

# Jharia Collieries Division

TATA Steel

## Unit Profile

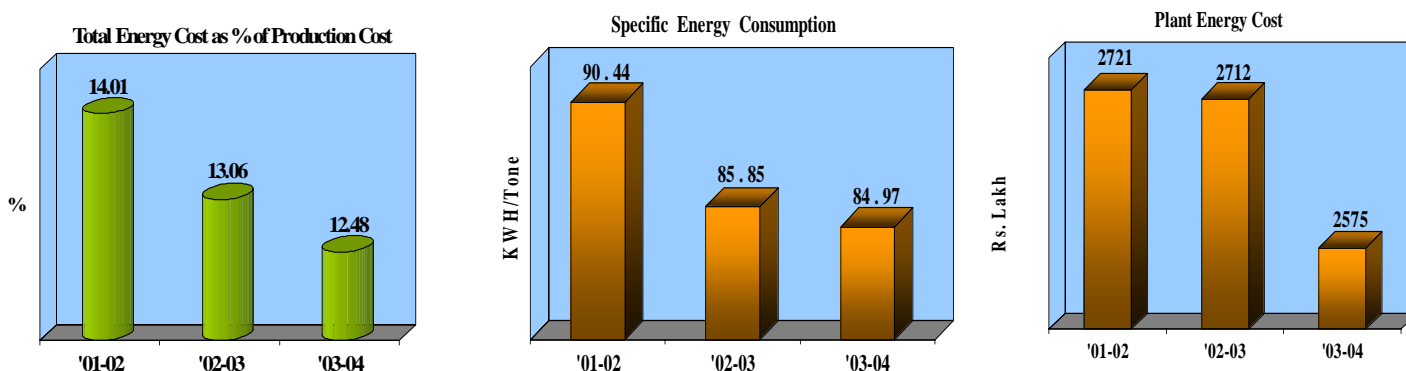
Jharia Collieries division is a captive unit of TATA Steel. It is located in Jharia Coalfields.(location plan JH / ECA-02 enclosed). It has +100 years old 5 underground mines-operating at maximum depth(600m) in Jharia Coal Fields, 2 Coal Preparation Plants(CPP) / Washeries with a combined 1.6 mtpa throughput capacity, 1x10MW captive FBC Power Plant(PP) and Services departments to support the operations.

Its main product is Prime Coking Coal ( Washed / Clean Coal). In FY 03-04, it produced 1.28 million ton(mt) washed coal at <17% ash by beneficiating 1.51 mt ROM Coal . After meeting the captive requirements of Jamshedpur Steel Works, the balance are sold to Public Sector Steel Plants. Plant effluents and by-products are very effectively utilized.

**It is EMS ISO 14001 certified unit.**

## ENERGY CONSUMPTION

Its plant (collieries, washeries & PP) combine consumes about ¾th of the total power, out of which , essential underground mine safety loads like Pumping, Ventilation, Fire Control, Roof supporting , Stowing etc. alone consume 80%.



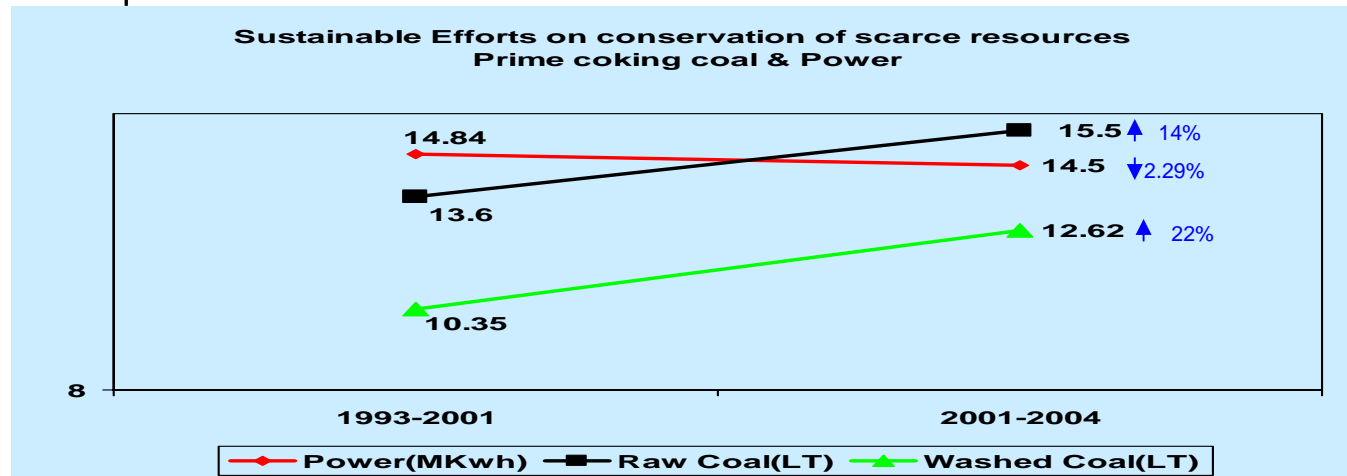
## The ORGANISATIONAL SET UP, COMMITMENT AND POLICY

It has consistently maintained its competitiveness through energy & resource conservation, cost effectiveness, consistency in product quality & delivery in otherwise; arduous, **manpower & energy intensive** Underground coal mining industry in an era when globally, the underground mining is becoming economically unviable for many of the established players in this field.

Its commitment to conservation of scarce energy resources is driven by its “Energy Policy” (enclosed).It has dedicated organizational set up for Conservation, Safety & Environment. (Organisational set up enclosed) The Improvement Group drives the energy conservation activities through various improvement initiatives , small group activities, innovations & mass awareness (Display of EVA meters on Power conservation- enclosed) on energy efficiency. During 2001-03 period , its employees contributed 464 major ideas on energy conservation through organizational initiative of TOP:Total Operational Performance- a McKinsey’s programme implemented first time in the world in underground coal mining application, Black / Green Belts Projects, Six Sigma, Suggestion Box , etc . It has structured review & monitoring mechanism of these initiatives through embedded systems like QMS( all units are certified to internal TISCO 13001- equivalent to ISO 9001 standard), EMS , OHSAS and internal Tata Business Excellence Model- replica of Malcom Baldrige US National Quality award .

## Energy Conservation Achievements

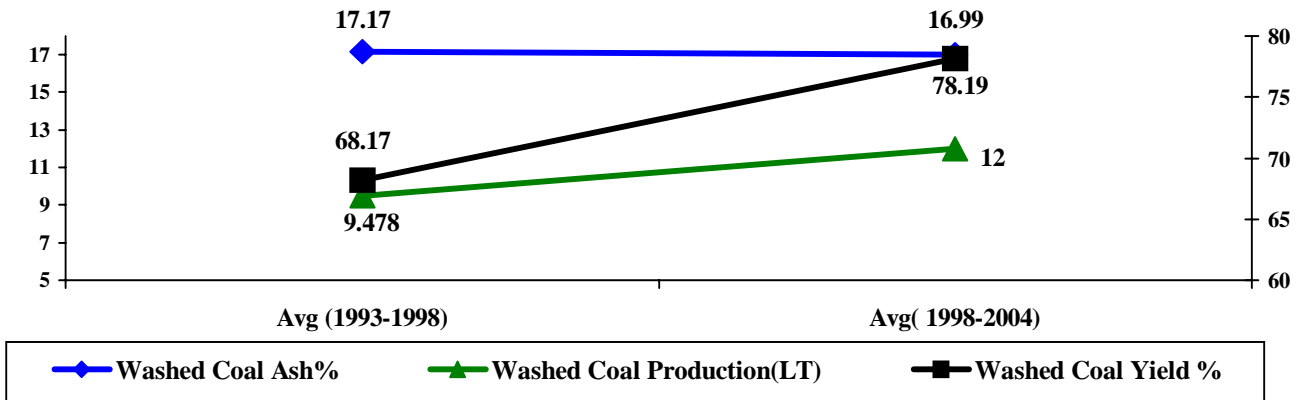
Maximum coal extraction with utmost care on safety & environment and Optimum recovery of useful heat / carbon value from this scarce national resource have been its guiding principles on conservation; accomplished by huge investments on energy & resource conservation and effectively taking care of the challenges arising out of the increasing mine depth, associated arduous working conditions and stringent operational & safety requirements stipulated by the DGMS for Ventilation, Dewatering, Gassiness, Fire and Strata Control by installing High capacity axial flow fans @ 4 lakh cfm, higher head Pumps, Pneumatic/ Hydraulic roof Bolting m/cs etc. In the recent years, despite 20% increase in the connected load on these mandatory energy intensive additional operational requirements and due to extensive mechanization at greater depths/ scattered mining districts, its has been able to consistently reduce power consumption.



In the areas of Conservation, it has played leading role in national underground coal mining industry by its many pioneering efforts; some of which are:

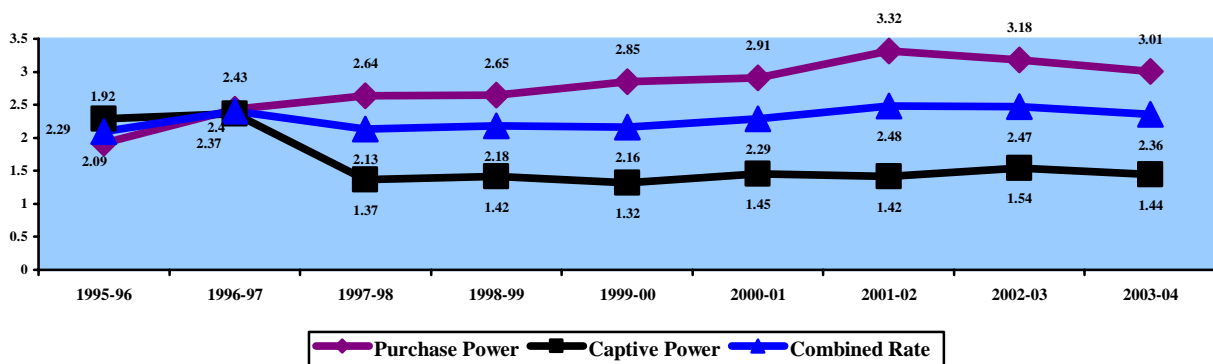
- First Underground Coal Mine in India ( perhaps in the World ) to be certified with EMS ISO 14001 in April' 2003
- Before enactment of law for the conservation of limited energy reserves of good metallurgical coal, it was First to introduce " Sand Stowing "(filling the void created from extraction of coal in underground mine) through large capital investments to improve the extraction of coal & protection from subsidence - otherwise 50 to 60% of the national reserves would have been lost
- Injection of Nitrogen to Fire affected areas in u/g mine through newly installed Plant for protection of scarce coal from Fire & its Conservation
- First to install Coal Washery way back in 1950 for use of uniform sized, blended & lowered ash coal in steel making , resulting into improved coke rate at Steel Plant;
- First to install way back in 1988, AFBC(Atmospheric Fluidised Bed Combustion) Technology based 10 MW Power Plant, using residual carbon/energy content of washery rejects- a by product of coal beneficiation process, for generating power; otherwise an environmental problem of disposing huge reject stock
- Conservation of surface soil ,degraded due to underground mining by filing Fly ash and its reclamation through plantation & vegetation- an unique successful experimentation in the mining industry.
- First to install close circuit effluents re-circulation system in its Washeries & Power Plant even before the enactment of law thus conserving water and energy as well with reduced fresh water requirement & associated pumping
- First to launch TPM( Total Productive maintenance) and OHSAS 18001 in Underground Coal Mine, enhancing its operational capabilities in resource conservation and environment, health & safety protections
- An Industry breakthrough Trial of using FRP Blades in Main Mine Ventilator is in progress at its Bhelatand Colliery which has 20% potential on energy saving .
- For conservation of scarce prime coking coal & optimum recovery of its useful heat

