

POSSIBILITY & PROPOSAL TO REDESIGN PUTTALAM COAL POWER STATION PHASE II

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DECLARATION

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T.N.Walpita.

The above candidate has carried out research for the Masters Dissertation under my supervision.

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Prof. J.P. Karunadasa.

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ABSTRACT

This thesis provides an analysis on the most economical coal grade which ensures the lowest generation cost at Puttalam coal power plant phase II which is the biggest and only coal fired thermal power plant in Sri Lanka. The investigation has been conducted to study and estimate the relevant cost components such Coal FOB cost, transportation cost, handling cost & operational cost as well as the minimum suitable process modifications such feeding, crushing, pulverizing & firing needed for different coal grades ranging from lower calorific value to higher calorific value while keeping the existing steam generating boiler which have the combustion efficiency of 88.5% as a reference model. Then the investigation is extended to propose a target potential supplier of coal and the currently used firing technologies in the utility industry.

The results show that the price of coal is increased in the world market when move towards the higher calorific value range coal. So it reflected an increase of coal cost to unit generation cost while lowering the operational and transportation cost components. The operational and coal storage costs are very minimal compared to the coal cost & transportation cost. There is an optimum total cost point identified as Rs. 6.06 which gives best burning rate of 126 t/h and low calorific value of NCV 5500kcal/kg. So it saves average Rs. 0.26 to generate 1kWh rather than the designed coal with calorific value of GCV 6300 kcal/kg or NCV of 6043 kcal/kg.

When the process path is concerned the capacity of pulverizer (35t/h) is the major barrier to move lower grade coal than NCV of 5000 kcal/kg. The boiler is the only major unit which needed to redesign for the above selected coal and remaining process path equipments as per the contract documents are capable enough to handle proposed coal.

It can achieve 5 million US\$ annual saving with the plant factor of 85% for single 300MW unit and the pay aback period is just 3 months for the additional expense for boiler modification it the additional cost is 10% of the boiler.

Indonesia is the most suitable supplier of coal according to the proposed coal properties and the available reserve & resource capacities. KCM Coal is the advisable coal brand available in the market and possible to alter the other properties of coal lined up with the environmental limitations since the coal blending facility is also available in Indonesia.

Key words: Coal, Bituminous, Steam, Boiler, Resources, Reserves.

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