



Where there is greenery everywhere, Where there are parks in all corners

Where there are colourful fountains, Where you find beautiful colonies

Where you find a shopping mall Where you see all brands of cars zoom past you

Where you are connected to the world through Internet, Where all offices are networked

Where you see smiling faces, Where you can talk to any part of the world through any means you wish to

Where you find wide & smooth roads, Where you see the life being lived

And where you come to know that coal is also being mined here, **You are in West Bokaro!!!**



(i) Unit Profile:

West Bokaro (WB) came into existence in 1948, as an independent coal company, managed by M/S Anderson Wright under the managing agency system. Tata Steel acquired the Company in 1956 to meet its requirement of metallurgical grade coal for Iron making. Subsequently, in 1976, WB was made a Division of Tata Steel. In 1974, when coal mines were nationalised, WB was exempted as it produced coal only for captive consumption of the Steel Works. The coal industry in India is highly regulated with only few private players allowed to produce coal only for captive use (in steel, cement and power industry). India has very low reserves of coking coal. Indian coals in general are not suitable for steel making being high in incombustible matter (Ash-25-38%) and also difficult to wash for reducing Ash. The first washery of the country was set up in WB. The current washeries are designed to reduce Ash from 36% to 17% at an yield of 38%. Any further reduction in Ash was considered uneconomical because of significant drop in yield. (5% drop for 1% drop in Ash). Though Ash can be reduced by improving process & application of technology, Rank of coal which is result of 'Metamorphosis' cannot be changed. Hence a large quantity of coking coal is imported for blending with Indian coal to make it suitable for iron making. The business objective of WB Division is to produce clean coal at optimum cost for captive use in the steel plant of Tata Steel at Jamshedpur. The strategy is to reduce Ash with minimum loss of yield so that quality of coal improves and yet the cost is beneficial vis-a vis imported coal.

The primary product of WB is the metallurgical grade coal (also called CC), for Coke Ovens, which converts coal into coke for use in the Blast Furnaces. The type of coal deposit in WB is that of medium grade metallurgical coal containing a very high percentage of Ash. Tata Steel has developed stamp charged technology for using the coal from WB after blending it with imported coal. The coal after mining is washed in the coal beneficiation plants to lower down the ash content from an average of 36% to 13%. Nowhere in world the coal is beneficiated from 36% to 13% and in this regard the coal beneficiation process at WB is unique. This is a highly commendable achievement especially in view of the fact that Indian coal comes under the category of "difficult to wash coal".

In order to improve the productivity of the Blast Furnace's, it is beneficial to lower down the Ash of CC. However, with every 1% drop in Ash of CC the yield drops by 4-5% resulting in lower volume of CC and thereby increasing the cost of production of CC. Every year Ash was reduced from 17% to 16% and this year Ash has been further reduced to 13% at a very short notice from the customer. There was an extreme

exigency to increase the productivity of blast furnaces in view of imminent shutdown of G-BF and recurring problem of F-BF. The division responded to the demand of the customer immediately by reducing the Ash from 15% to 13% level in 24 hours. The process is being stabilised and there is a continuous improvement in yield even while reducing Ash. The delivery mechanism to steel plant at Jamshedpur is mainly through rail.

