Annexure 'A' to Directors' Report

Particulars Required under the Companies (Disclosure of Particulars in the Report of the Board of Directors) Rules, 1988.

A. Conservation of Energy

a) Energy Conservation Measures Taken :

i) Conversion of boiler no. 7 & 8 stoker coal fired boilers at Power House No. 3 into by-product gas fired boilers.

ii) Electrical energy saved through installation of V/F drives at LD Shop and Hot Strip Mill.

b) Additional Investments and Proposal for Reduction of Consumption of Energy:

i) Installation of Top Recovery Turbine (TRT) at 'G' & 'H' Blast Furnace.

ii) Recovery of sensible heat of coke by installation of Coke Dry Quenching system in Batteries 5, 6, 7, 8 & 9 at Coke Plant.

iii) Enhancing waste heat recovery at Sinter Plants to reduce energy consumption and reduce CO_2 emission.

iv) BF Gas fired re-heating furnace at Hot Strip Mill.

v) Elimination of heat not recovered due to parallel blow to improve LD Gas recovery, so as to reduce coal consumption in boilers.

c) Impact of the above measures:

Energy Conservation measures during 2007-2008 has resulted in achieving:

i) Lowest ever Plant Specific Energy Consumption of 6.655 Gcal/tcs.

ii) Lowest ever boiler coal consumption of 38.97 kg/tss.

iii) Higher LD Gas Recovery of 66.80 Nm^3/tcs.

iv) Higher combine boiler efficiency of 83.67%.

Form - A

Form for disclosure of particulars with respect to Conservation of Energy : 2007-2008

Particulars	2007-2008	*2006-2007*
A. POWER AND FUEL CONSUMPTION		
1. ELECTRICITY		
a) Purchased		
Units (M. KWH)	**2,031.07**	*1,980.45*
Total Amount (Rs. Lakhs) #	**55,715.67**	*52,287.26*
Average Rate/Unit (Rs./KWH)	**2.74**	*2.64*
b) Own Generation		
i) Through Diesel Generator		
Units (M. KWH)	**14.05**	*22.68*
Units per litre of Diesel Oil (KWH)	**3.91**	*3.97*
Average Cost/Unit (Rs./KWH)	**12.27**	*10.31*
ii) Through Steam Turbine/Generator		
Units (M. KWH)	**996.85**	*955.05*
Units per tonne of Coal (KWH)	**4,294**	*2,364*
Average Cost/Unit (Rs./KWH)	**1.88**	*1.94*
(*This includes generation of PH 4 in MKWH which is operated on by-product gases upto 95%)	**325.52**	*355.61*
2. COAL		
i) Coking Coal & Cookeries		
Quantity (Million Tonnes)	**3.37**	*3.15*
Total Cost (Rs. Lakhs)	**98,770.88**	*103,068.32*
Average Rate (Rs./Tonne)	**2,929.54**	*3,275.99*
ii) Blast Furnace Injection Coal		
Quantity (Million Tonnes)	**0.39**	*0.42*
Total Cost (Rs. Lakhs)	**15,946.06**	*24,240.75*
Average Rate (Rs./Tonne)	**4,122.84**	*5,752.30*
iii) Middling Coal and ROM		
Quantity (Million Tonnes)	**0.20**	*0.34*
Total Cost (Rs. Lakhs)	**2,127.71**	*3,170.98*
Average Rate (Rs./Tonne)	**1,059.37**	*942.33*
3. FURNACE OIL		
Quantity (Kilo Litres)	**12,701.73**	*12,079.17*
Total Amount (Rs. Lakhs)	**2,300.14**	*2,031.59*
Average Rate (Rs./KL)	**18,108.91**	*16,818.94*
4. OTHERS		
L.D.O.		
Quantity (Kilo Litres)	**7,920.11**	*9,238.63*
Total Cost (Rs. Lakhs)	**2,294.54**	*2,610.45*
Average Rate (Rs./KL)	**28,971.05**	*28,255.85*
L.P.G.		
Quantity (Tonnes)	**4,292.69**	*3,835.40*
Total Cost (Rs. Lakhs)	**1,512.48**	*1,219.36*
Average Rate (Rs./Tonne)	**35,233.88**	*31,792.24*
NG		
Quantity (Tonnes)	**2,217.40**	*2,814.56*
Total Cost (Rs. Lakhs)	**242.14**	*254.95*
Average Rate (Rs./Tonnes)	**10,920.00**	*9,058.26*

