

CALCULATION ON ENCON SCHEMES

(2006-07)

DETAILS OF ENERGY CONSERVATION MEASURE IMPLEMENTED IN 2006-07

(3) Replacement of passing Steam Trap by improved trap

Sl.No.	Unit	No. of traps
1	CDU-I	210
2	CDU-II	150
3	DCU-I	132
4	DCU-II	146
5	Offsites	247
6	CPP	50
7	Xylene	30
8	Total steam traps	965

Fuel Savings calculation:

Sl.No.	Parameters	Value	Unit
1	Average steam savings per steam trap	0.5	kg/hr/trap
2	Total potential of steam savings for 965 trap	482.5	kg/hr
		11.58	MTPD
3	Operating Days	365	Days
4	Fuel Cost	16144.81	Rs./MT
5	Total steam savings	4226.7	MT of steam
6	Equivalent fuel savings	354.9	MT/year
		57.302	Rs. Lakh/year

BRPL, Assam

DETAILS OF ENERGY CONSERVATION MEASURE IMPLEMENTED IN 2006-07

(2) Reduction of Coil Outlet Temperature (COT) in Pretreater Furnace

Sl.No.	Parameters	Value	Unit
1	Coil Outlet Temperature (COT) before reduction	297	°C
2	Coil Outlet Temperature (COT) before reduction	290	°C
3	Reduction in temperature	7	°C
4	Flow	14057	Kg/hr
5	Operating days	365	days
6	Fuel Cost	16144.81	Rs/MT
6	Fuel savings	0.063	MMKCal/hr
		0.151	SRFT/day
		0.153	MT/day
		56.007	MT/year
		9.042	Rs. Lakh/year

BRPL, Assam**DETAILS OF ENERGY CONSERVATION MEASURE IMPLEMENTED IN 2006-07****(1) By passing of Moisture Removal Column (MRC)**

Sl.No.	Parameters	Value	Unit
1	Operating days	365	days
2	<u>Steam savings</u>		
		1.0	MT/hr
		8760	MT/year
	Equivalent fuel	735.60	MT/year
	Fuel Cost	16144.81	Rs/MT
		118.76	Rs. Lakh/year
3	<u>Power savings</u>		
	No of motors	2	
	Rated power	15.4	KW
	Power savings	0.66528	MWH/day
		243	MWH/year
		83.455	MT/year
		13.474	Rs.lakh/year
4	Total equivalent fuel savings	819.054 132.235	MT/year Rs.lakh/year

DETAILS OF ENERGY CONSERVATION MEASURE IMPLEMENTED IN 2006-07(4) Energy Savings on account of Operation of 1TG & 2 Boilers instead of 2 TG & 3 Boilers at lower load

Estimated Potential of Energy savings in CPP due to operation of one TG & two Boilers instead of operating two TG & three Boilers at lower steam & power demand
Basis: per day

Sl.No.	Parameters	Unit	Values
I.	TURBO-GENERATOR:		
a.	Steam savings due to operation of one TG:		
	Quantity of steam (Fixed steam to TG at '0' load)	MT/hr	8.00
	Equivalent fuel	SRFT/hr	0.62
		MT/hr	0.62
		MT/day	14.99
b.	Power savings due to stopping of one condensate pump on account of stoppage of one TG:		
	Power consumption	KW	44.00
	Total saving per day	MWH/day	1.06
	Equivalent fuel	SRFT/day	0.34
		MT/day	0.35
c.	Total estimated potential of energy savings due to to operation of one TG	MT/day	15.340
II.	BOILERS:		
a.	Power savings due to stopping of Ignitor Air Fan, APH motor on account of stoppage of 3rd Boiler:		
	Power consumption	KW	3.60
	Total saving per day	MWH/day	0.09
	Equivalent fuel	SRFT/day	0.03
		MT/hr	0.03
b.	FD Fan (Motor) on account of stoppage of 3rd boiler:		
	Current savings	Amps	18.00
	Power consumption	KW	164.61
	Total saving per day	MWH/day	3.95
	Equivalent fuel	SRFT/day	1.27
		MT/day	1.29
c.	Steam savings due to sootblower,atomising steam on account of stoppage of 3rd boiler:		
	Quantity of steam	MT/hr	0.21
	Equivalent fuel	SRFT/hr	0.02
		MT/hr	0.02
		MT/day	0.39
c.	Total estimated potential of energy savings due to to operation of two boilers	MT/day	1.713
III.	Total equivalent fuel savings (TG + Boilers)	MT/day	17.05
IV.	Operating days for 1 TG & 2 Boilers	Days	65
V.	Fuel Cost	Rs//MT	16144.81
VI.	Calculation of fuel savings		
	Potential of fuel savings for 1 TG & 2 Boilers operation (sl. No. III)	MTPD	17
	Total fuel savings	MT/year	1100
		Rs.Lakhs/year	177.6