Mining Process At West Bokaro



Drilling of holes



Charging with explosive



Blasting



Removal of overburden



Raw Coal Mining and despatch to crushing plants



Crushing and conveying to washeries



Beneficiation in washeries and segregation into different value added products



Loading in railway wagons and despatch to steel Works, Jamshedpur

Few Milestones



1947 In the year of independence, M/s Bokaro Ramgarh Ltd. came into existence

1948 Underground mine opened with Raw Coal production capacity of 0.3 MTPA

1951 Washery - I commissioned as 1st Washery in India to produce Clean Coal at 18% Ash

1952 Became a wholly owned subsidiary of Tata Steel

1972 Became a division of Tata Steel. Modernisation Phase- 1 to produce 0.4 MTPA Clean Coal @ 18% Ash

1982 Modernisation Phase - II . New facilities added: Washery- II, BC Ropeway, Power House

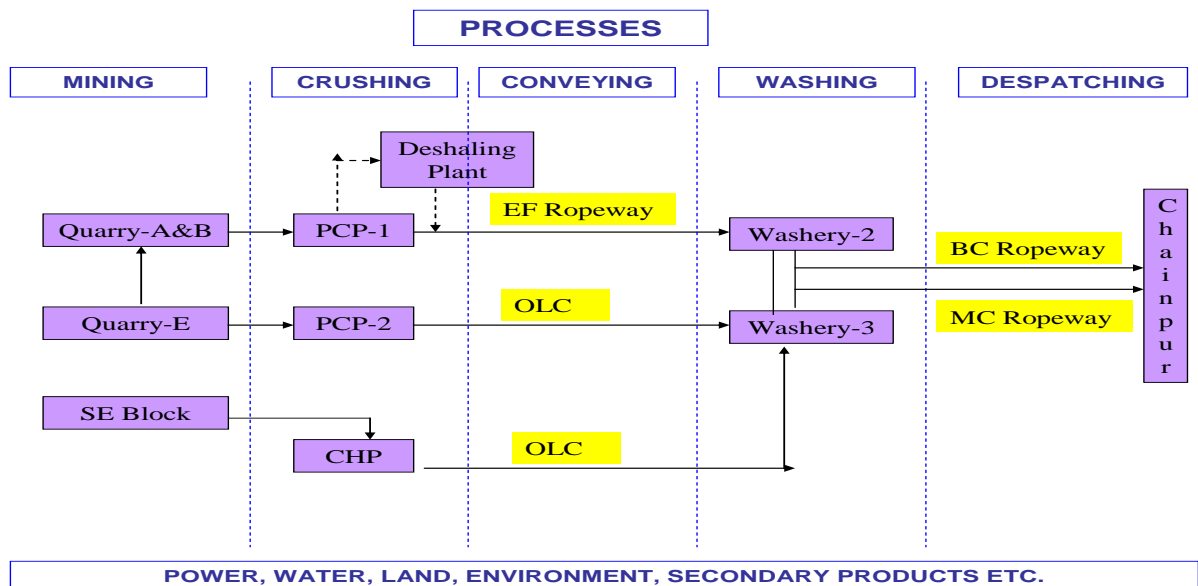
1994 Modernisation Phase III to produce 1.4 MTPA Clean Coal at 17% Ash. Major facilities added: Washery- III, Quarry- E, Primary Crushing Plant, New 2x10 MW Fluidized Bed Combustion Power Plant

2003-04 Inaugurated new Quarry- South Eastern Block. Started producing Clean Coal at 16% Ash. Clean Coal production increased to 1.8 MT

2004-05 Clean Coal production at 15% Ash. Production exceeded 1.95 MT

2005- 06 Started Clean Coal production at 14% Ash. New Coal Handling Plant feeding Q- SEB coal to W-3 commissioned

Started clean coal production at 13% Ash from 1st Jan 06



LEGEND

CHP-Coal handling plant, PCP-Primary crushing plant, OLC-Overland conveyer

BC- Bicable, MC- Monocable, Chainpur: Fast coal loading station.

(ii) Energy Consumption:

Include information on total energy consumption (i.e. coal, oil, gas, electricity and money value). Information on energy consumption in terms of percentage of manufacturing cost should also be presented. Also, it should highlight the specific energy consumption for the period 2005-2006, 2006-2007 & 2007-2008 .Good Computer Graphic Presentation related to Specific Energy Consumption may also be incorporated.

Description	Unit	2005-2006	2006-2007	2007-2008
Production	LT	40.27	46.36	47.94
Total Electrical Energy Consumption /annum	Lakhs Kwh	1328.20	1389.59	1405.74
Specific energy consumption - Electrical	LKwh/LT	32.98	29.97	29.32

Total diesel (fuel) consumption / annum	KL	34312	25696	36601
Specific diesel consumption	KL/LT	852.04	554.27	763.47

(iii) Energy Conservation Commitment, Policy and Organizational Set up
(Please include a photo copy of unit's Energy Conservation Policy, if decided)

Energy Conservation Commitment, Policy and Set up:

West Bokaro Division, Tata Steel is committed to conserve the natural resources. Number of energy improvement projects has been undertaken which have saved energy worth Rs. 914 Lakhs last year.

The plant energy profile consists of Electricity and Diesel, Water. Energy audits are also carried out and the feasible recommendations are implemented as per the requirement. Sufficient energy conservation posters, banners are displayed to make employees aware regarding energy conservation.

Senior executives have strong commitment towards energy conservation which they demonstrate in their daily routine and lead by example. The importance of energy conservation has also been recognized through TPM (Total Productive Maintenance), TOC (Theory of Constraint). Many energy conservation Kaizens have been implemented and the members of the teams are suitably awarded for their effort. The Energy conservation is given thrust through the Small Group activities undertaken by workmen by undertaking Kaizens in their respective areas and also through TQM/TOC activities for taking breakthrough projects for energy conservation.

TATA STEEL

ENERGY POLICY

Tata Steel reaffirms its commitment to conserve scarce energy resources and shall endeavour to :-

- Comply with national and international regulations
- Adopt best available technology for energy efficiency
- Implement world class operating practices
- Conduct regular Energy Audit for continual improvement
- Promote energy efficiency through mass awareness