Excludes electricity duty paid on purchases

Form for disclosure of particulars with respect to Conservation of Energy : 2007-2008

B. CONSUMPTION PER UNIT OF PRODUCTION

Particulars	Steel (per tonne)	Tubes (per tonne)	Bearings (per no.)	F.A.M.D. (per tonne)	Rings & Agrico (per no.)	Growth Shop (per tonne)	CRC West (per tonne)	Wire Div. (per tonne)	CRM SISODRA (per tonne)
Electricity (KWH)	412.06	108.00	0.76	3556.70	—	528.98	133.11	229.06	—
	(398.52)	*(97.00)*	*(0.73)*	*(3632.90)*	*(1.23)*	*(457.35)*	*(151.23)*	*(220.71)*	*(349.95)*
Furnace Oil (Litres)						21.99	7.03	21.99	
						(15.68)	*(7.93)*	*(23.09)*	
Coking Coal (Tonnes)	0.66								
	(0.72)								
Others :									
Light Diesel Oil (Litres)	1.21	1.21						7.82	—
	(1.29)	*(—)*						*(8.02)*	*(52.65)*
High Speed Diesel Oil (Litres)									
L.P.G. (kg)							13.25	10.08	—
							(13.23)	*(10.29)*	*(0.35)*
NG (kg)								23.21	
								(24.54)	

Form - B

Form for disclosure of particulars with respect of Technology Absorption 2007-08

Research and Development

1. *R&D Activities continue to focus on identified thrust areas of relevance to the Tata Steel Group, that would lead to a step change or breakthrough :*

- Economic mineral beneficiation
- Stretch the raw material envelope
- Heavy end of the future
- Next generation high strength steels
- Advanced coatings development
- New low energy process for production of Ferro Chrome
- Hydrogen harvesting
- Development of a viable PV coating system
- Energy efficient fluids
- Construction

2. *Benefits derived :*

A number of individual projects have been taken up in each of the thrust areas and while most of these are of a long term nature, some benefits have already accrued, brief details of which are mentioned below :

8% ash in coal without reduction in yield.

- Plant trials, with a newly developed and patented frother, conducted at West Bokaro Collieries indicate a 1% increase in the washery yield.
- Pilot plant trials with a new design of Dense Media Cyclone (DMC) at JKMRC, Australia show a step change in separation efficiency. The new design of the DMC has been patented.
- A new chemical based technology for treating middlings, tailings and rejects has been developed and a pilot plant is being set up (500 Kg batch scale) for testing this technology.

Beneficiation of Iron Ore :

A pilot plant for iron ore beneficiation is expected to be commissioned in January 2009. Exploratory work on utilization of slimes for making building material, such as tiles, has been completed.

Lowering Phosphorous in Steel Making :

- Equilibrium phosphorous partition study has shown possibility of improving actual partition with the addition of a small quantity of Al_2O_3. The low basicity findings will be implemented in the BOF operation after further studies.
- The output of a 2-dimentional numerical model developed to predict the fluid flow and mixing during combined blowing corroborate with plant trials conducted. This could result in the development of a new design of lance for the BOF vessel.

Improving Blast Furnace Productivity :

- A comprehensive model of the process, comprising physical model experiments linked with fluid flow models, will be developed in a year.
- ULCOS, a large research project, combining the capabilities of all major European steel makers and engineering companies, aims at developing new processes that could achieve 50% less CO_2 emissions per tonne of steel. 4 possible routes have been identified :
  1. New Blast Furnace using pure oxygen and top gas recycling.
  2. ISARNA, a new smelting reduction process.
  3. Direct reduction process using gas or hydrogen with geological storage of CO_2.
  4. Electrolysis of iron ores for production of steel.

