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SO/F, HWP-THAL
EA-0546



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EA-1356



Format for Information regarding Total Energy Consumption and Energy Consumption per Unit Production

1. Name of the company : Heavy Water Plant (Thal)
2. Full Address of the company : C/o RCF, Thal, Taluka, Alibag, Distt : Raigad
Maharashtra – 402 208
3. Contact Person : Shri S.C.Bhowmick, Scientific officer/F; /
Shri P. Ayyanar, Officer on Special Duty.
4. Email address : <scbhowmick@thal.heavywaterboard.org> /
<payyanar@thal.heavywaterboard.org>
5. Telephone/ Fax numbers : 02141-238089 / 02141-238087
6. Residential Address : Heavy Water Plant (Thal)
C/o RCF, Thal, Taluka : Alibag, Distt : Raigad
Maharashtra – 402 208
7. Power and Fuel Consumption : **For financial year 2004 - 2005**

7.1. Electricity:

7.1.1. Purchased:

- | | | |
|-------------------------|----------------------------|--------------|
| i. Contract demand | : 25000 | KVA |
| ii. Connected load | : 30456 | kW |
| iii. Annual consumption | : 1127.2 x 10 ⁵ | kWh |
| iv. Total cost | : 3454.4 | Rs. in Lakhs |

7.1.2. Own Generation:

- | | | |
|-------------------------------------|-------------------|-------------------|
| i. Through diesel generator | } | |
| a) Annual generation | | _____ kWh |
| b) Annual diesel consumption | | _____ kilo liters |
| c) Total fuel costs | | _____ Rs. in Lakh |
| ii. Through steam turbine/generator | | |
| a) Annual generation | | _____ kWh |
| b) Fuel used ¹ | | _____ |
| c) Annual consumption | | _____ kilo liters |
| d) Total fuel costs | | _____ Rs. in Lakh |
| iii. Through Gas Turbine | | (N.A) |
| a) Annual generation | | _____ kWh |
| b) Fuel used | | _____ |
| c) Annual consumption | _____ kilo liters | |
| d) Total fuel costs | _____ Rs. in Lakh | |
| iv. Through non-conventional | | |
| a) Type of generation ² | _____ | |
| b) Annual generation | _____ kWh | |

¹ State which type of fuel or energy was used (C = coal, B = biomass, O = oil, G = gas, E = electricity). If coal was saved state which grade i.e. C/I = imported, or C/F coal of grade F.

² State which type of other non-conventional method have been used (e.g. Wind, Solar, tidal etc.).

7.2. Coal :

- | | | |
|------------------------------------|---|--------------------|
| a) Quality (Gross calorific value) | } | _____ kCal/kg |
| b) Annual consumption | | _____ Tonnes |
| c) Total coal costs | | _____ Rs. in Lakhs |

7.3. Oil:

7.3.1. Furnace oil

- | | | |
|-----------------------|---|-------------------|
| a) Annual consumption | } | _____ kilo liters |
| b) Annual costs | | _____ Rs. in Lakh |

7.3.2. Low Sulphur Heavy Stock (LSHS)

- | | | |
|-----------------------|---|-------------------|
| a) Annual consumption | } | _____ kilo liters |
| b) Annual costs | | _____ Rs.in Lakh |

7.3.3. Hot Heavy Stock (HHS)

- | | | |
|-----------------------|---|-------------------------|
| a) Annual consumption | } | (N.A) _____ kilo liters |
| b) Annual costs | | _____ Rs. in Lakh |

7.3.4. Diesel Oil

i.High Speed Diesel (HSD)

- | | | |
|-----------------------|---|-------------------|
| a) Annual consumption | } | _____ kilo liters |
| b) Annual costs | | _____ Rs. in Lakh |

ii.Light Diesel Oil (LDO)

- | | | |
|-----------------------|---|-------------------|
| a) Annual consumption | } | _____ kilo liters |
| b) Annual costs | | _____ Rs. in Lakh |

7.4. Gas:

i. Compressed Natural Gas (CNG)

- | | | |
|----------------------------------------------------|--------------------------|-----------------------|
| a) Gross calorific value (Annual average) | 8553.33 | kCal/NM ³ |
| b) Annual consumption | 268.19 x 10 ⁵ | SM³ |
| c) Annual costs | 836.75 | Rs. in Lakh |

ii. Liquefied Petroleum Gases (LPG)