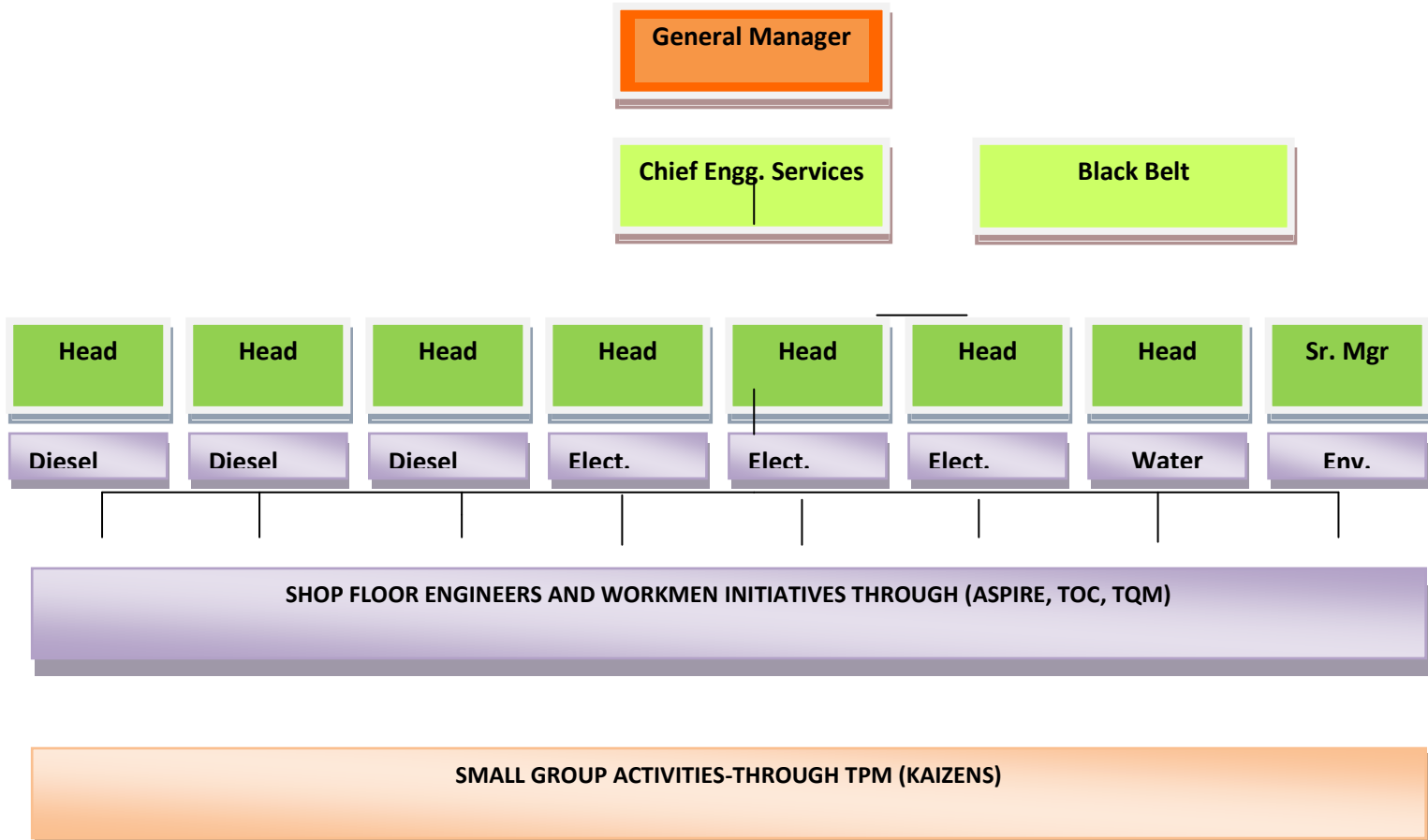
Date: 1st April, 2004


B. MUTHURAMAN
MANAGING DIRECTOR

16 10 2007



Organisational set up for Energy Conservation



West Bokaro Division, Tata Steel is committed to conserve the natural resources. Number of energy Improvement projects has been undertaken in 2007 - 08 which have saved energy worth Rs.290.35 Lakhs.

The plant energy profile consists of Electricity, Diesel, and Water. Energy audits are also carried out and the feasible recommendations are implemented as per the requirement. Sufficient energy conservation posters, banners are displayed to make employees aware regarding energy conservation. Environment cell and the improvement group support the activities of the departments by closely monitoring the energy conservation activities.

Senior executives have strong commitment towards energy conservation which they demonstrate in their daily routine, providing necessary budgets and motivating people. West Bokaro division of Tata Steel is driving energy conservation through structured system of improvement activities involving every employee. Bigger projects are taken under TQM, Six Sigma banner and smaller projects through small group activities vis TPM, Quality circles. All projects are recognized through the reward and recognition system of the company. The reward and recognition system motivates the employees to contribute towards energy conservation activities. Kaizens have been implemented and the members of the teams are suitably awarded for their effort. The Energy conservation is given thrust through the Small Group activities undertaken by workmen by undertaking Kaizens in their respective areas and also through TQM/TOC activities for taking breakthrough projects for energy conservation.

(iv) Energy Conservation Achievements:

- 1. Energy Saved using CFL lamps in place of Incandescent lamps in Flats, Bungalows, Hospital , Schools, Training Center ,Guest House etc.**
 - **23 W CFL in place of 100 W GLS Lamps: 300 Nos**