content/ carbon value ,It has invested about Rs. 100 crores during last few years in enhancing its coal beneficiation technology by installing new state of art Benificiation Plant at Bhelatand and upgradaing the existing processes by energy efficient technology like replacement of Primary Cyclones by Scrolled Evolute Cyclones/ MULTO TECH having higher separation efficiency & higher t'put rate in the Coarser side and introduction of Richard Mozely Hydro Cyclones in the fines circuit. It resulted into 20% reduction in the specific power consumption of these plants and 12 % increase in carbon recovery at 1% lower ash which has breakthrough effect in reduction of coke rate in the steel plants.



In its pursuit for energy conservation, the division has reduced & contained its energy bill in an energy intensive industry by optimizing operational efficiency & maintaining stringent safety standards through various conservation projects/ initiatives; some of which are:

- Reorganisation of Belt Conveyor network and optimizing Trunk Belt speed
- Reorganising Pumping & elimination of stage pumping
- Amalgamation of its adjoining mines & Rationalisation of working districts in underground significantly helped in conservation of energy, manpower & other resources.
- Optimising plant through put rate by installing higher capacity screens and reducing down/ idle time at Washeries
- Rightsizing the Motor capacities of Pumps, Compressors, Belts etc.
- Shutting down uneconomical power generating units PH # 1&2- oil supported stoker fired boilers using HV Coal with avg. generation cost @ Rs.3 per unit. It immensely facilitated the conservation of HV Coal and contained the ever escalating power bill
- Invested huge money in strengthening & reorganization of power distribution network to mininmise T&D losses and in installation of Capacitors Bank to operate at cost economic optimum power mix. Twin objectives of energy conservation & containment of power bill have been achieved with the above actions



### Energy Conservation Plans and Targets

The division has definite plans on energy conservation & reduction in power consumption in spite of ever increasing energy intensive operational & safety demands associated with underground coal mining . The major ones are:

	Energy Conservation Activities/ Plans	Potential saving (Rs.Lakhs)	Estimated Expenditure (Rs. Lakhs)	Schedule
1	Recovery of prime coking coal from locked up Fire area	125.00	75.00	March'05
2	Optimising Carbon recovery from prime coking coal & Conserving electrical energy by improving plant throughput at washeries	400.00	210.00	Jan'06
3	Installation of capacitors for improvement of power factor at collieries sub station	24.00	12.00	March'06
4	Replacing overhead lines by u/g cabling to eliminate power theft	14.00	34.00	Oct.'06
5	Identification & right sizing of Motors, Cables etc.	24.00	64.00	March'05
6	Upgrading & Strengthening of transmission network to minimize line losses	28.00	38.00	July'05
7	Reorganisation of Pumping	16.00	2.00	March'05
8	Phasing out ageing Motors, Electrical equipments etc.	55.00	68.00	Oct'05
9	Fire Protection activities to contain its propagation to virgin areas in u/g mines	National Duty	120.00	Continuous

Some of the improvement projects/ initiatives identified through employees' small group activities/ cross functional teams have been listed out in the Annexure-

In addition, the initiatives like attending to water/ compressed air/ steam pipe line leakages /replacement of damaged pipes, replacement of energy saver bulbs in phases, extensive recovery of blocked coal in underground through stowing etc are part of our Annual Business Plan .

### Environment & Safety:

The mined coal is transported from the underground face at a depth of 600m through a series of Coneveyor network to the Washery at the surface. After beneficiation at Washeries, the fines rejects (Tailings) are sold to Briquette & Clin and the coarser one is utilized for generating power .Bed ash & Fly ash from Power Plant are utilized respectively for stowing in underground voids and filling of low lying areas / degraded land on the surface- **a unique eco-friendly system of taking out coal from mother Earth and filling it back with its by products- nothing left unutilized.**

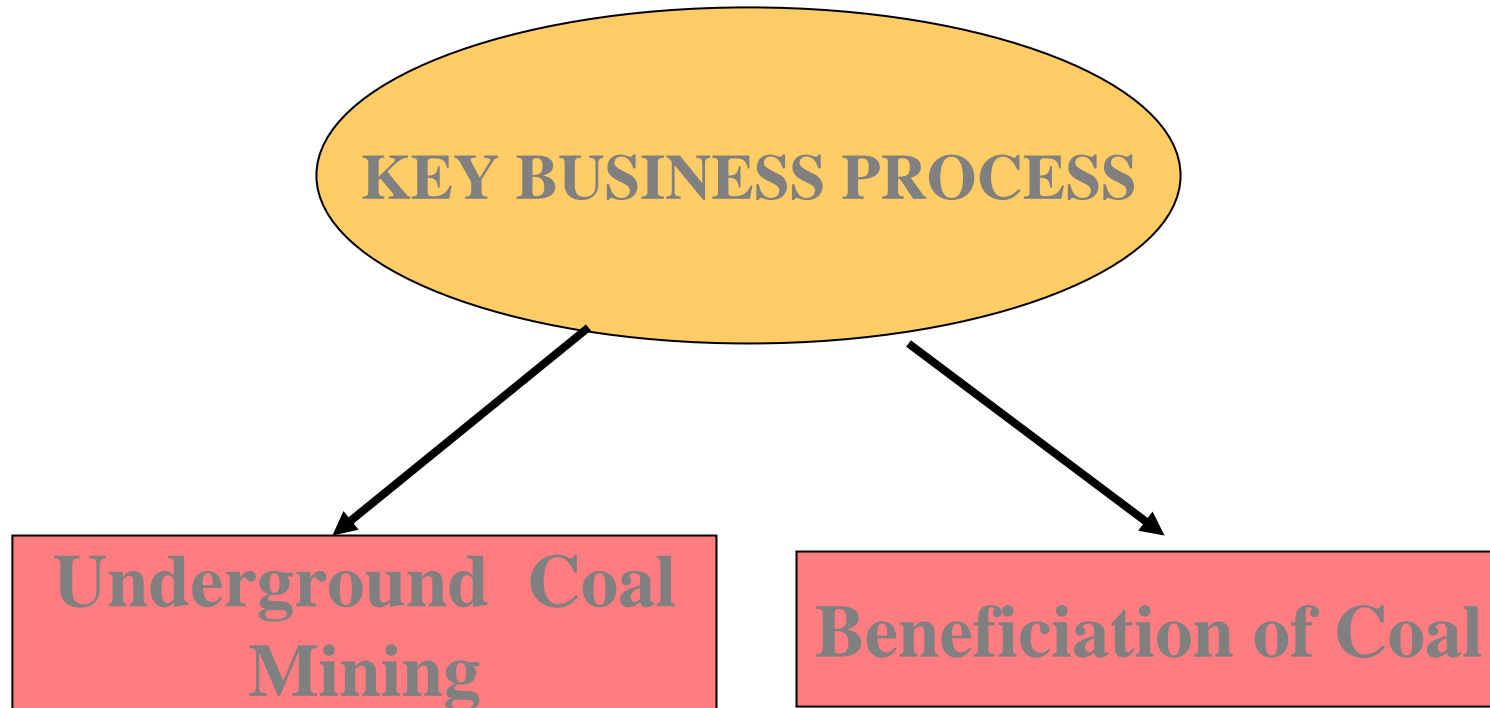
It is guided by its EHS Policy( enclosed). EMS 14001 certification has been effectively sustained. Its mines have been selected as model mines for conducting joint risk assessment with Indian & USA Directorate General of Mines Safety. It has implemented Green Cross movement on safety and OHSAS 19001 implementation is in progress

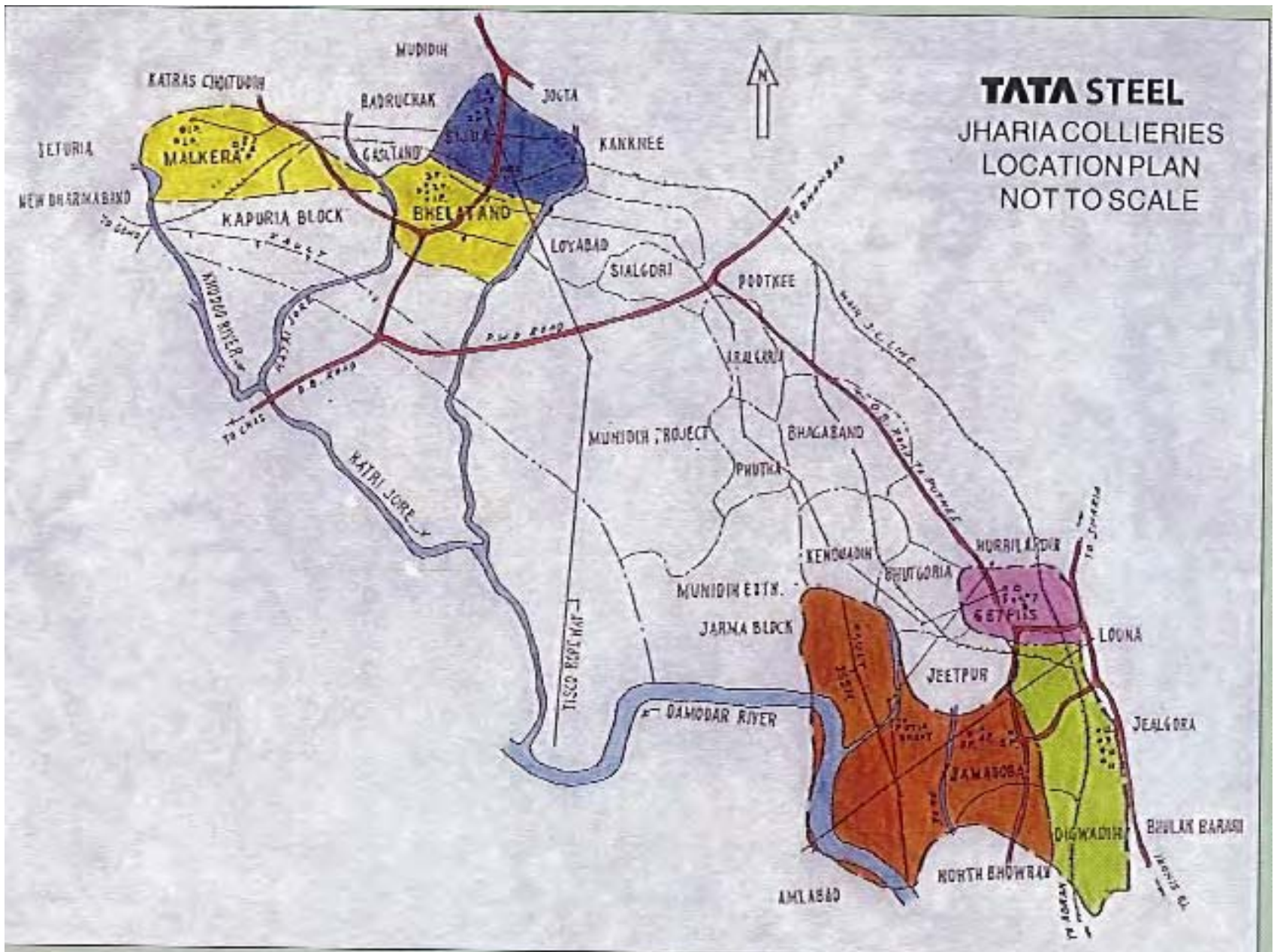
The Division has dedicated departments to monitor and improve safety, occupational health, and environment.

