Rs.150000/-

2) Chilling unit Rs.161000/-

3) Pipe line + misc Rs.25000/-

4) Pipeline insulation Rs. 50000/-

Total Rs. 3,86,000/-

C. Operating cost

1) 3 HP Chilling Pump
2) Chilling Unit } ---------- 6 Unit / Hr

Power cost----- 6 x 24 x 5 = Rs.720/- per day

= 720 x 150 (5 months Running / Year)

= **Rs.1, 08,000 per year**

Soft water treatment

% blow down Quantity on feed water (to keep boiler TDS levelof 6000ppm)

A. At TDS 900 = 17.60 % by softener Case-I

B. At TDS 50 = 01.00 % by R.O.Plant Case-II

Difference in Qty. = 16.6%

Combined boiler capacity = 38 M3/hr (8 TPH * 2 + 4TPH + 6 TPH +12 TPH New IBL boiler)

Water requirement per hour after reducing condensate recovery of 20 %
(38 x 80 %=30.4 M3/hr.)

Adding blow down qty in both cases.

Softener 46.0 M^3/hr. (38/82.4%)
R.O. 38.40 M^3/hr. (38/99.0%)

Difference in blow down qty = 7.6 M^3/hr (46-38.4)
Or 7.6 x 24 hrs = 182.4M^3/Per day
Or x 300 days = 54720 M^3/Per year

Heat lost in blow down water :
54720 x 1000 x 1 x (190 C -65) = Kcal
(Water of 100 C at 12.5 Kg/cm^2 during blow down,water temp of 65 C at feed pump)

Taking average GCV of coal as 6500 Kcal/kg and efficiency of boiler as 75% Coal qty comes to be 5,05,80,00,000 Kcal/(x) = 1140000 Kgs.
= 1140 Mt. Of Coal
1140 @ 1700/-per MT of Coal = 1938000/-

This means savings say Rs.19.4 Lacs

So, As per Our Plant Running @ 25M^3/hr and saving = 12 Lacs.

Condensate water

- All the condensate of Lecithin plant (Ref.II) is not in use. We will use this condensate to feed water tank of Boiler.

Approximate condensate from Lecithin plant is 35 kg/hr

Condensate loss per Day = 35 kg/hr x 24 hr
= 840 kg/hr.
Condensate cost per Day = 840 Kg/hr. x Rs.0.50
= Rs.420/- Per day.

So Saving = Rs 420/- Per Day (Rs.114000 for 217 days working)

Using over flow condensate

- Energy saving by using over flow condensate water from Refinery-I & Refinery-III

- At present all the condensate of water Mechtech Refinery (D.O Section) is coming from hot water tank of neutralization & being continuous over flow to E.T.P.
  Steam required = 2.40 TPH
  Steam Pressure = 10 kg/cm^2
  Condensate Recovery = 0.40 TPH

  Conclusion: - Approximate 400 kg/hr Condensate is coming from hot water tank. Which we have decided to take feed water tank of boiler. There will be a provision to take this condensate to neutralization section only.
  Approximate condensate saving = 400 kg/hr.
  Steam cost is approximate0.50 Rs/kg
  Saving = 400 kg/hr x 0.50 Rs
  = Rs.200/- per hours

  Saving = Rs 200/- x 24hr = Rs.4800/- Per Day

Fatty acid tank insulation

1) It is observed that fatty acid is discharged from DEO to fatty acid tank at 55°C. Freezing temperature of fatty acid is 30°C. If fatty acid tank is

insulated, steam will be required less to maintain the temperature. At present, steaming is done in the tank and temperature is around 80°C up to 3-meter tank height. Above 3-meter tank height, temperature is reducing. So temperature of bottom is more than required and the temperature at top is less than required. If the tank is insulated, heating will be required very less to maintain the temperature during running plant.

Insulation cost : -

Height of tank:- 9 Meter

Diameter of tank:- 3.27 Meter

Surface area to insulate = 41 M^2

Rate of insulation (with material 40 mm thick insulation)

= 42 Rs/sq.fit

= 420 Rs/Sq. M^2

So total cost (with material) = approx. Rs 17220/-

Heat require to raise the temp.of fatty acid from 59°C to 60 °C

$Q = mcp\Delta t$

= 40000 x 1 x 5

= 200000 Kcal/Hrs

At present heat required

$Q = mcp\Delta t$

= 400000 x 1 x 20

= 800000 Kcal/Hrs

Heat saving = 600000 Kcal/hrs

Heat saving in steam = 600000 Kcal/ $h_{vapour} - h_{liquid}$

= 600000 Kcal./517

= 1160 Kg/Day

= 290 Kg Lignite/Day

Steam saved = 1160 x Rs.0.50 per kg

= Rs 580/- per day

Pay back period = 1 month approx

Fatty acid collecting tank.

Inlet steam temperature =130°C

Out let steam temperature =125°C (A lot of steam is lost with condensate water)

So it seems heating system is in efficient.