(100-23) W X 300 Nos = 23100 Watts

Energy = 12 Hours X 365 X 23.1 KWH = **101178 KWH**



- 11W CFL in place of 60 W GLS Lamps: 200 Nos

$$(60-11)W \times 200\text{Nos} = 9800 \text{ W}$$

$$\text{Energy} = 12 \text{ Hours} \times 365 \times 9.8 \text{ KWH} =$$

42924 KWH

- 11X2 = 22 W CFL in place of 40 W Tube Lamps : 60 Nos

$$(40-22) \times 60 \text{ Nos} = 1.68 \text{ KW}$$

$$\text{Energy} = 12 \text{ Hours} \times 365 \times 1.68 \text{ KWH} =$$

7358 KWH

Total Saving = 101178 + 42924 + 7358 = 151460 KWH per annum

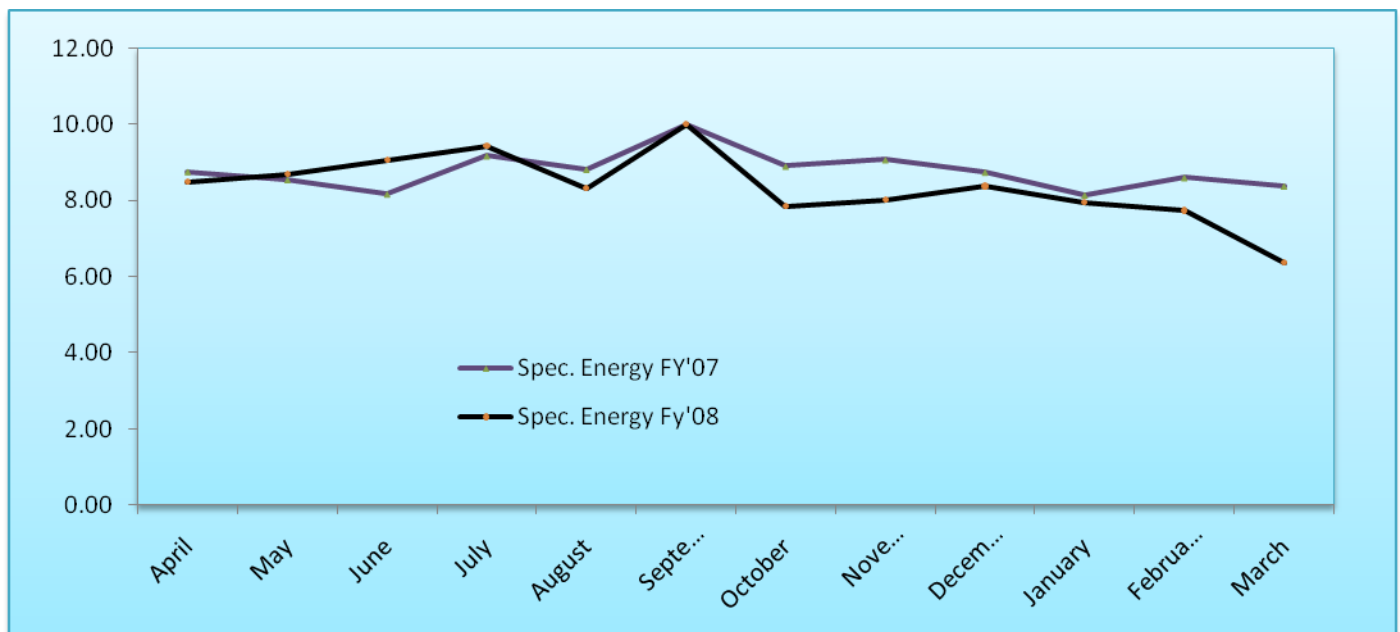


Energy Saved during 2007-08	
Saving in Terms of Energy (KWH)	Saving in Terms of Rupees (@ Rs.2.81/Unit)
151460 KWH	Rs.425602.60

Total saving = Rs. 4.26 Lakhs

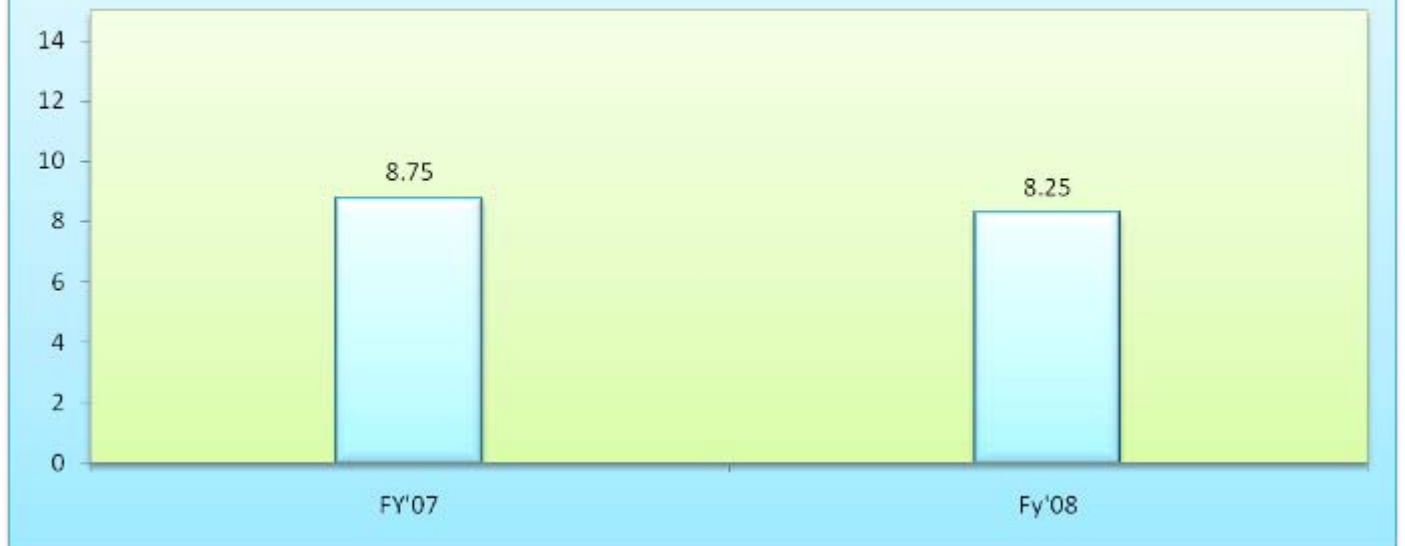
2. Energy saving at W-3 (FY'08)

- The Specific Energy consumption reduce from 8.75 Kwh/Ton in FY'07 to 8.27 Kwh/Ton in FY'08 .
- Total power consumption reduce from 25.251 million unit to 24.492 million unit, hence a reduction of 0.759 million unit from previous year.
- This has resulted in saving of Rs 70,95,425 while the cost of Captive Power Consumption reduce from Rs 2.25 per unit to 2.03 per unit.