Its Pioneer effort in the areas of environmental protection and conservation of energy by generating -“ **Power from Waste**” has been duly acknowledged & recognized by PCBs.

It has won major awards in the areas of Safety & Pollution Control and Some are listed in the Annexure

# TATA Steel-Jharia Collieries Division

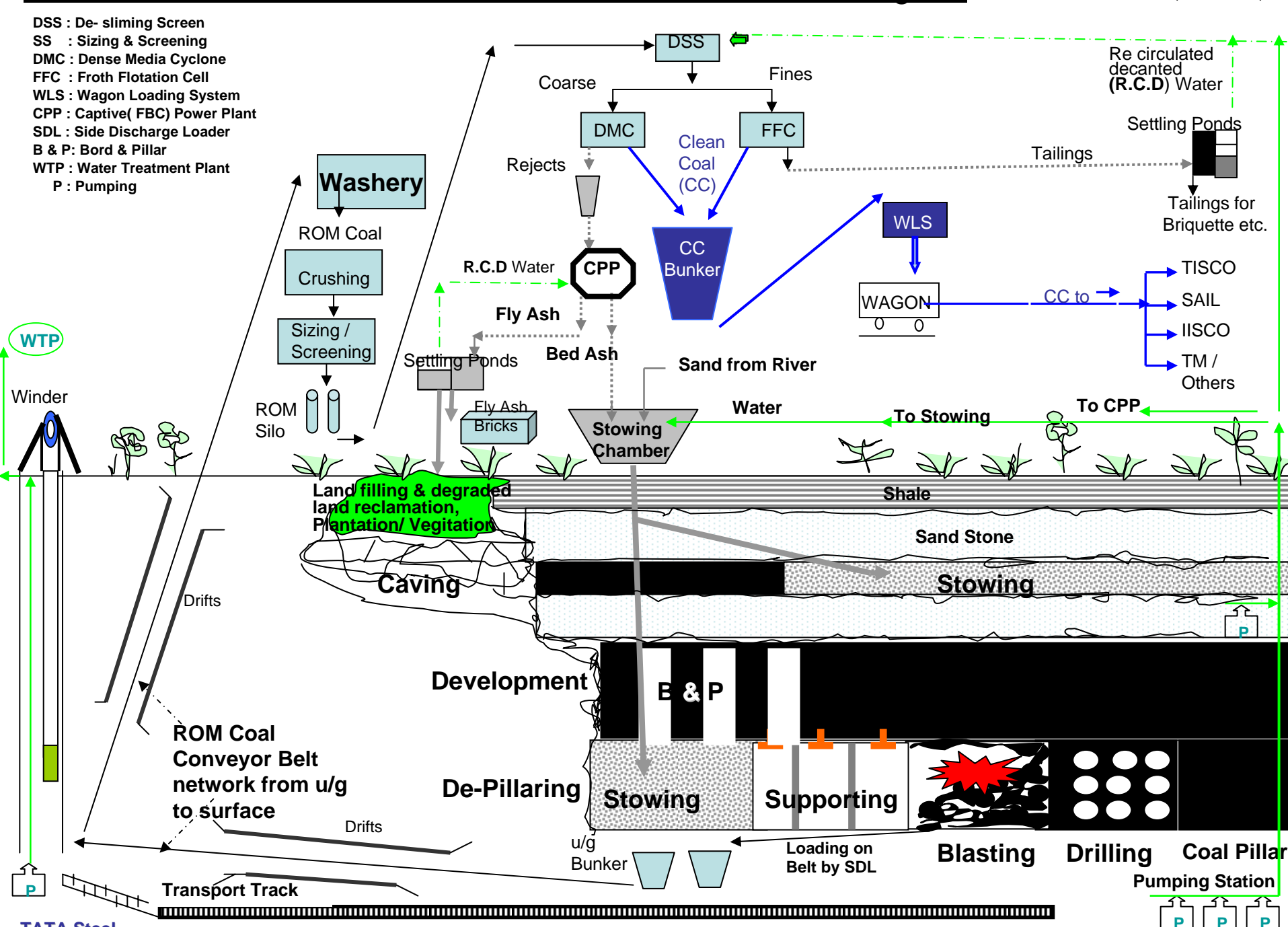




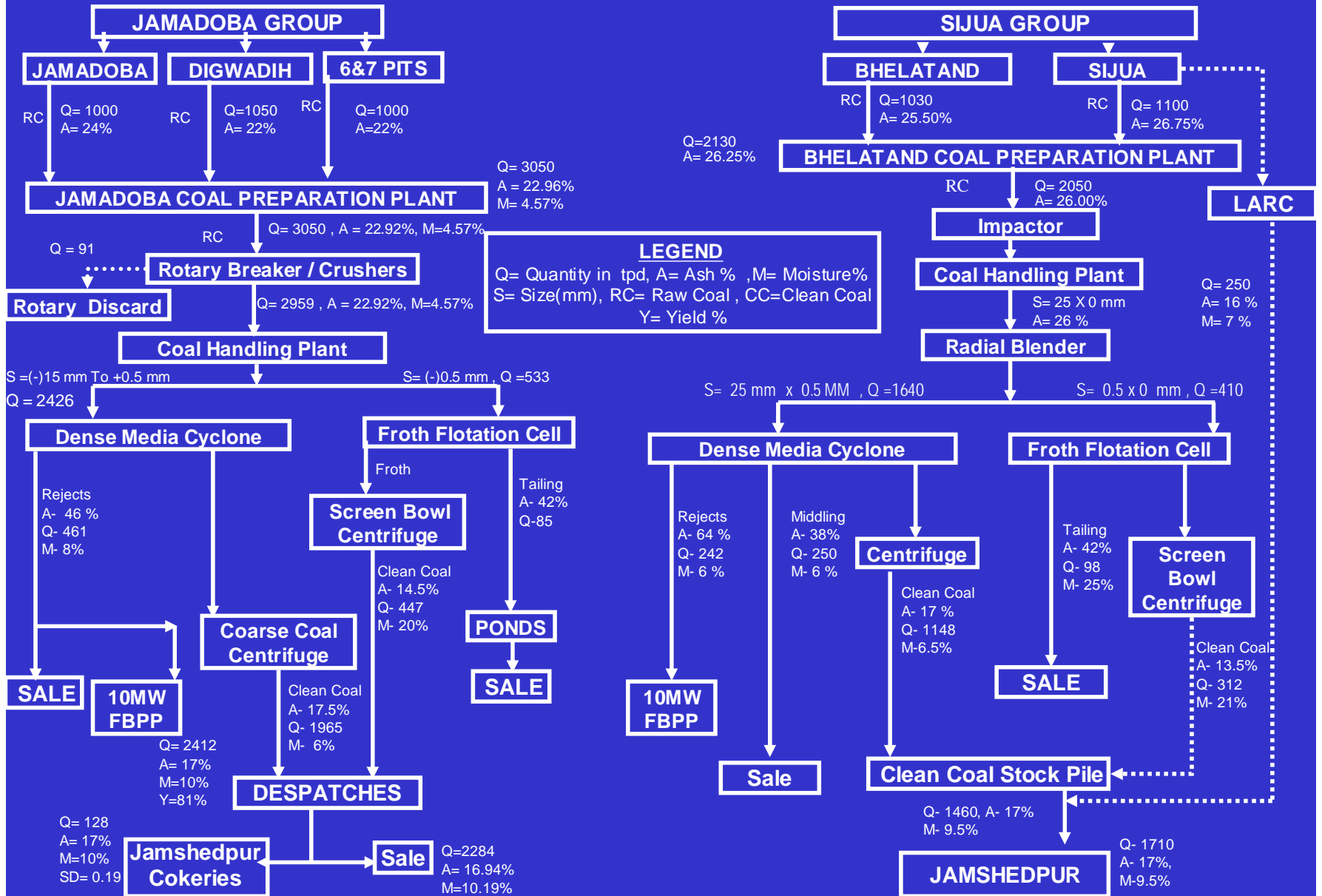
# Jharia Collieries Division : Production Process schematic Diagram

(JH/ECA-01)

- DSS : De- sliming Screen
- SS : Sizing & Screening
- DMC : Dense Media Cyclone
- FFC : Froth Flotation Cell
- WLS : Wagon Loading System
- CPP : Captive( FBC) Power Plant
- SDL : Side Discharge Loader
- B & P: Bord & Pillar
- WTP : Water Treatment Plant
- P : Pumping

