

Initiative Policies and Practices in the area of Coal beneficiation and reject coal utilization in the Indian context

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Introduction:

Coal Industry was nationalized in two phases, coking coal in 1972 and non-coking coal in 1973. In pre-nationalization period, four washeries belonged to private sector companies who were both producers and users. Rest of the washeries belonged to public sector companies. Except NCDC (National Coal Development Corporation) who washed coal for the consumers, HSL had washeries washing coal for their own use. All these washeries were beneficiating coking coal for use in steel plants except one at Nawrozabad belonging to ACC and another at Giddi belonging to NCDC which washed non-coking coal.

At the time of nationalization (1972) India was producing about 78 million tonnes of coal of which about 17 million tonnes were produced per annum from open cast mines. The washery feed was entirely from underground mines with the result that washery yield of clean coal was about 70%. Today the quality of feed to washery has deteriorated due to 80% of production from open cast mines with the result that yield in coking coal washeries has come down to 40-45%.

Initiatives :

Coal India Ltd. was formed in 1975. One of its objective was to add value to the mined coal for supplying clean and sized coal to the customers by adopting appropriate coal beneficiation route. This led to construction of coal beneficiation plants for non-coking coal. The washeries belonging to NCDC and HSL were transferred to CIL. In late 90's there was a policy directive from Govt. of India that all coal meant for consumers beyond 500 km distance and transported by Indian Railway system must be beneficiated to optimize

carrying capacity of the Railways and save energy. This directive did not enthuse the producer, in this case CIL, to construct washeries to handle its entire coal production owing to the fact that power utilities were unwilling to pay the additional cost of washing coal. Besides, the Indian Railway is happy to carry any coal, as it is their major source of revenue (approx. 40%).

The initiative to wash coal has been dampened due to rocketing crude price leading to substantive increase in the price of coal in International market. In 1998 the crude price was \$ 10 to \$ 12 per barrel and the steam coal price in the spot market was \$ 26 C.I.F. CIL had to compete with International coal market as import of non-coking coal was permitted in 1993. 1998 was the first year in which CIL had to slash its production target by 6 million tonnes in the middle of financial year due to loss of coastal market to imported coal. Had the energy prices continued at this level, the producer might have been forced to undertake construction of more washeries for non-coking coal. This was not to be so, as the crude prices started climbing and is poised to break \$ 80 barrier. The reasons for increasing price of energy resources are many, including Mr. Laden fixing the fair price of crude at \$ 100. The International coal price of non-coking coal ranges between \$ 60-80 and that of coking coal between \$ 120-160. Till 1998 import of coal was perceived as a threat, now it is an opportunity for the producers of coal in this country, specially when KYOTO did not impose restriction of use of coal on India, China and South Korea with U.S. not rectifying KYOTO Protocol.

Economics of coal marketing is in favour of selling run of mine coal, as margin on sale of ROM is much higher compared to margin on washed coal; as it is in the case of crude vis-à-vis refined products. What I am trying to stress is that in sellers market producers are not enthused to wash coal.

With the creation of Asia-Pacific Partnership on Clean Development and climate, however, the member countries feel need for coal beneficiation as

integral part of carbon abatement initiative. This workshop is the outcome of this initiative.

Policies :

I am in no position to delineate on the policies to be formulated and implemented, as these are prerogatives of the governments of the member countries.

Practices :

Starting with chance sand flotation cone used at West Bokaro and Jamadoba washeries of TISCO, Indian washeries have used more sophisticated schemes of washing coal (coking coal). CFRI has classified the technology used in three groups.

Group A : Run of mine coal crushed to 75 mm is directly screened (25 or 13 mm size) and separate washing systems are incorporated for the coarse and small size coals. The coarser fractions are treated in HM baths and the under sizes are washed in Baum or Feldspar Jig or in HM cyclone.

Group B : The washing system is same as above, except that a pre-washer (Baum Jig) is incorporated to eliminate stone bands and deliver a more consistent feed.

Group C : This scheme is suited for upgrading inferior coal envisaging the use of HM cyclone washer for treating the entire quantity after crushing it to some convenient size (20, 13 or 6 mm) and separating the slurry below 0.5 mm by wet screen. The upgrading of slurry is done either in hydro-cyclones or in flotation cells.

In non-coking coal washeries the beneficiation is done after crushing of ROM to 100 mm and passing it through Batac Jig.

Washability of Indian Coal :

At this juncture I would like to point to the participants that Indian coals are difficult to wash due to presence of fixed dirt consisting of inherent mineral matter of coal resulting from the residual inorganic constituents of the coal forming plants. CFRI developed a system to determine washability characteristics of coal in terms of a index represented by a number ranging between 0 to 100. It was called washability index which was independent of total ash in coal. When index is low, the coal is difficult to wash. They have evaluated the washability indices of Indian and foreign coals. Indian coals belonging to Permo-Carboniferous period have indices between 15-43, whereas the Tertiary coal indices range between 47-76. The indices for British, German and American coal range between 45-76, while those from Japan, Australia, South Africa have indices between 20-49.

CFRI proposed following nomenclature to define cleaning possibilities of Indian coals.

Washability characteristics	Range of washability Indices
Easy	Above 40
Medium	20 – 40
Difficult	20 & below

They also suggested the use of yield reduction factor. It is defined as a percentage reduction in yield for each one per cent reduction in ash content at any selected ash level of the clean coal.

I do not intend to deal with the entire spectrum of the fundamental studies they have carried out in Indian coals regarding their washability.

Use of Coal Reject :

CIL is utilizing some of the rejects for captive power generation through normal route and through fluidized bed combustion route (7.5 MW Fluidized Bed Plant is at Rajrappa Washery). Major users are brick manufacturers.