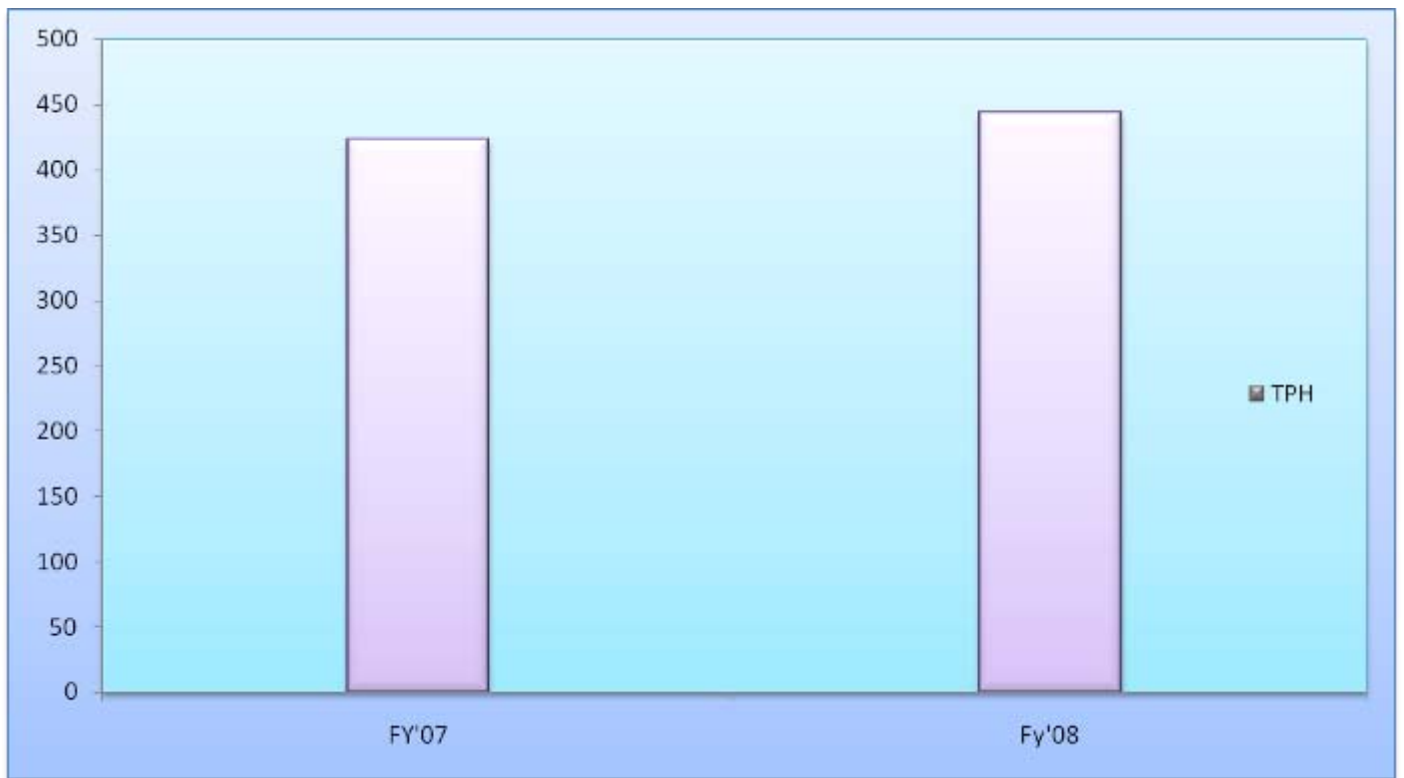


Specific Energy of W#3

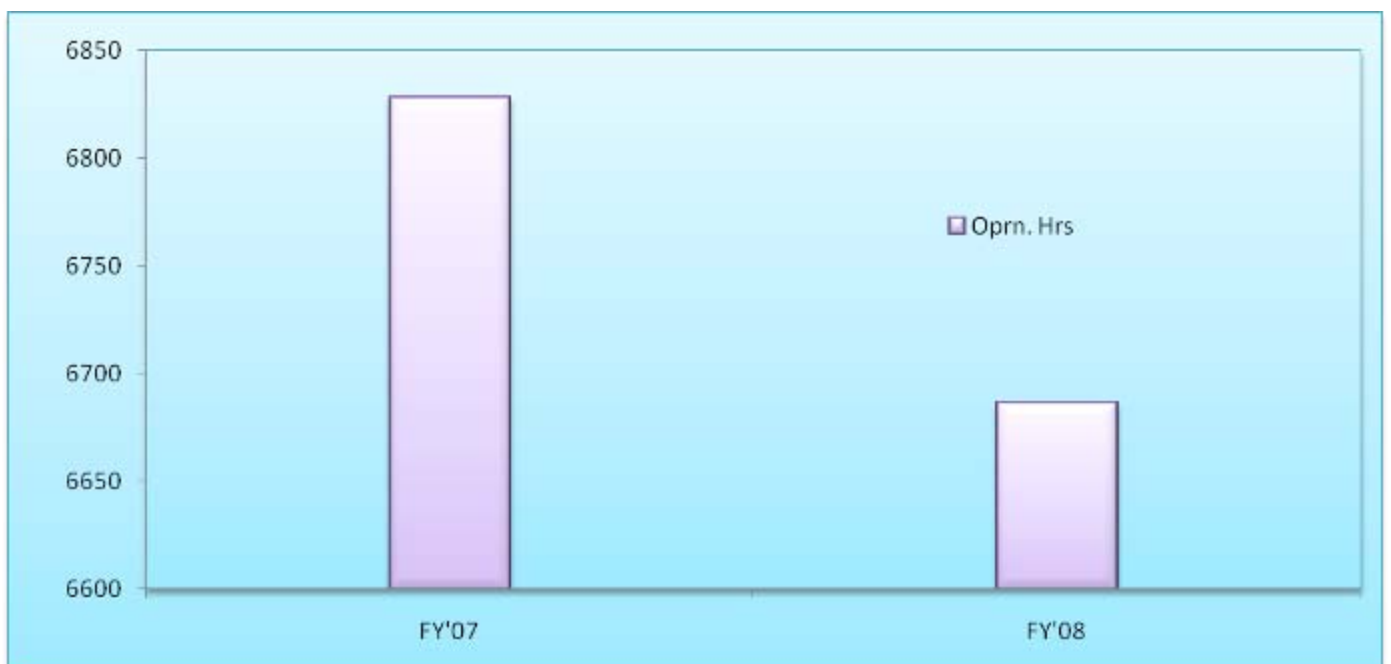
Energy



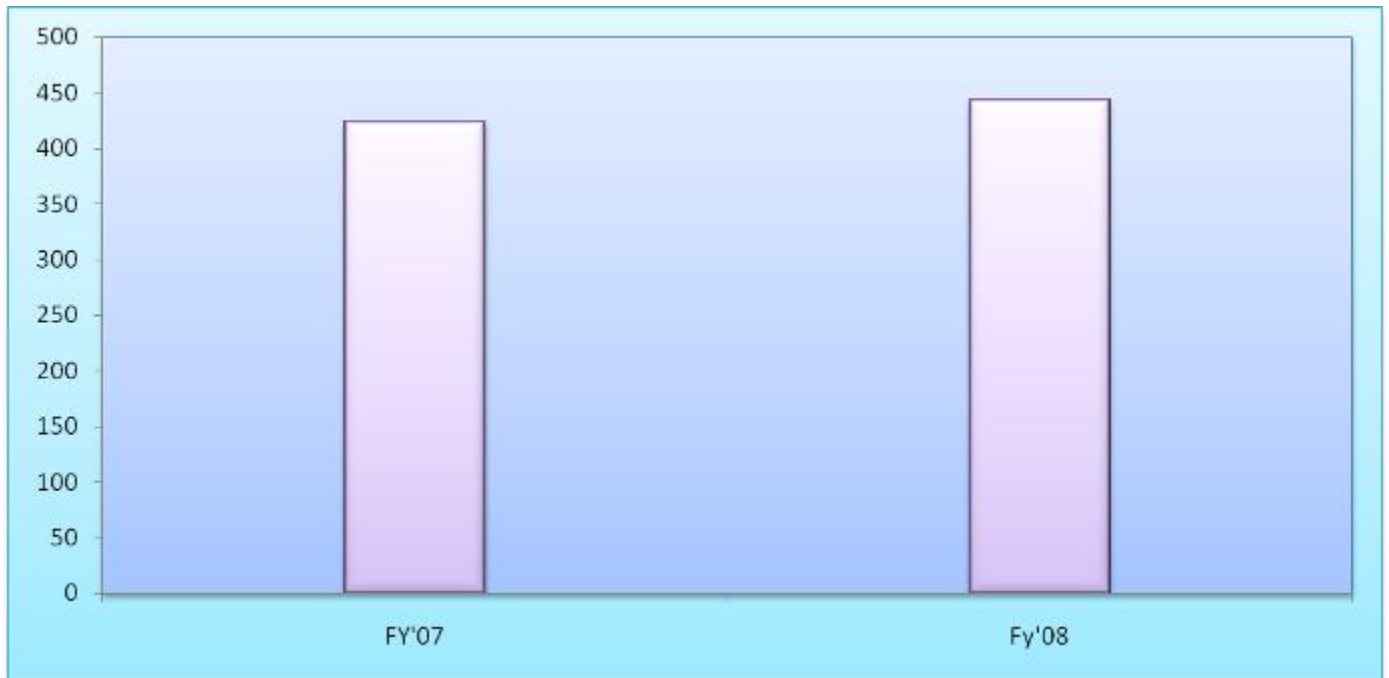
Plant TPH of W#3



Operation Hours of W#3



Plant TPH of W#3



Development job for reduction in Power Consumption

- Four nos of 132 Kw Secondary cyclone feed pump changed from Dol. to VVF Drive.
- Four nos of 40Kw Eddy current coupling drive for plough feeder change with VVF Drive.
- Optimization of the operation of screen bowl centrifuge for dewatering of fines coal. Out of three drives most of the time only two or one were operated thereby reduction of 295Kw each of power consumption.
- Reduction in idle running & low feed running of washing plant by developing stringent monitoring system. The TPH increased from 423 to 443 while the operation hours reduced from 6828 hours to 6686 hours. This has resulted in energy efficient operation of the plant.