- | | | |
|--------------------------|---|-------------------|
| a) Gross calorific value | } | _____ kCal/kg |
| b) Annual consumption | | _____ Tonnes |
| c) Annual costs | | _____ Rs. in Lakh |

iii. Piped Natural Gas (PNG)

- | | | |
|--------------------------|---|-----------------------------------|
| a) Gross calorific value | } | (N.A.) _____ kCal/NM ³ |
| b) Annual consumption | | _____ NM ³ |
| c) Annual costs | | _____ Rs. in Lakh |

7.5. Biomass:

- | | | |
|--------------------------------------------|---|-------------------|
| a) Average moisture content, as fired | } | _____ % |
| b) Average Gross calorific value, as fired | | _____ kCal/kg |
| c) Annual consumption | | (N.A) _____ MT |
| d) Annual biomass costs | | _____ Rs. in Lakh |

8. Product based energy consumption³

Product name 1: Heavy water(D ₂ O).	:	25.2	GJ/Kg
Product name 2:	-	:	(units)
Product name 3:	-	:	(units)
Product name 4:	-	:	(units)

³ For example if you are a cement manufacturing unit producing different grades of cement, you may like to say under product name 1: OPC grade – XXX Tonnes and under product name 2: Portland slag cement– XXX Tonnes and so on.

		FORM - 2												
REPORT ON ENERGY CONSERVATION MEASURE UNDER TAKEN DURING THE FINANCIAL YEAR 2004-05														
CATEGORY No.	Description of areas	Investment (Rupees in lakh)	Consumption reduced / Energy ¹ savings/Prod. Raised					Cost reduction ² (Rs in Lakh)					Life cycle years ³	
			oil (KL)	gas (lakh Sm3)	Coal (Lakh tone)	electricity (Lakh kwh)	others	oil	gas	coal	electricity	others		
1	Optimization of operating parameters for energy saving:	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Pressure drop reduction in the fluid flow system and recovery of energy:	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Effective capacity utilization of equipment & machinery like sharing, redistribution etc:													
	3.1. Parallel operation of purifiers(12A11/12B) to reduce pressure drop and process more gas for higher production.	6.0	-	-	-	-	-	2.0 MT	-	-	-	-	198	Full life of the plant
4	Installation of additional heat exchanger (hot & cold):													
	4.1. Installtion of gas-gas cold recovery heat exchanger.(E4109)	70.0	-	-	-	21.94	-	-	-	-	83.37	-	Full life of the plant	
5	Modification / replacement of existing heat exchanger(s) for efficient heat / cold recovery:	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Capacity reduction of running machinery:													
	6.1. Removal of impellers from cracker ammonia feed pump (12P62A & 12P61B).	Nil	-	-	-	0.77	-	-	-	-	2.93	-	Full life of the plant	
	6.2. Provision of VFD for boiler feed water pumps(31P42)	4.5	-	-	-	2.5	-	-	-	-	9.50	-	MIN. 10 years	
7	Replacement of existing machinery with higher efficiency machine:	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Improvement of efficiency in running machinery:	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Installation of high efficiency motor:	-	-	-	-	-	-	-	-	-	-	-	-	-

10	Improvement of efficiency in motor:	-	-	-	-	-	-	-	-	-	-	-	-
11	Efficiency improvement / replacement of electrical fittings such as lighting, fans, switches, regulators etc:	-	-	-	-	-	-	-	-	-	-	-	-
12	Electrical load management and improvement of power factor:	-	-	-	-	-	-	-	-	-	-	-	-
13	Loss reduction in power transmission & static electrical equipment:	-	-	-	-	-	-	-	-	-	-	-	-
14	Installation of additional static equipment (other than heat exchanger) to reduce specific energy consumption:	-	-	-	-	-	-	-	-	-	-	-	-
15	Modification / replacement of existing static equipment. (other than heat exchanger) for efficiency improvement:	-	-	-	-	-	-	-	-	-	-	-	-
16	Reduction in surface energy losses:												
	16.1. Insulation of main cr. Burners to reduce radiation losses.	1.2	-	0.75	-	-	-	-	-	-	2.33		10 YEARS
17	Heat recovery from flue gas:	-	-	-	-	-	-	-	-	-	-	-	-
18	Fuel switching:	-	-	-	-	-	-	-	-	-	-	-	-
19	Recovery and recycling:	-	-	-	-	-	-	-	-	-	-	-	-
20	Utilization of non-conventional / renewable energy:	-	-	-	-	-	-	-	-	-	-	-	-
21	Technology up-gradation:	-	-	-	-	-	-	-	-	-	-	-	-
Note:													
1	Use commercial units of litre, kg, tons, normal cubic meter, kWh or MWh and indicate the unit. Indicate the anticipated potential in <u>energy</u> savings.												
2	Anticipated <u>cost</u> savings in the first year based on anticipated fuel savings.												
3	Estimate the predicted life of the measure, meaning the number of years the level of first year energy savings or even larger amounts will materialise.												