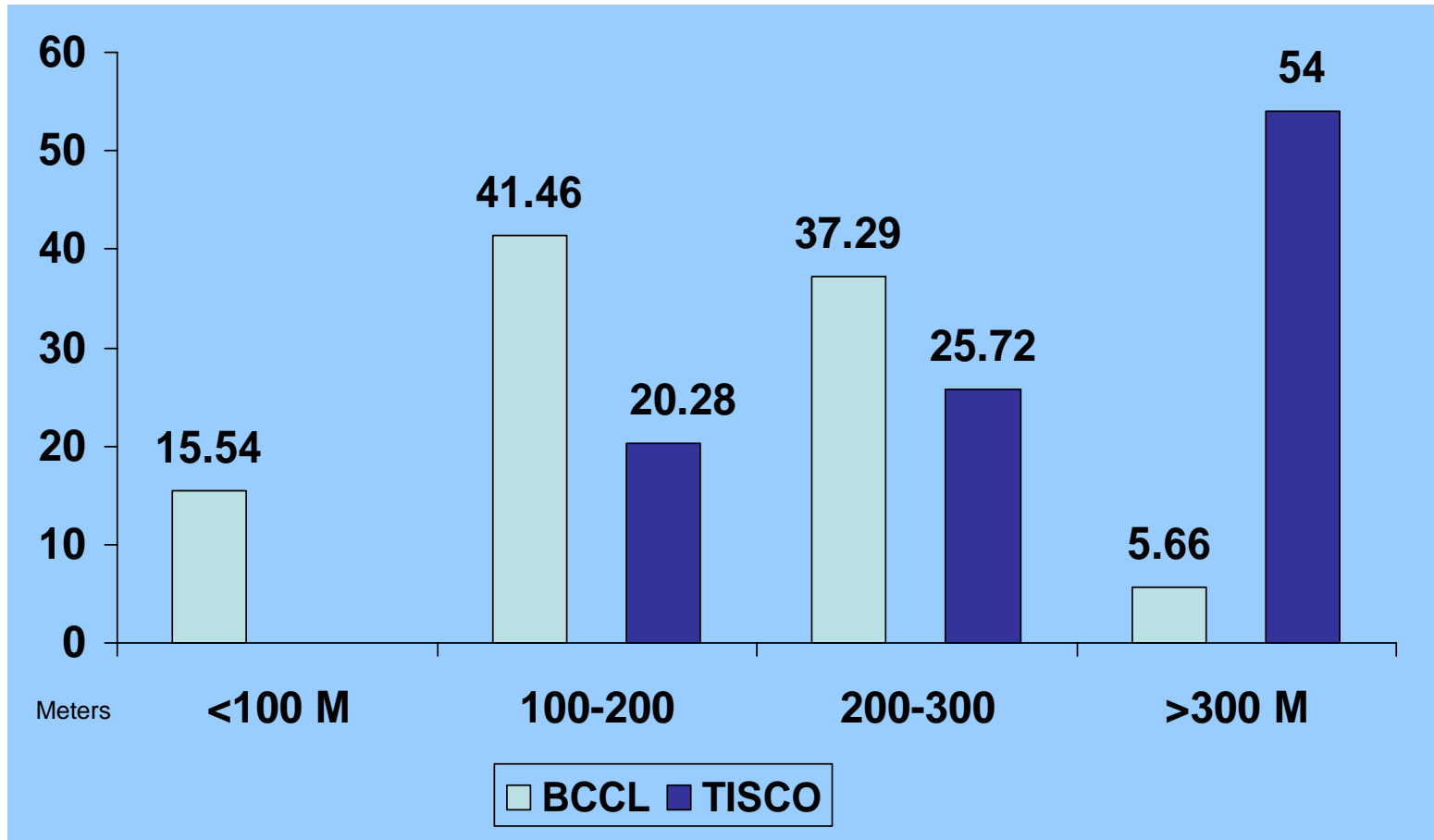


# MATERIAL & PROCESS FLOW (tons per day- tpd) CHART : JHARIA DIVISION ( JH / ECA-03)

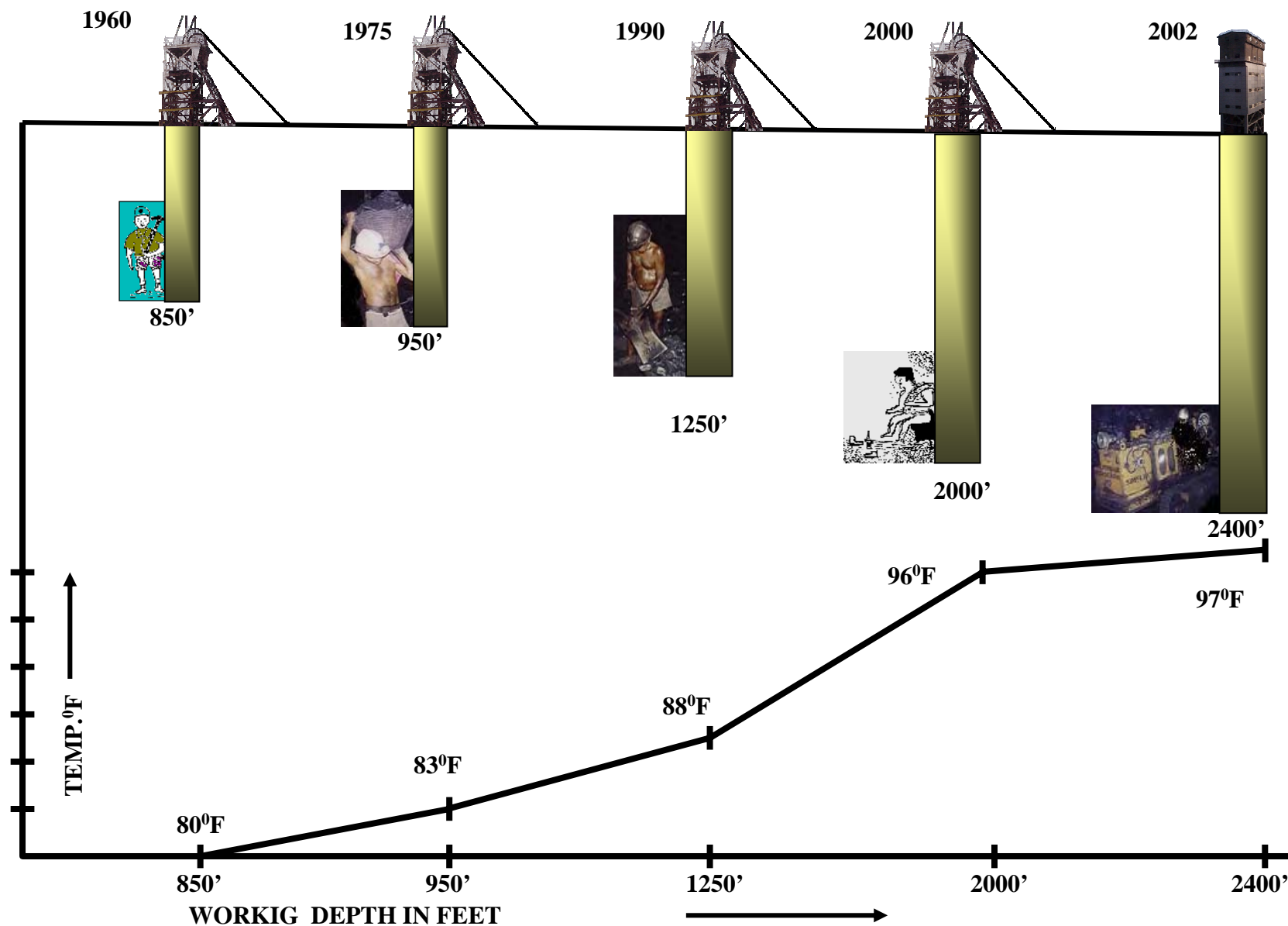


# Depth wise production in %

Arduous Geo-Mining conditions of TISCO u/g Mines; + 50% production from depth+ 300m against 6% of BCCL who is only other player in Jharia Coal Fields