  Trials are presently being conducted.
- KDRI, a coal based DRI technology, is presently in the pilot plant stage and is being developed with the aim of

achieving a substantial advantage in capital and operating costs over other DRI technologies.

Ferro Chrome - Reduction in Power Cost

- Based on laboratory experiments a pilot scale rotary hearth furnace has been designed, installed and commissioned. Process and design parameters are now being established. The power consumption is expected to reduce to 2,800 Kwh/ tonne from 3,500 Kwh/tonne.

Development of Advanced Coatings

The main objective of this thrust area is

(i) to develop a suitable advanced coating on steel sheet to either minimize the use or replacement of zinc (zero zinc).

(ii) to develop chrome free passivation for our galvanized sheet.

MagiZinc (MZ), a hot dip zinc coating, has been successfully commercialised by Corus after extensive trials. Added value of MZ for customers mainly lies in improved product performance and cost reduction. MZ will be promoted as a premium product for building and automotive applications.

Various Zn-alloy coating systems (Zn-Mg, Zn-Cu and Sn-Zn) are currently being developed in lab scale. Texture-coating property correlation for high strength steel (HIF 440) has been established. The commissioning of the indigenously developed HDG simulator with hot trials is in progress.

Improvement in corrosion resistance properties of nano-hybrid titania coating obtained by incorporating other silanes in coating formulation giving 144 hrs of SST on CRCA sheet. The life could be further improved to more than 192 hrs. by addition of trace amount of tartrazine yellow or Safranin-O. This also provided yellow and red coloration to coated sheet respectively. Efforts underway to fabricate A4 size coated sheets as part of the lab development.

Technical specifications and plant layout for a pilot coating line with facilities for spray, roll coating and dip coating systems have been finalised. Expected commissioning activities will start by September 2008.

A4 size composite panels with adhesive bonded EPP were evaluated for thermal stability, adhesion testing and cyclic humidity testing. No delamination was found after 1 hr exposure at 120C. The samples also passed different humidity cycles ETAG 016. Additionally, we are also interacting with IICT, Hyderabad for lab scale sandwich panel development with suitable polymer development tailor made for auto application.

Next generation High Strength Steels (HSS)

- A new grade of hot rolled steel – HR Tata 800, was developed with 800 MPa UTS, 20% elongation and > 150% hole expansion ratio. The fatigue properties of this grade are far superior to conventional multi-phase steels of equivalent strength.

  A common platform has been established with Corus RD & T for shortening of model development time.

  Simultaneous efforts are on for development of HSS with 1000 mPa yield strength and 50% elongation.

For prediction of spring back in HSS, materials model has been developed & implemented in collaboration with Seoul National University, South Korea. Facilities for (i) Spring back test (ii) Hole expansion test were added in the existing forming Press.

3. Future Plan of Action

The challenges ahead are:

Rapid growth

Multiple locations – how to share learnings

Concentrate on "high end" – new technology

Raw materials – best use of captive resources

4. Expenditure on R&D

		(Rs. Crores)
(a)	Capital	5.83
(b)	Recurring	36.37
(c)	Total	42.20
(d)	Total R&D expenditure as a percentage of total turnover	0.21

Technology Absorption, Adaptation and Innovation

Efforts made On the Process Front …

Hydrogen Harvesting

The Stage III (Technology Development phase) of the project was successfully completed in Jan. 2008. In this stage, pilot scale (10 ton slag capacity) was designed, developed and commissioned. Experimentation has been done in which product gas with + 70% hydrogen was achieved. The work on Stage IV (Technology Demonstration phase) initiated from February 2008. The detailed action plan for the stage IV has been prepared. The work on optimisation of design and process parameters is in progress.