Executive summary to appraise Energy conservation measures under taken during 2004-05

Sl no.	Description of areas	Category ¹	Total Investment ² (Rs in lakh)	Verified savings ³ (Rs in lakh)	Verified energy ⁴ savings	Energy Units ⁵	Type of Fuel ⁶	Remarks
1	Effective capacity utilization of equipment & machinery like sharing, redistribution etc:	3	6	198	-	-	-	Production rise, leading to spec. consumption reduction.
2	Installation of additional heat exchanger (hot & cold):	4	70	83.37	2.194	M. Kwh	E	Nil
3	Capacity reduction of running machinery:	6	4.5	12.43	0.327	M Kwh	E	Nil
4	Reduction in surface energy losses:	16	1.2	2.33	0.075	M Sm3	G	Nil
Note:								
1	Use Category number form "Form - 2" as reference.							
2	Sum of all the investments under this category.							
3	Sum of all the savings(as money)under this category.							
4	Sum of all the energy savings under this category.							
5	Use conventional energy, volume or mass units with proper prefix k = 10 ³ , M = 10 ⁶ , G = 10 ⁹							
6	State which type of fuel or energy was saved (C = coal, B = biomass, O = oil, G = gas, E = electricity). If coal was saved state which grade i.e. C/I = imported, or C/F coal of grade F.							

**SUGGESTIONS FOR CHANGES TO BE INCORPORATION IN FORMAT NAMED
“FORM – 1”**

FORM NO. & PAGE NO.	LOCATION	DIFFICULTY ENCOUNTERED	PROBABLE SOLUTION	REMARKS
1 (Page 1)	Gap between “Form-1” & heading	Clear under standing (CUS)	Gap increasing	Distinct identification
- do -	Form – 1	- do -	Under closed Block	Better high-lighted
- do -	Heading	- do -	Underlining	- do -
- do -	1 st line (Name of company)	Reference	Sl.No. “1” given	Distinct identification (D.I.)
- do -	2 nd line (Full address)	- do -	Sl.No. “2” given	- do -
- do -	2 nd line	Full address of What ?	“of the company” added	More clear
- do -	3 rd line	Reference	Sl.No. “3” given	D.I.
- do -	4 th , 5 th , 6 th	Reference	Sl.No. 4, 5, 6	D.I.
- do -	6 th line (Plant address)	Already given in 2 nd line	Residential address	--
- do -	A. Power and fuel consumption	CUS	Bold & underlined	Better high lighted
- do -	2004/2005	Report for which year data is not clear	Financial year 2004-05	More clear
- do -	Electricity	Reference	Numbered as 7.1	D.I.
- do -	(a) Purchased	Reference	Numbered as 7.1	D.I.
- do -	Contact demand to total cost	Reference	Numbering as (i), (ii), (iii) & (iv)	D.I.
- do -	Under 7.11 (i) (unit for contact demand)	Generally KW is not used	KVA	--
- do -	Under heading of “own generation”	No reference number	Numbering like 7.1.2 (i) a,b,c (ii) a,b,c (iii) a,b,c (iv) a, b	--
- do -	Total cost for all cases	Written in “Rs. Lakhs”	May be changed to “Rs. in Lakhs”	--