6 . Energy Saving Communications:



(v) Energy Conservation Plans and Targets

ENERGY CONSERVATION PLAN

(vi) Environment and Safety:

(A sample write up is attached at Annexure C for ready reference)

Environment: Tata steel at West Bokaro has established a strong Environment Management Cell having multi-disciplinary team of professionals and technical staff with vast experience, fully abreast of state of art technologies and having an intimate understanding of latest trends.

Responsibilities of this department include liaisoning with State Pollution Control Boards, monitoring and efficacy of pollution control measures, monitoring of weather and environment quality in and around West Bokaro, work place environment monitoring, drinking water monitoring, rehabilitation and reclamation of mined out areas, ecological conservation and organizing environment awareness campaign etc.

We are OHSMS-OHSAS 18001 (2005) and ISO 14001 certified division (2000)



**Environment Management System
at
West Bokaro**



Environment Management



West Bokaro is fully committed to preserve nature's balance and conduct all its operations in the most eco-friendly manner.

The key processes at West Bokaro are mining, crushing, conveying, beneficiating and dispatching of coal to various customers. These activities have an impact on the environment. Every effort is put to nullify the impact by a series of activities towards protection of environment.

Our endeavour is to ensure sustainable growth and continual improvement in our environment performance. Our basic philosophy in this regard is based on 3 R's i.e. Reduce, Reuse and Recycle. Our key activities in order to maintain a perfect harmony between operations and environment are:

Air Management : Mining Operations result in generation of dust. Our Air Pollution Management system consists of water spraying over haul roads, dry fog system over conveyors, ESP in Power House to control the stack emission, providing green belt around mines and haul roads etc.

Water Management : Our Water Pollution Management system consists of well established Effluent Recycling system in all operating units, wet ash handling system at Power House for recycling of clear water, dewatering of tailings through centrifuges and high frequency screens and cascading of tailings in a series of tailings ponds and recycling of clear water to washeries etc.

Noise Management : These activities consist of reduction in noise level through the use of silencer in high noise areas, provision of ergonomically designed cabins in HEMMs and control rooms in plants and promoting use of ear plugs among workers etc.

Solid / Liquid (used oil) Waste Management : It includes Proper identification, segregation, collection and disposal of solid waste, safe disposal of hazardous waste into impervious concrete bin, disposal of tailings for reuse in brick kilns, use of washery rejects as fuel in Power



House to generate power etc. It includes Proper identification, segregation, collection and disposal of solid waste, safe disposal of hazardous waste into impervious concrete bin, disposal of tailings for reuse in brick kilns, use of washery rejects as fuel in Power



House, Collection of used oil by oil recovery system and its disposal through the authorized recyclers.

Land reclamation / Afforestation : Mining activities lead to deforestation which is managed through back filling of mined out area and covering old overburden dumps with thick layer of soil for land reclamation. Afforestation on overburden dumps, ash dumps and other waste lands and greenery in and around operational units and residential areas is an ongoing activity. Millions of trees have been planted so far with more than 80 % survival rate. Development of parks and gardens is an integrated element of our environment management which can be seen all around the place.



Conservation of Natural Resources : Optimization of consumption of resources like water, energy, fuel and lubricants and also process re-agents like frother and magnetite is another area of constant attention. Reduction in oil leakages from machines, recirculation of clear water from oily effluent ponds, minimization of Coal spillage from conveyors and from various transfer points, waste minimization through improved housekeeping and motivated work force are other activities in this field. Also, all by-products are utilized in some or the other way and nothing goes unused.



The entire mining operation is safe guarded against occurrence of unsafe incidents. Pro-active measures are undertaken to ensure the employees' health, safety and productivity through ergonomically designed workstations and by protecting them from occupational hazards.



These and many other similar activities have brought us laurels as West Bokaro was certified with ISO-14001 and OHSAS 18001. It has also been declared as QIMPRO national benchmark in Indian coal industry.



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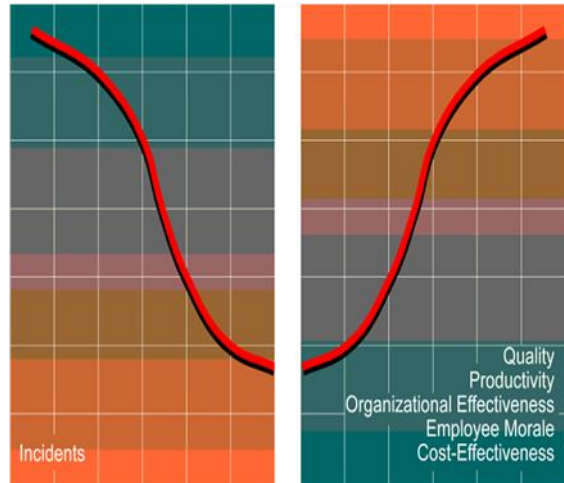
We have also won “Best Environment Management award” by Bihar Pollution Control Board for three consecutive years and. “Indira Priyadarshani Brikshya Mitra Award in the year 2003 .