Wires

Initiative to build a world class "Wires Research and Technology Centre" launched so that Wires Division can be a world leader in all aspects of wire related products and processes.

R&D and Wires Division has designed and manufactured steel fibres for use in concrete; tests are on to benchmark this product with Bekaert's DRAMIX fibres.

Thin organic coating on galvanised wires was successfully developed and commercialised as a new premium brand. This wire product has a life 2 times its original life.

Modelling and Advanced Process Designs

A common platform for integrated model development between CORUS RD&T and R&D has been developed along with ITS. This will shorten model development times and avoid duplicacy of efforts.

A steel laminate product has been designed that can be a market differentiator product for Tata Shaktee. Tests are on to study its durability and efficiency.

A MOU is in final stages with IISc Bangalore to build a "hi-strain rate machine" for finding hi-end applications in steels.

R&D innovations

- Development of a low cost laminate for roofing and cladding.
- Development of nano fluid to improve the heat transfer by about 20%.
- Development of an environmental friendly process for Chrome and Ferro Chrome nuggets, with a potential to save 20% energy.
- Laboratory development of TWIP steel.
- Development of advanced level spring back model to predict the spring back of high strength steel during forming.
- Addition of hot water to improve the permeability of green mix at SP-3, which contributed to record production.
- A mathematical model for phase transformation and heat transfer during wire rod cooling on the Stelmor was developed to reduce the UTS variation within the ring of the wire rod.
- Development of a thermo dynamic computational model during solidification to achieve improved steel cleanliness.

Raw Materials

Use of Jhama Coal as an alternative to Raw Petroleum Coke (RPC) in Sinter mix will increase the mine life from 14 years to 32 years.

Use of Banded Hematite Jasper (BHJ) in place of Quartz in Blast Furnace gives substantial saving to the company.

Plant trial for the Pneumatic flotation in the fine coal circuit was conducted to reduce the ash and also improve the overall yield. An improvement in yield to the tune of 10-15 units at an ash level of 10.5% was achieved by this process.

Developed process flow sheets for the total beneficiation of Noamundi and Joda Iron ore deposits. It is possible to achieve an overall yield of 70%.

Long Products

LD-1

Billet Caster#2 at Steel making Shop No. 1 has been equipped with quick nozzle change facility resulting in increased best ever monthly average casting sequence length of 16 heats.

Nitrogen reduction in High carbon to customers desired level by use of low Nitrogen Petroleum Coke.

WRM

Stabilisation and modification in rolling practices to produce 5.5 mm at 100 m/sec to improve productivity.

Use of 'COMBI' rolls in stand 8, 9, 10 and 11 to achieve better surface finish.

Development of roll profile image checking system to control ovality.

Development of coil centering rolls for Stelmor Conveyor to reduce the UTS variation within the ring.

NBM

Use of HSS (high Speed roll) in Stand 14 and 15 to increase the pass life and the mill productivity.

Reduction in cycle time of walking beams in reheating furnace to improve the productivity.

Merchant mill

Modification of Stand – 1 pass to roll all sections from 130 mm square billets.

Modification of reheating furnace stopper at the Charging side to improve the furnace refractory life.

Grade Development

Development and branding of Super Ductile Rebar with a higher ductility and improved UTS / YS ratio for seismic application.

Development of Graphitic high carbon steel with proeutectoid composition for improved drawability of wire rod.

Flat Products

LD-2

Heat weight increased from 130 tonnes to 152 tonnes.

LD Vessel - 3 registered highest ever life of 4105 heats.

After an extensive trial, zero-angle port sub entry nozzle (SEN) has been replaced with 15-deg down port SEN in slab casters to improve slab quality.

Use of coated mould in place of bare Copper (Cu) mould has been established in two slab casters to achieve good surface quality. This has resulted in reduction of slab rejection due to star crack from 20% to a very low figure.

Hot charging of slab increased from 56% to 63% at reheating furnace of Hot Strip Mill.

Strike rate of interstitial free steel for auto application has been increased to 89.4% from 84.7%.