FORM NO. & PAGE NO.	LOCATION	DIFFICULTY ENCOUNTERED	PROBABLE SOLUTION	REMARKS
- do -	Bottom note	--	--	2 nd is added for type of generation under 7.1.2.(iv).a.
- do -	Under 7.1.2 Own generation	No heading under non-conventional generation	Added under this heading as “Though non-convention” iv.a), b)	--
1 (2 nd page)	Coal and its sub details	To identify	Numbered as 7.2.a), b), c)	--
- do -	Oil and its sub-details	- do -	Numbered as 7.3, 7.3.1 a), b) etc.	--
- do -	Diesel at	To identify category	Put inside the category “oil” and numbered as 7.3.4 I) a, b, ii) a, b	--
- do -	“Units” for oil quantity “dome time Tonnes”	Diff. Units for quantity	Uniformed by “Kilo Litre”	--
1 (2 nd page)	Gas 7.4.1. Gross cal. Value	It is changing regularly so which value to be given	“Annual Avg” word is added	More clarity
- do -	Unit of G.C.V.	Given in “Kcal/NM3”	May be modified as “Kcal/SM3)	More commonly used unit now a days
- do -	Unit of Annual consumption	NM3	Sm3	- do -
- do -	Biomass	Identification	Number as 7.5) a, b, c, d	- do -
- do -	B. Product Mix. Specification	- Not clear - Not identified	“As product based energy consumption” Numbered as “8”	This will give specific energy consumption which otherwise not at all given in the Form-1 but heading of the form No. 1 says about absorption & specific consumption.

SUGGESTIONS FOR CHANGES TO BE INCORPORATION IN FORMAT NAMED
“FORM – 2 & 3”

Regarding the format of Form No. 2 & 3, it is proposed to interchange i.e. Form No. 2 should give the details of energy conservation measure report for the financial year and Form No. 3 should give the executive summary of the details given in Form No. 2.

Accordingly, the modified Form No. 2 & 3 are enclosed and bold letters in the forms are indicating the area / location where changes are further proposed. Few of these are given below :-

- 1) Presently enclosed modified Form No. 2 compared to given in Form No. 3 :

S.No	Location / area (in the form)		Remarks / proposed suggestion
i)	Heading	:	New name proposed for more clarity.
ii)	Heading of the table	:	a) “Description of Area” in place of “Area of improvement & modification”
			b) (Rs. In lakh) instead of “Lakh Rs.”
			c) “Consumption reduction / energy saving / Production raised” instead of “First Year Energy Savings”.
			d) Units of savings are given KL, LakhSm ³ , Lakh tonne, Lakh Kwh
			e) “Cost reduction (Rs. In Lakh)” instead of “first year cost reduction, Lakh Rs.”
iii)	Category column	:	Numbered as 1, 2,3,.....21.
iv)	Under each category	:	Different modifications are numbered as 3.1, 6.1, 6.2 etc.
v)	Note 1, 2, 3	:	Remains same

- 2) Presently enclosed modified Form No. 3 compared to given in Form No. 2 :

S.No	Location / area (in the form)		Remarks / proposed suggestion
i)	Heading	:	New name proposed for more clarity.
ii)	Heading of the table	:	a) “Description of Area” instead of description of measure.
			b) “Rs. In lakh” instead of “Rupees”
			c) 6 notes incorporated instead of 4 notes only.
			d) “Type of fuel” instead of “fuel” only
			e) Remarks column added.
iii)	Remarks column added especially where production is raised by modification and specific energy consumption reduced.		

NOTE : Important changes in the forms forwarded have been modified and highlighted in bold fonts in the filled forms.

- 1) Optimization of operating parameters for energy saving.
- 2) Pressure drop reduction in the fluid flow system and recovery of energy.
- 3) Effective capacity utilization of equipment & machinery like sharing, redistribution etc.
- 4) Installation of additional heat exchanger (heat & cold).
- 5) Modification / replacement of existing heat exchanger(s) for efficient heat / cold recovery.
- 6) Capacity reduction of running machinery.
- 7) Replacement of existing machinery with higher efficiency machine.
- 8) Improvement of efficiency in running machinery.
- 9) Installation of high efficiency motor.
- 10) Improvement of efficiency in the existing motor.
- 11) Efficiency improvement / replacement of electrical fittings such as lighting, fans, switches, regulators etc.
- 12) Electrical load management and improvement of power factor.
- 13) Loss reduction in power transmission & static electrical equipments.
- 14) Installation of additional static equipments other than heat exchanger to reduce specific energy consumption.
- 15) Modification / replacement of existing static equipments other than heat exchanger for efficiency improvement.
- 16) Reduction in surface energy losses.
- 17) Heat recovery from flue gas/waste gas.
- 18) Fuel switching.
- 19) Recovery and recycling.
- 20) Utilization of non-conventional / renewable energy.
- 21) Technology up-gradation.