# DISCOMFORT INCREASES WITH DEPTH



# Coal Preparation Activity – Manpower intensive manual Drilling Operations in u/g Face



# Productive & Safe Mechanized Drilling Operation in u/g Fcae



# After Blasting Coal Face Dressing Activity in u/g Face



# Manual shoveling and loading of blasted Coal in u/g Face



# Manual Loading of coal by miner in u/g



# Mechanized loading of coal by SDL- Side Discharge Loader



# Mechanized Coal getting( cutting & loading from one m/c) operation by ROAD HEADER m/c



## Coal Evacuation in mine TUBS in u/g



## Coal Evacuation by BELT CONVEYOR in u/g



## Roof Support by Timber in u/g

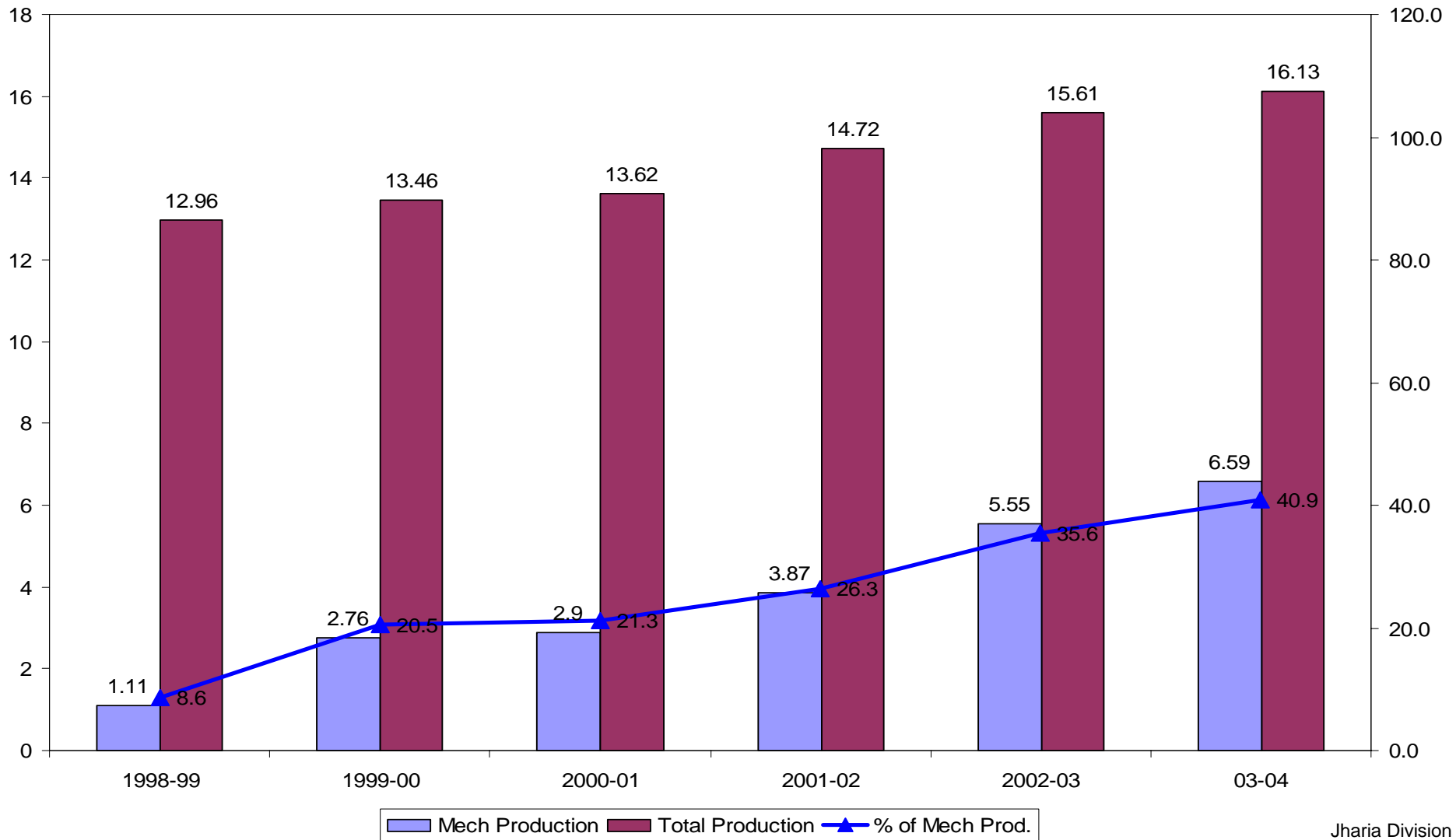


## Roof Bolting Support in the Gallery

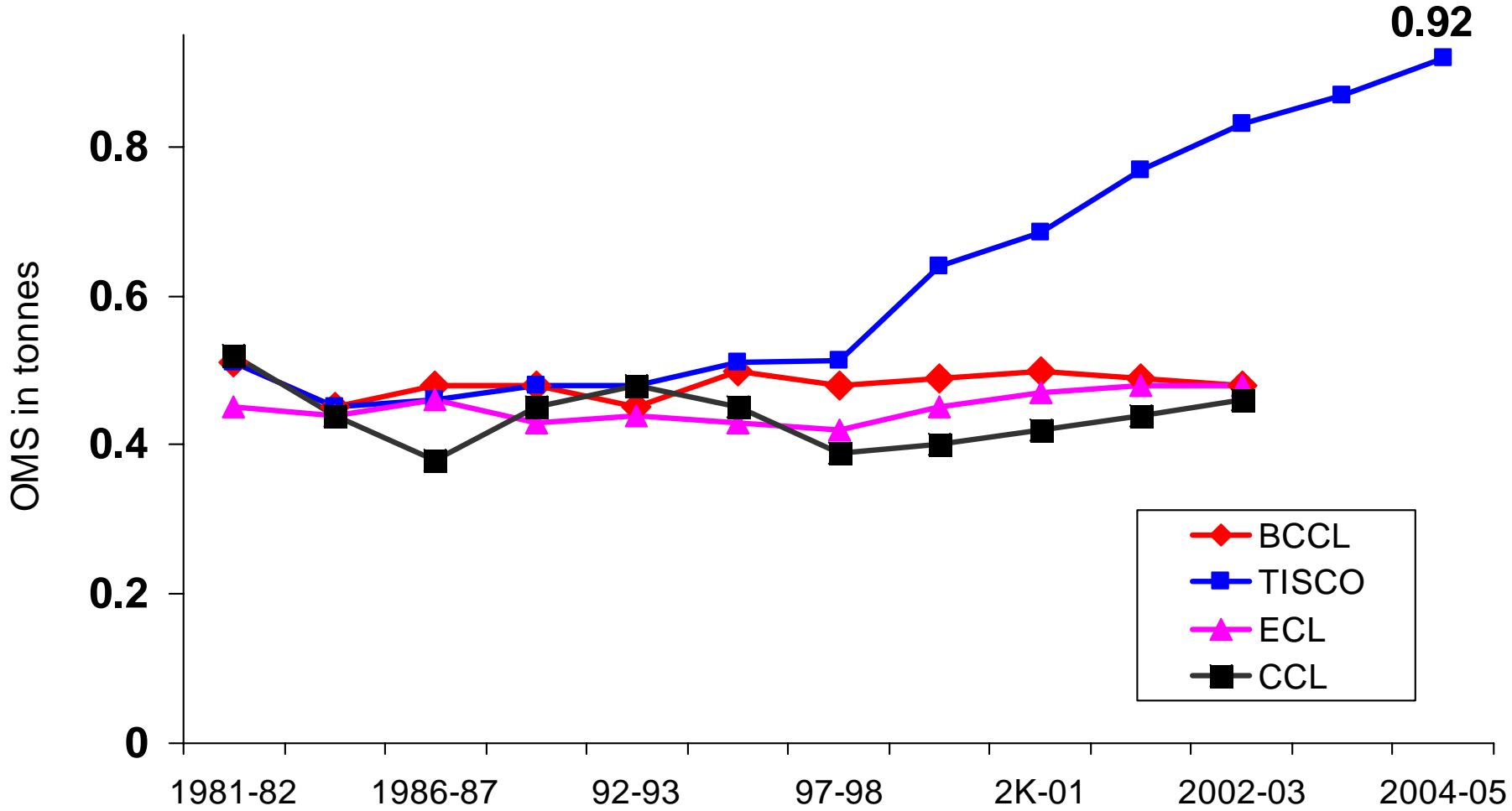


**Economic Viability , Productivity & Safety of u/g coal mine is dependent on Energy intensive  
Mechanisation**

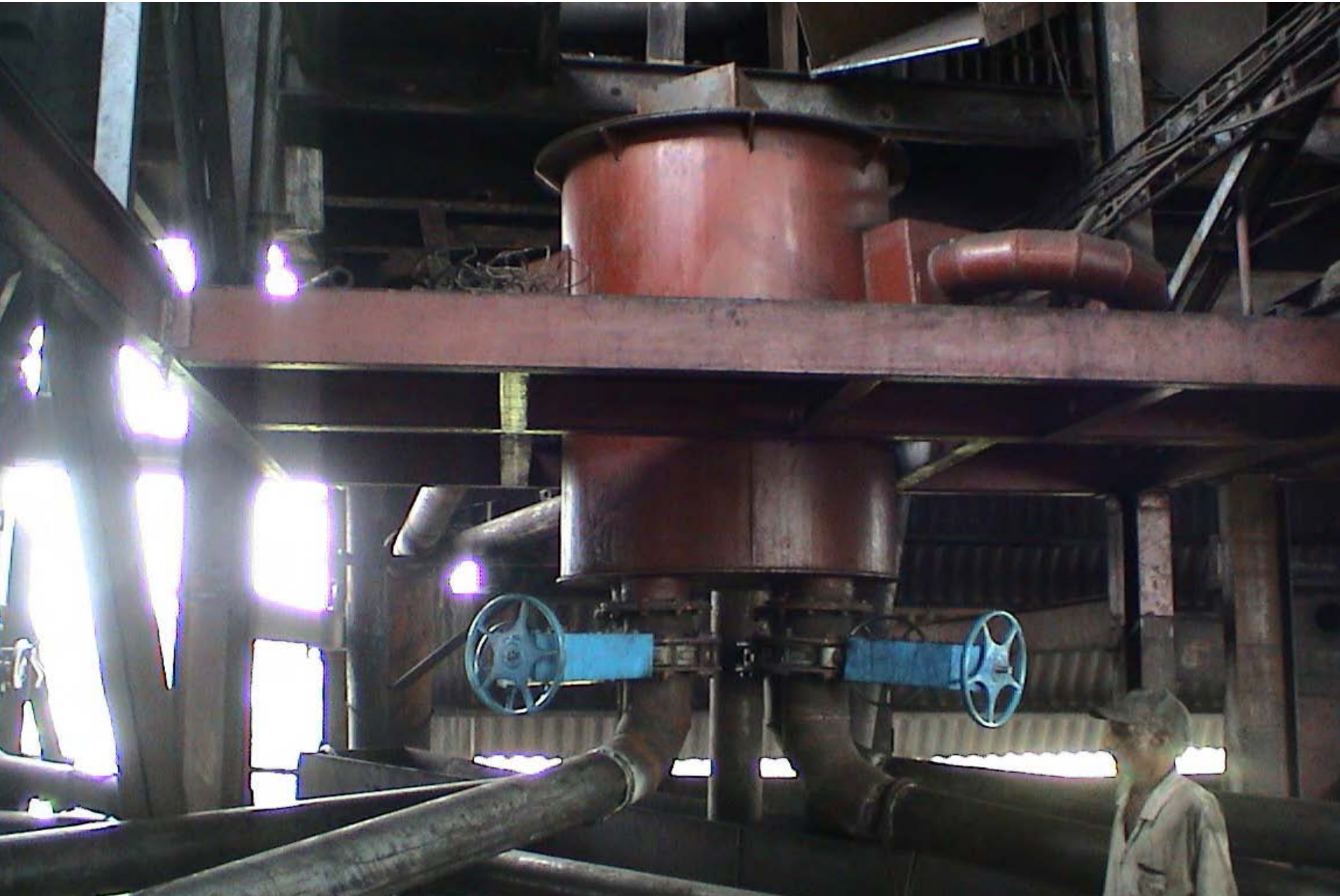
**Total Production Vs Mechanized Production**