Water recycling in tailing pond



We Strongly Believe

Good safety = Good Business



Safety:

All activities at West Bokaro are governed by the Mines Act & safety measures are in compliance with DGMS norms.

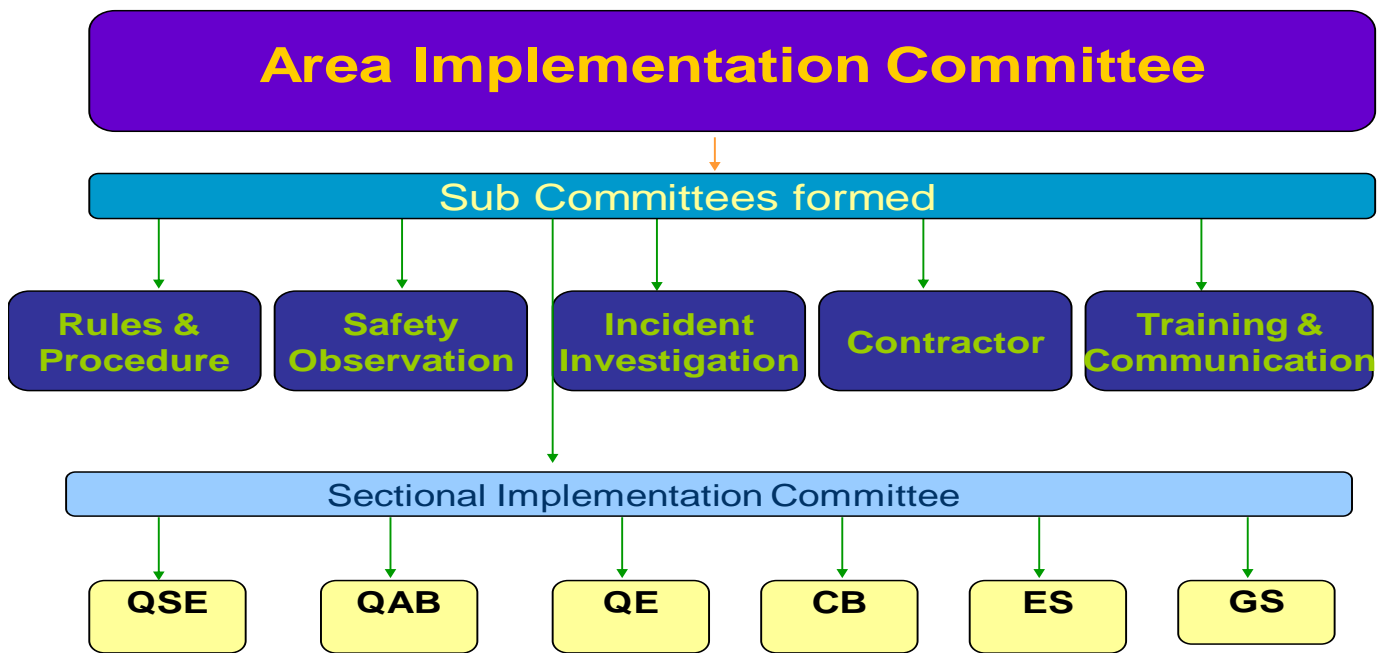
The entire lease area of West Bokaro is divided in three groups to form three Group of Mines. Each Group of mine is headed by a statutory agent and, under him, there is a statutory Mines Manager, Statutory Safety Officer, Statutory Colliery Engineers and Workmen Inspectors (explained through organizational chart in sheet No. 2)

In addition to this, all the individual Departments have an appointed Safety Officer for the promotion & implementation of safe practices in the Departmental activities.

The Division has an appointed Head, ISO (Internal Safety Organisation) to oversee the safe practices in all spheres of activities, identify the gaps and propose recommendations to bridge the gap. The compliance to the proposed recommendation is tracked to close the loop.

We are also taking consultancy of Du pont to guide and improve our overall safety standard of the division. In the last safety week celebration Ranchi- Koderma region West Bokaro won 12 prizes in open cast Category.

Our safety Management Structure:



2.0 Few unique Safety practices in the Opencast Mines of West Bokaro

- ✓ **Bigger blast with out any fly rocks and at reduced ground vibration & noise**
- ✓ **Enhancing safe operation skill & man productivity by Training through Simulator**
- ✓ **Better Ergonomics and Online control of Mining Operations helps in improving the safety standard in Opencast Mines.**
- ✓ **Effective role of Global Positioning System (GPS) Control Room In-charge in the Opencast Mine during night shift for safe operation of HEMM.**
- ✓ **Adherence to Director General of Mines Safety (DGMS) Norms in the Opencast Mines**

Safe and Wide Haul Road with Island



Installations at Night for Safe Working



3

2.2 Few other best practices on safety at West Bokaro

- ✓ Green Cross Movement: Risk & Hazard identification and future course of action under
- ✓ Daily morning dispatcher review of safety at GM Level
- ✓ Transparency in communication about safety standards by one and all
- ✓ Every week at West Bokaro begins with safety pledge by all officers reiterating the division's commitment to follow safety practices in words and spirit and make it a safer place to work in.