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## **Issue # 1: June 2008**

### **IGEN – Thermal Power Plant Corner**

Estimation of savings due to control of de-super heater water spray

#### **Background:**

A 140 MW thermal power generating unit, operating at 110 MW, was found to having main steam flow of 390 Ton/hr (TPH) at 120 kg/cm<sup>2</sup>(g) pressure and 536°C temperature (enthalpy = 822.9 kCal/kg). To control the super heat temperature, 30 TPH of water spray at 128 kg/cm<sup>2</sup>(g) and 170°C (enthalpy = 173.4 kCal/kg) was used in the de-super heater. The other operating parameters/ assumptions of the generating unit are as under:

#### **Parameters/ Assumptions:**

- (a) Main steam required at the above main steam pressure & temperature to generate 1 MW = 3.5 TPH.
- (b) Specific coal consumption = 0.65 kg/kWh
- (c) Coal GCV = 4,600 kCal/kg
- (d) Landed coal cost = Rs. 1,800 per ton
- (e) Expected steam consumption in the soot blowers after repair = 110 ton per day
- (f) Average revenue realised = Rs. 2 per kWh generated
- (g) Investment towards repairing of soot blowers = Rs. 4 crores
- (h) Boiler efficiency = 80%
- (i) Annual plant operating hours = 7000

#### **Proposal:**

The power plant plans to repair the existing steam soot blowers in order to improve the heat transfer within the boiler and to reduce the de-super heater water spray from 30 TPH to 7 TPH.

#### **Issue:**

What will be the energy and money saving potential if the above proposal is implemented by the power plant management?

**Solution:****Estimation of savings due to control of de-super heater water spray**

	Unit	Present Value	Proposed Value
Avg. power generation	MW	110	110
Specific power Consumption	ton/MW	3.5	3.5
Steam flow	tph	390	390
Enthalpy of main steam	kcal/kg	822.9	822.9
Desuperheat water spray	ton/hr	30	7
Enthalpy of depuper water	kcal/kg	173.9	173.9
Expected Steam Cons. for Soot blowing	tons/day	0	110
Cost of power	Rs./kwh	2	
Annual operating hours	hrs	7000	
Boiler efficiency	%	80%	
GCV of coal	Kcal/kg	4600	
Cost of coal	Rs./ton	1800	
Heat input	kcal/hr	326148	325919.93
Energy Savings	kcal/hr X 1000	base	228.075
Coal savings	tons/yr		433.84
Cost savings due to coal	Rs.Lakhs		7.81
Additional power generation	MW		6.69
Revenue due to Additional power gen.	Rs. Lakhs		936.67
Total savings	Rs. Lakhs		944.48

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