# Industry Comparisons on Underground Mine Productivity : Output per man shift



# Coal Preparation Plant / Washery: Raw Coal Distributor . Blending for optimum Yield



# Coal Preparation Plant / Washery:Thickener Optimum Recovery of Carbon



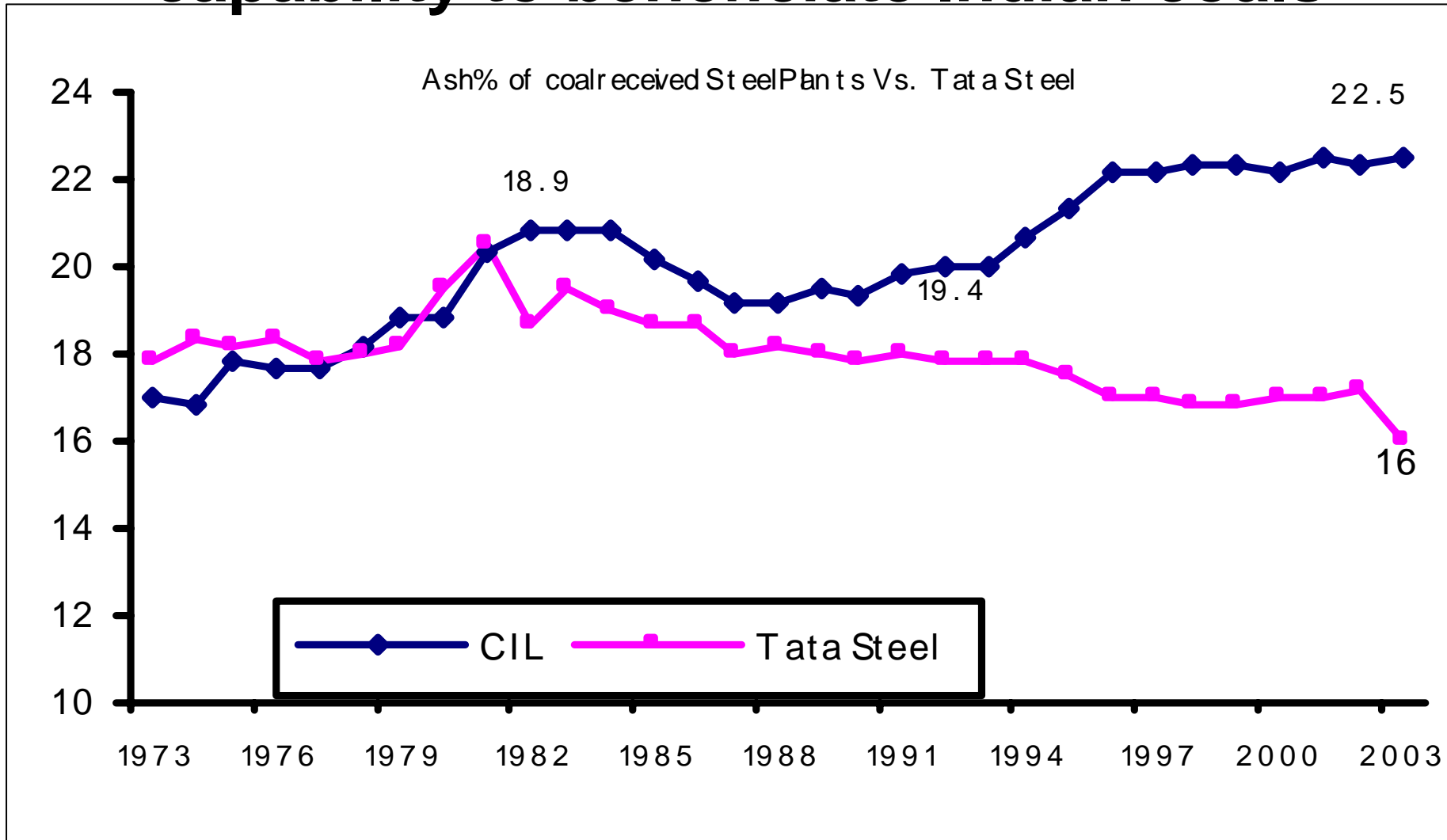
**Coal Preparation Plant / Washery: Screen Bowl Centrifuge.  
Dewatering for water recovery & environmental protection  
from effluents**



## **Coal Preparation Plant / Washery: Sized, Screened & beneficiated Washed Coal for Wagon Loading**



# Beneficiation Process :Tata Steel capability to beneficiate Indian coals



Source: Report of Working group on coal & lignite for 10<sup>th</sup> 5 Yr. Plan (2002-07)  
 Govt. of India Ministry of Coal , Nov. 2001

## Capacitor installed at 33 KV RS-Bhelatand



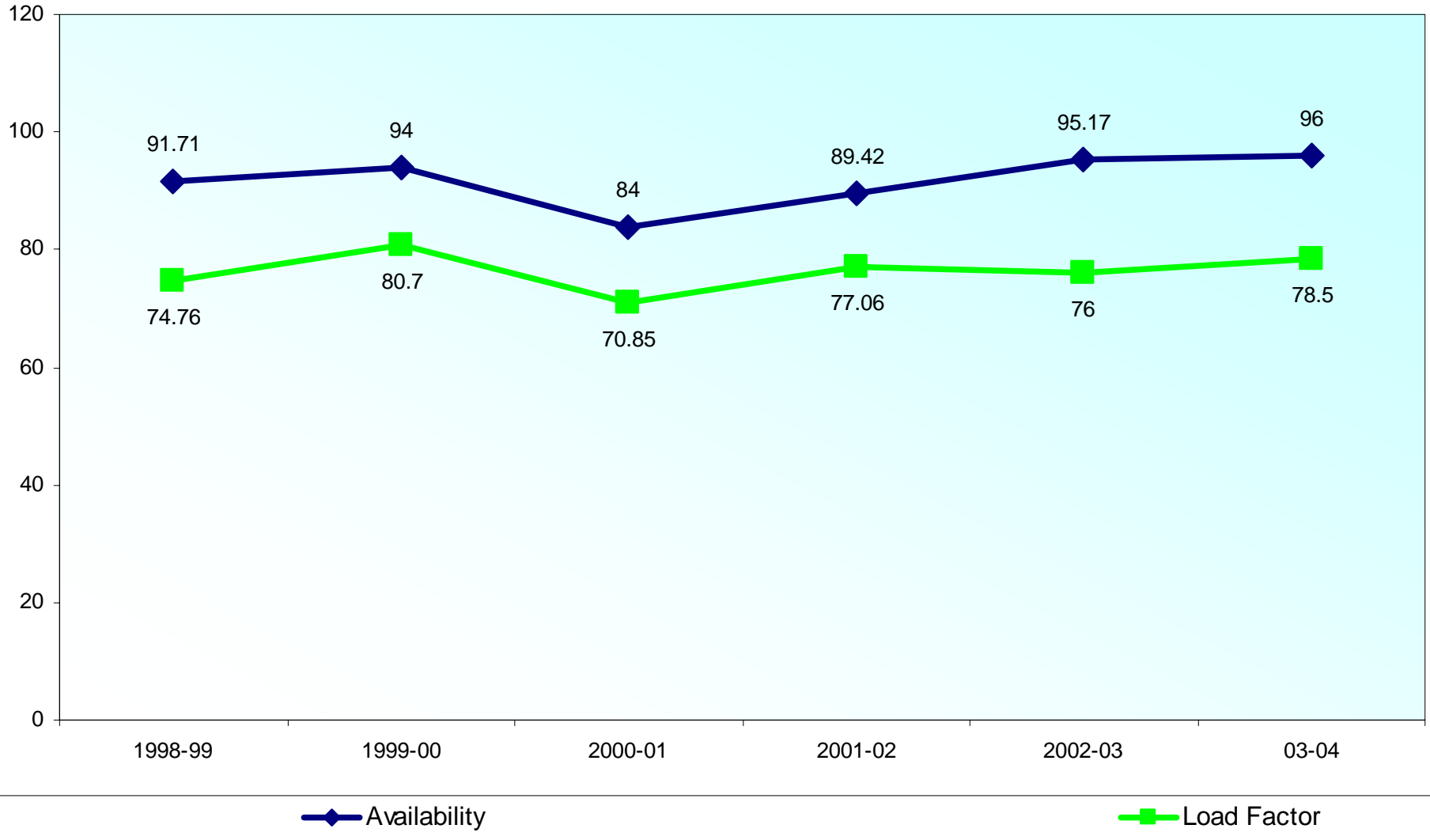
## Capacitor installed at 33 KV RS-Jamadoba



Jharia Division

TATA Steel

## Improved Plant Load Factor & Availability of Captive Plant



# Eco-friendly Processes

- Closed Circuit Washeries
- Zero Effluent Discharge
- Reducing water and air pollutants
- Reducing Timber Consumption
- Waste discharge elimination
- Water conservation
- ISO –14001 Certification
- 10MW Washery Rejects based Power Plant.

# Environment friendly Coal Preparation / washery Plant



# Settling pond filled with washery effluent before decanting/ removal



# Clean water collected at the end of Settling Pond



# Bed Ash of Power plant used for STOWING- mother Earth gives Coal & takes back its product



# Subsided land surface



# Reclamation with Fly ash for Park development



# Overview of Sir Dorabji Park-TISCO, Jamadoba. Developed by Environment Cell on Fly Ash



# Awareness on Conservation through Displays of EVA( Economic Value addition) Meters



8. 3. 2004

# Awareness Displays on Conservation at Jamadoba Washery



**List of Power Saving Projects completed during FY03-04**  
**Jharia, TATA STEEL**

<b><u>Sl. No.</u></b>	<b><u>Project Title/ Summary</u></b>	<b><u>Savings (Rs.L)</u></b>
<b>1.</b>	<p><b>REDUCTION IN POWER CONSUMPTION ON PUMPING &amp; IMPROVING THE AVAILABILITY OF RAW WATER TO CAPTIVE WATER TREATMENT PLANT IN JAMADOBA</b></p> <p>The 1408RL in 16 seam of Jamadoba colliery there are 9 pumping units installed. Out of 9 units, 5 are type-III x 9 CHR, M&amp;P pumps with 350 KW motors and 4 units are type-III x 6 CHR, M&amp;P pumps with 300 KW motors. The type-III x 9 CHR pumping units are discharging at 3 pit surface reservoir and type-III x 6 CHR units are discharging at 2 Pit dam in underground. At 2 pit dam there are 5 unit of type-III x 6 CHR pumping units which are delivering at 2 pit surface reservoir. The surface reservoir at 2 pit caters raw water to 2 pit sand stowing plant and 2 pit water treatment plant.</p> <p>At 3 pit surface reservoir a 90 KW, split casing centrifugal pump a installed which supplies water to 10MW power plant, 2 pit water treatment plant, colonies, 2 incline etc. Since water supply to 10 MW power plant and the stowing plant always remains on top priority, scarcity of raw water has been faced by the water treatment plant, particularly during monsoon period</p>	<b>59.59</b>
<b>2</b>	<p><b>REDUCING POWER CONSUMPTION OF MAIN MECHANICAL VENTILATOR AT JAMADOBA</b></p> <p>For mine ventilation at Jamadoba Colliery, Voltas make, VF3000 type fan with 337 KW, Synchronous Induction Motor is installed at 3 pit. There is SIROCCO make Axial Flow fan with 200 HP synchronous motor, installed at 3 pit and the same is used as stand by main mechanical ventilator Reduced power consumption of main mechanical ventilator has resulted in a saving of Rs.8.5L</p>	<b>8.5</b>
<b>3</b>	<p><b>INCREASING UTILISATION OF STOWING PLANTS IN TERMS OF TPH OF SAND STOWED, 6&amp;7 PITS</b></p> <p>With the increase in stowing demand, rate of stowing had to be increased to improve the efficiency of plant Amount of sand stowed increased from 1,45,012 tones to 1,90,090 tones in 7 months. With increased stowing less water was required to be pumped out saving the power consumption.</p>	<b>5.43</b>