BRPL, Assam

DETAILS OF ENERGY CONSERVATION MEASURE IMPLEMENTED IN 2006-07

(5) Replacement of 17 nos of metallic fin fan cooler blades with FRP blades in DCU-II

DCU-II Fan	Before		After		Savings	
	Current	KW	Current	KW	Current	KW
<u>14-E-17</u>						
1	12.7	7.76	9.7	5.93	3.00	1.83
2	16.8	10.26	11.7	7.15	5.10	3.12
3	16.3	9.96	12	7.33	4.30	2.63
<u>14-E-29</u>						
A1	26.3	16.07	16.1	9.84	10.20	6.23
A2	25	15.27	16.1	9.84	8.90	5.44
B1	19.8	12.10	13.9	8.49	5.90	3.60
B2	20.2	12.34	14.2	8.68	6.00	3.67
<u>14-E-32</u>						
A	12.5	7.64	9.7	5.93	2.80	1.71
B	17.6	10.75	12.4	7.58	5.20	3.18
<u>14-E-7 to 31</u>						
1	23.8	14.54	17.8	10.88	6.00	3.67
2	21.7	13.26	17.1	10.45	4.60	2.81
3	20.0	12.22	15.8	9.65	4.20	2.57
4	20.3	12.40	16	9.78	4.30	2.63
<u>14-E-15</u>						
1	38.8	23.71	27	16.50	11.80	7.21
2	37.6	22.97	26.4	16.13	11.20	6.84
3	37.6	22.97	28.4	17.35	9.20	5.62
4	37.4	22.85	27.9	17.05	9.50	5.80
Total	-	-	-	-	-	68.55

Energy savings calculation:

Sl.No.	Parameters	Value	Unit
(1)	Operating days	365	Days
(2)	Fuel Cost	16144.81	Rs./MT
(3)	Power savings	68.55	KW
		1645.2	KWH/day
		600.50	MWH/year
(4)	Eq. fuel savings	206.4	MT/year
		33.3	Rs. Lakh/year

DETAILS OF ENERGY CONSERVATION MEASURE IMPLEMENTED IN 2006-07**(6) Re-insulation of RCO tanks****Heat loss calculation tho' insulation**

The following equation has been used valid upto 200 °C surface temperature. Factors like wind velocity, conductivity of insulating materials has not been considered in the equation.

$$S = [10 + (Ts - Ta)/20] \times (Ts - Ta)$$

S = Surface heat loss in Kcal/hr m²

Ts = Hot surface temperature in °C

Ta = Ambient temperature in °C

Total heat loss/hr = S x A

A = Surface area in m²

(Reference BEE book on Energy Manager)

I. Heat loss calculation tho' insulation (RCO Tanks)
(Calculation show is for 1 tank only)

Sl.No.	Parameter	Value	Unit
1.0	Tank No	803 & 804	
2.0	Total height of the tank to be insulated	10.2	m
3.0	Tank dia	35500	mm
4.0	Average insulation thickness	40	mm
5.0	Old Insulation		
5.1	Surface Temperature, Ts	57.0	°C
5.2	Ambient Temperature, Ta	27.0	°C
5.3	Difference	30.0	°C
5.4	Surface heat loss, S	345.00	Kcal/hr.m ²
6.0	New Insulation		
6.1	Surface Temperature, Ts	37.0	°C
6.2	Ambient Temperature, Ta	27.0	°C
6.3	Difference	10.0	°C
6.4	Surface heat loss, S	105.00	Kcal/hr.m ²
7.0	Fuel savings calculation:		
7.1	Total heat loss with old insulation per m ²	345.000	Kcal/hr
7.2	Total heat loss with New Insulation per m ²	105.000	Kcal/hr
7.3	Reduction in heat loss per m ²	240.000	Kcal/hr
7.4	No. of hours in a year	8760	hrs
7.5	Savings per m ²	2,102,400	Kcal per year
7.6	Calorific Value of fuel	10,000	Kcal/kg
7.7	Boiler efficiency	90%	
7.8	Average Price of fuel oil	16144.81	Rs./MT
7.9	Yearly fuel savings per m ²	234	Kg/m ² /year
		3771	Rs/m ² /year
7.10	Total height of the tank to be insulated	10.2	m
7.11	Tank dia	1398.00	inch
7.12	Average insulation thickness	40	mm
7.13	Average dia including insulation	35.589	m
7.14	Average total surface area, m ²	1141	m ²
7.15	Yearly fuel savings	266511	Kg fuel oil
		266.511	MT fuel oil
		43.03	Rs. Lakhs/year
III.	Total Savings of fuel for 2 nos of tank	533.023	MT of fuel/year
		86.06	Rs./lakhs/year