<b><u>Sl. No.</u></b>	<b><u>Project Title/ Summary</u></b>	<b><u>Savings (Rs.L)</u></b>
4	<b>REARRANGING OF PUMPING LAYOUT IN 6&amp;7 PITS COLLIERY</b>	<b>45.2</b>
	Pumping out capacity from dip most area to surface was in sufficient and unnecessary pumping station was used, the layout of pumping in 14 seam & 11 seam was not proper. Elimination of two pumping stations and increase in pump out capacity from dip most area to the surface. Also concentrating on dip pumping by avoiding stage pumping has resulted in saving of power consumption at 6&7 pits colliery	
5.	<b>REORGANISATION OF PUMPING CIRCUIT IN 2 PIT 10 SEAM (WEST SECTION), SIJUA</b>	<b>2.26</b>
	In 2 pit 10 seam of Sijua colliery one 6L3 pump was installed at 15 th level/1st dip to handle stowing water as well as make of water of east section & thus resulting more pumping cost. Reorganization of was done and 6L3 pump was eliminated. A saving of Rs.2.26 L has been achieved.	
6	<b>IMPROVEMENT IN RATE OF STOWING IN 2 PIT SIJUA COLLIERY</b>	<b>5.2</b>
	In Sijua 2pit the ratio of coal output to sand stowed is 1:2.97. Therefore, for 500 TPD of production from 2 pit total stowing requirement is 1485 TPD. This requires 23 hrs. of stowing per day at the present rate of 63 TPH. At 700 GPM of water requirement for stowing, total consumption of water for 23 hrs. of stowing is 9.6 lakh gallons of water per day which needs to be pumped out. Improving the rate of stowing to 90 TPH will reduce the water requirement to 6.93 lakh gallons therefore a saving of Rs.10 Lakhs per annum on pumping cost alone At present the rate of stowing is 63 TPH in 2 Pit, requiring 23 hours of stowing per day. leaving little time for plant or range maintenance or. Therefore in case of breakdown total stowing requirement cannot be met. As a result required coal to sand ratio is not maintained. Therefore, improving the rate of stowing will reduce cost of pumping and improve face availability Actions Taken: Surface screen was constructed in north side of sand bunker to sort +5" size pebbles. Size of the screen was increased to +4", Ergonomics' of the chamber was improved by bringing all controls nearer to the operator, improving lighting, steps, regular housekeeping, and proper seating arrangement, damaged pipes are being changed @ of 20 pipes per month and daily inspection of the main range introduced, Daily inspection of range is being done as a preventive measure to avoid breakdowns.	
7	<b>IMPROVING STOWING RATE AT BHELATAND COLLIERY</b>	<b>2.24</b>
	At Bhelatand colly the stowing rate was increased from 61.27 tph to 81.26 by Construction of grizzly in north side of the sand bunker, increasing the Size of the screen to +2" & specially designed nozzles for increasing the pressure of water, Reduction in no. of bends and replacement of 4" pipe by 6" pipe at face	

<b><u>Sl. No.</u></b>	<b><u>Project Title/ Summary</u></b>	<b><u>Savings (Rs.L)</u></b>
<b>8</b>	<b>REDUCTION IN SPECIFIC POWER CONSUMPTION BY USE OF SMALLER COMPRESSOR AT JCPP</b> Power consumption by compressor is high though requirement of compressed air has reduced power consumption has been reduced from 11.73 Kwh/T of Rc to 11.51 Kwh/T of RC at Jamadoba Coal Preparation plant achieving a saving of Rs.3.29L	<b>3.29</b>
<b>9</b>	<b>REPLACEMENT OF DESLIMING SCREEN HIGHER CAPACITY AT JCPP</b> At Jamadoba Coal Beneficiation Plant an improvement initiative was taken to enhance the efficiency of desliming screen. The investment made in replacing the desliming screen was Rs. 16.00 Lakhs. It has resulted in a recurring saving of 0.8 Lakhs per annum.	<b>0.8</b>
<b>10</b>	<b>ELIMINATING CONVEYOR 111 OF PRETREATMENT PLANT AT BCPP</b>  At Bhelatand coal preparation plant, conveyor 111 was causing frequent breakdown, a modification in the layout was done eliminating the conveyor 111. It has resulted in saving of Rs.0.5 L	<b>0.5</b>
<b>11</b>	<b>REDUCTION IN AUXILIARY POWER CONSUMPTION AT POWER PLANT</b>  Power Requirement to the collieries are fulfilled by captive generation at Power Plant and purchased Power from DVC. Customer needs Power Supply at Lower cost. The captive generation cost is Rs. 1.31 whereas the purchase power cost is Rs. 3.10. Thus it is necessary to reduce the combined Power Cost (Purchase + Generation). The average auxiliary Power Consumption for the Power Plant during the period Sept '03 to Dec.'03 was 29452 Kwh / Day. This effects net Generation of the Power Plant and increases combined Power Cost. Actions Taken are: Replacement of motor at TRF TE-13 Screen by 37 KW motor- November 2003, Replacement of raw water pump motor for slurry system by 45 KW motor – December 2003, Installation of Belt weigher monitor at control room of CHP to monitor CHP feed rate.- November 2003	<b>5.94</b>
<b>12</b>	<b>IMPROVEMENT IN PLANT LOAD FACTOR</b>  Power consumption in this division has increased with new installation of underground equipment. In last year, there was power interruption in every shift during peak load period which affected the production of collieries. Remedial action was taken by staggering timing of Pumping and production load after discussion with Head, Collieries. The transmission line was modified to connect additional lighting load of Digwadih during low load period CT fan blade angle was increased To 35 <sup>0</sup> , (b) all leakage was arrested and (c) Strainers were cleaned. These were completed on 10.6.03 and inlet- outlet temperature Difference was increased up to 12 <sup>0</sup> C .Condenser vacuum has also Increased from 660 mm to 675mm at a load of 9 MW	<b>8.03</b>

<b><u>Sl. No.</u></b>	<b><u>Project Title/ Summary</u></b>	<b><u>Savings (Rs.L)</u></b>
<b>13</b>	<b>REDUCTION IN ELECTRICAL POWER CONSUMPTION AT DIGWADIH NO.12 OFFICERS' CLUB AND GT HOSTEL AMD IMPROVEMENT IN OVERALL AESTHETIC LOOK</b>	<b>0.94</b>

Previously high power consuming luminaries were in use at both the places and illumination was also not adequate . Moreover there used to frequent replacement of luminaries. High power consuming luminaries have been replaced by energy saving luminaries improving illumination as well as saving Rs.0.94 L

<b>14</b>	<b>REDUCTION IN ELECTRICAL POWER CONSUMPTION BY RE-ORGANISING POWER DISTRIBUTION NETWORK IN DURGA MANDIR AREA OF 6&amp;7 PITS COLLIERY</b>	<b>2.33</b>
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There were lot of unauthorized power connections taken by persons living in private houses of the adjacent village thus increasing the power consumption. It was decided to divert the existing LT overhead transmission line through another route so that the accessibility to the same by villagers is eliminated. It has resulted in a saving of Rs.2.33 lakhs.

<b>15</b>	<b>REDUCTION IN ELECTRIC POWER CONSUMPTION OF JAMADOBA PROJECT OFFICE COMPLEX</b>	<b>3.07</b>
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The power distribution network of Project Office Complex was from cable laid over the roof top of Project Office, where from huge unauthorized connection were taken by the outsiders residing in the village adjacent to Project Office. This was causing more power consumption and frequent breakdown of power distribution in the complex. Reduction in power consumption has been achieved by reorganization the power distribution in the complex.

<b>16</b>	<b>REDUCTION IN DOMESTIC POWER CONSUMPTION OF STREET LIGHTS OF JAMADOBA GROUP</b>	<b>4.42</b>
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There were 422 numbers, 250 watts sodium vapor lamps in Jharia Division for street lighting purposes in addition to 150 watts and 70 watts SV lamps. The power consumption of 250 watts SV lamps are more than 150 watts SV lamps with nominal difference in illumination. Replacement of all 250 watts SV lamps with 150 watts SV lamps in Jharia Division has resulted in power saving of Rs.4.42 lakhs

<b><u>Sl. No.</u></b>	<b><u>Project Title/ Summary</u></b>	<b><u>Savings (Rs.L)</u></b>
<b>17</b>	<b>REDUCTION IN DOMESTIC POWER CONSUMPTION BY UNDERGROUND CABLING ETC. IN NO.1 COLONY, JAMADOBA</b>	<b>9.04</b>
	The actual power consumption of 105 nos. of quarters at No.1 Colony, Jamadoba was much more than what should be because of power pilferage by the outsiders residing near the colony. By modifying the power supply networks through underground cabling a power saving of Rs. 9.04 lakhs has been achieved	
<b>18</b>	<b>REDUCING DOMESTIC POWER CONSUMPTION AT SIJUA GROUP</b>	<b>11.05</b>
	In Sijua group of collieries the domestic power consumption was high. The transmission network has been modified to reduce the power consumption. It has resulted in a saving of Rs. 11.05 lakhs	
<b>19</b>	<b>PHASED REPLACEMENT OF GENERATING TUBES AT F.B.C PLANT</b>	<b>1.65</b>
	In Captive Power Plant of Jharia division the generating tubes were having poor efficiency. The tubes have been replaced in a phased manner incurring an investment of Rs.38.00 Lkhs. It has resulted in a saving of Rs.1.65 Lakhs.	
<b>20</b>	<b>PHASED REPLACEMENT OF DAMAGED WATER &amp; COMPRESSED AIR PIPELINE IN COLLIERIES</b>	<b>2.65</b>
	In all the collieries of Jharia division compressed air is used for roof bolting operation and water is used for quenching the dust after blasting the coal as well as for drinking purpose. Replacement of these damaged pipes has incurred Rs.28.00 Lakhs of investment and resulted in a saving of Rs.2.65 Lakhs.	
<b>21</b>	<b>PHASED REPLACEMENT OF AGING MOTORS, COMPRESSORS, TRANSWITCH UNITS</b>	<b>1.65</b>
	The equipments like Motors, Compressors, Transwitch units etc. are used in various underground mining operations like transportation, Supporting, Pumping, stowing etc. The replacement of these equipments in a phased manner has given a saving of Rs. 1.65 Lakhs. The investment made for these replacements has been Rs.38.00 lakhs.	
<b>22</b>	<b>REDUCING POWER CONSUMPTION IN INDUSTRIAL COMPLEX &amp; OUTSIDE AREAS BY RE-ENGINEERING THE LIGHTING ARRANGEMENT</b>	<b>0.67</b>
	In the Sijua Group Industrial Complex lighting power consumption was high leading to high power cost. Rationalization of the lighting arrangement and simplification in the network has reduced the power consumption in the industrial complex and surrounding areas. The saving achieved is Rs.0.67 lakhs	

## List of Power saving Improvement Projects (2001-2003)

Annexure-16

## Jharia Collieries Division, TATA STEEL

SI. No.	PROJECT TITLE	Year of Completion	Savings (KWH)	Savings (Rs.Lakhs)	Investment (Rs.Lakhs)
1	REDUCTION IN POWER CONSUMPTION ON PUMPING & IMPROVING THE AVAILABILITY OF RAW WATER TO CAPTIVE WATER TREATMENT PLANT IN JAMADOBA	2003	2190809	59.59	16.00
2	REDUCING POWER CONSUMPTION OF MAIN MECHANICAL VENTILATOR	2003	312500	8.5	1.45
3	INCREASING SAND STOWING RATE(TPH) OF STOWING PLANTS	2003	199632	5.43	2.35
4	REARRANGING OF PUMPING LAYOUT IN 6&7 PITS COLLIERY	2003	1661765	45.2	0.26
5	REORGANISATION OF PUMPING CIRCUIT IN 2 PIT 10 SEAM (WEST SECTION)	2003	83088	2.26	0.53
6	IMPROVEMENT IN RATE OF STOWING IN 2 PIT SIJUA COLLIERY	2003	191176	5.2	0.00
7	IMPROVING STOWING RATE AT BHELATAND COLLIERY	2003	82353	2.24	0.00
8	REDUCTION IN SPECIFIC POWER CONSUMPTION BY USE OF SMALLER COMPRESSOR	2003	120956	3.29	1.62
9	REPLACEMENT OF DESLIMING SCREEN WITH HIGHER CAPACITY AT JCPP	2003	45000	0.8	16.00
10	ELIMINATING CONVEYOR 111 OF PRETREATMENT PLANT	2003	18382	0.5	0.00
11	REDUCTION IN AUXILIARY POWER CONSUMPTION AT POWER PLANT.	2003	218382	5.94	0.00
12	IMPROVEMENT IN PLANT LOAD FACTOR	2003	295221	8.03	0.00
13	REDUCTION IN ELECTRICAL POWER CONSUMPTION AT DIGWADIH NO.12 COLONY	2003	34559	0.94	0.45
14	REDUCTION IN ELECTRICAL POWER CONSUMPTION BY RE-ORGANISING POWER DISTRIBUTION NETWORK IN 6&7 PITS COLLIERY	2003	85662	2.33	0.16
15	REDUCTION IN ELECTRIC POWER CONSUMPTION OF JAMADOBA OFFICES	2003	112868	3.07	0.25
16	REDUCTION IN DOMESTIC POWER CONSUMPTION OF STREET LIGHTS OF JAMADOBA GROUP	2003	162500	4.42	1.27
17	REDUCTION IN DOMESIC POWER CONSUMPTION BY UNDERGROUND CABLING ETC. IN NO.1 COLONY, JAMADOBA	2003	332353	9.04	0.27
18	REDUCING DOMESTIC POWER CONSUMPTION COLONIES	2003	406250	11.05	0.00
19	PHASED REPLACEMENT OF GENERATING TUBES AT F.B.C PLANT	2003	128000	1.65	38.00
20	PHASED REPLACEMENT OF DAMAGED WATER & CMPRESSED AIR PIPELINE IN COLLIERIES	2003	245000	2.65	28.00
21	PHASED REPLACEMENT OF AGING MOTORS , COMPRESSORS, TRANSWITCH UNITS	2003	125000	1.65	38.00
22	REDUCING POWER CONSUMPTION IN INDUSTRIAL COMPLEX & STREETS BY RE-ENGINEERING THE LIGHTING ARRANGEMENT	2003	24632	0.67	3.80
	TOTAL		7076088	184.45	148.41

**List of Power saving Improvement Projects (2001-2003)**

Annexure-16

**Jharia Collieries Division, TATA STEEL**

*Collieries Division-Jharia, TATA Steel*

Sl. No.	PROJECT TITLE	Year of Completion	Savings (KWH)	Savings (Rs.L)	Investment (Rs.L)
1	IMPROVING RATE(TPH) OF COAL TRASPORT CIRCUIT JAMADOBA, COLLY.	2002	129333	2.91	1.75
2	REORGANISING VENTILATION AT 16 SEAM IN D/NORTH SECTION	2002	411556	9.26	2.68
3	REDUCE PROCESS VARIABILITY BY OPTIMISING THE SAND:WATER RATIO IN STOWING DISTRICTS OF 6&7 PITS COLLIERY	2002	449778	10.12	6.80
4	ELIMINATING STAGE PUMPING FROM B-DIP.	2002	1468889	33.05	18.00
5	BOREHOLE PUMPING IN 6TH INCLINE FROM SURFACE TO 16 SEAM	2002	512889	11.54	9.00
6	INCREASING RATE OF STOWING IN 2 PIT THROUGH BOREHOLE	2002	319111	7.18	9.79
7	REORGANISING SURFACE PUMPING AT BHELATAND	2002	215111	4.84	0.97
8	REORGANISATION OF BELT CONVEYOR SYSTEM IN 17 SEAM OF AT BHELATAND A. COLLY.	2002	319111	7.18	4.24
9	TO REDUCE POWER CONSUMPTION IN FINE COAL TREATMENT SECTION	2002	170667	3.84	1.57
10	REDUCTION IN POWER, FLOCULANT CONSUMPTION & IMPROVING SD OF ASH OF FEED TO CYCLONE BY MODIFY RAW COAL DISTRIBUTOR.	2002	397333	8.94	4.50
11	REDUCTION IN AUXILIARY CONSUMPTION BY RATIONALIZING PRIME MOTORS	2002	444	0.01	0.08
12	REDUCTION IN POWER CONSUMPTION IN PUMPING	2002	104000	2.34	0.10
13	UTILISATION OF CAPACITOR BANK DURING LOW LOAD PERIOD	2002	48889	1.1	0.00
14	REDUCTION IN CONSUMPTION OF ENERGY AT CENTRAL WORKSHOP AND GARAGE	2002	75111	1.69	0.35
15	REDUCTION INPOWER CONSUMPTION AND IMPROVEMENT IN ILLUMINATION WITHIN DIGWADIH COLLIERY OFFICE COMPLEX	2002	9778	0.22	0.68
16	REDUCTION IN DOMESTIC POWER CONSUMPTION BY INSTALLING ENERGY METER IN OFFICERS RESIDENCES ETC.	2002	1432444	32.23	5.86
17	REDUCTION OF POWER CONSUMPTION IN SIR DORABJI TATA PARK	2002	14667	0.33	0.25
18	REDUCTION IN POWER CONSUMPTION OF TRUNK BELT BY 30% THROUGH EFFECTIVE THRUSTER BRAKE ARRANGEMENT	2002	456000	4.85	1.68
19	REPLACEMENT BED EVAPORATOR TUBES IN F.B.C PLANT	2002	143000	1.5	35.00
20	REPLACEMENT OF AGING MOTORS, COMPRESSORS	2002	275000	3.85	25.00
			6953111	146.98	128.30

**List of Power saving Improvement Projects (2001-2003)**

Annexure-16

**Jharia Collieries Division, TATA STEEL**

*Collieries Division-Jharia, TATA Steel*

Sl. No.	PROJECT TITLE	Year of Completion	Savings (KWH)	Savings (Rs.L)	Investment (Rs.L)
1	REORGANISING BELTNETWORK IN N DIP 2ND BELT	2001	390213	9.17	0.10
2	REORGANISATION OF PUMPING IN 14 SEAM 4-S SECTION OF JAMADOBA COLLIERY	2001	883404	20.76	0.00
3	INCREASING POWER FACTOR BY INSTALLATION OF CAPACITOR BANKS IN POWER HOUSE NO.3	2001	923404	21.7	3.50
4	REDUCTION IN SURFACE PUMPING POWER CONSUMPTION.	2001	430213	10.11	0.07
5	REDUCTION IN SPECIFIC POWER CONSUMPTION	2001	530213	12.46	0.00
6	REORGANISATION OF TRANSPORT CKT OF DUNGRI NORTH SECTION.	2001	72766	1.71	0.00
7	OPERATING A1 BELT CONVEYOR OF JAMADOBA TRUNK NETWORK WITH ONE MOTOR	2001	151489	3.56	0.00
8	REDUCTION IN POWER CONSUMPTION BY ELIMINATING MISMATCHES IN BELT CONVEYOR MOTORS.	2001	84681	1.99	0.00
9	REDUCTION IN MAINTENANCE COST AND POWER COST BY ELIMINATING 306 SCREEN.	2001	94043	2.21	0.00
10	REDUCTION IN POWER CONSUMPTION AND SPILLAGES BY MODIFICATION OF RAW COAL FEED BELT CONVEYOR NETWORK.	2001	403830	9.49	4.80
11	ELIMINATING LEAKAGE RECIRCULATION PUMPS BY PUTTING DIVERT BALANCE VALVE WATER OF 14-SEAM H.T PUMPS TO ITS OWN SUCTION LINE AT COLLIERIES	2001	180000	2	0.25
12	IMPROVEMENT IN COMMUNICATION SYSTEM WITH PUMPING STATION AT WASHERIES	2001	35000	0.4	0.10
13	REDUCTION IN PLANT LIGHTING AT WASHERIES BY USE OF PERPEX SHEETS IN BUILDINGS	2001	64000	1.5	0.75
14	REPLACEMENT OF DAMAGED STOWING PIPELINES	2001	54000	1.1	6.00
15	REDUCTION IN COMPRESSED AIR PIPELINE LEAKAGES AT 6&7 PITS	2001	24000	0.58	1.00
16	INSATLLATION OF SCADA SYSTEM FOR CONTROLS AT POWER PLANT	2001	134000	1.54	36.00
17	REPLACEMENT OF STEAM TUBES AT POWER PLANT	2001	85000	1.12	25.00
18	REPLACEMENT OF 350 KW MAIN VENTILATOR FAN AT DIGWADIH BY 250 KW KIRLOSKAR MOTOR	2001	600000	7.75	16.00
19	SUBSTITUTION OF FREE DOMESTIC COAL BY COOKING GAS CONNECTIONS TO WORKERS	2001	0	14.5	18.00
20	REDUCTION IN LIGHTING POWER CONSUMPTION INSIDE THE ADMIN. OFFICES	2001	49787	1.17	0.60
			5190043	124.82	112.17