Specific refractory consumption per ton of crude steel reduced from 7.16 to 6.69%.

Grade / Process Development

HS – 800 is a steel grade with 100% ferrite matrix containing nano carbides. It has high strength coupled with excellent

ductility and stretch flangeability. The complete characterisation of the grade which was during the year indicates that it is a grade of high merit.

Development of SPFH 590 (Steel with 600 MPa strength) for the manufacture of Automobile wheels.

New cold rolled grades such as BH 220, ReP 340, SPC 440, SPRC 350 with higher R bar were developed for the automotive applications.

Proto type automatic surface inspection system was developed for surface inspection in PLTCM.

Chrome-3 and Chrome passivation technologies were developed for the export of coated products.

Epoxy paint coated steel is in the advanced stage of development and it will be a good replacement of imported steel for the four wheeler fuel tank applications.

Customer approvals

Approvals were received from Toyota, Maruti, Ford, Hyundai, Fiat Palio, Logan, Nissan etc. for critical skin panel and high strength steel applications.

Technology Upgradation and Absorption in Tubes Division – 2007-08

In the Tubes division, the following efforts were made to improve operational efficiency.

ST Mills

Installation of state of the art automated new 3 inch continuous tube Mill of size range 15 mm NB to 65 mm NB, with solid state welder and high speed cold saw.

Fully automated pickling line followed by semi automatic hot dip tube galvanizing line.

Online packaging and weighing line for HF 1 mill.

Semi automatic high capacity threading, socketing, marking, colour banding and weighing line in Finishing.

PT Mills

Installation of state of the art new 4 inch mill of size range 31.75 mm to 114.3 mm OD and thickness upto 6.00 mm for manufacture of high end automobile tubes.

6 t per hour bright normalizing furnace for manufacture of high end precision tubes and boiler tubes.

Modernisation of 2 inch mill with new solid state welder.

Upgradation of HF welder in 3 inch mill.

New surface treatment plant for cold drawing with facilities for use of reactive oil to improve surface quality of high end automobile tubes.

Semi automatic 60 t capacity new cold draw line integrated with CNC straightener, cutting, end chamfering, online eddy current testing and packaging.

Modification of hydraulic testing unit with internal resources for tube testing upto 300 psi for OD upto 114.3 mm.

Major Innovations on Process and Product Development

Development of High strength Tubes using ERW Process for auto vehicle weight reduction.

Optimization of Tube Heat Treatment Process in PT Mills to improve productivity.

Development of (i) 80 new products in house from PT Mills for auto market and (ii) 13 new products from ST Mills for structural end use in house and at EPAs.

Development of Structura (i) with low temperature impact properties and (ii) weather resistance grade.

Development of flux through collaborative project with NML to reduce dross generation during hot dip galvanizing – resulted in savings of approx. 1 crore a year.

Some Major New products Developed through new technology absorption

CBQ tubes and TFF tubes for two wheelers

Tubes for hydro forming for Tata Motors Ltd. – NANO Cars

As drawn and As welded Prop. Shaft tubes for Ashok Leyland Ltd., Tata Motors Ltd.

Thin wall exhaust tubes for Ashok Leyland Ltd., Tata Motors Ltd.

Bright normalized tubes for Automobile application.

St 45 grade of boiler tubes/pipes.

Efforts for Energy Conservation at West Bokaro

Improvement in Average Captive Generation per day from 12.1 MW to 14.0 MW through Enhancement of Loading Efficiency of TG Sets.

Background

Till FY 2005-06, the Fluidized Bed Combustion (FBC) Power

Plant at Tata Steel West Bokaro was running with one upgraded boiler of 15 MW capacity with two TG sets of 10 MW each. The average SPH generation per day for the year during FY 05-06 was 12.1 MW due to the inefficiency of the TG sets to take the load as per design parameters.

Reasons for inefficient loading of the TG sets:

1. Vacuum drops and Exhaust Temperature increases beyond permissible limits.
2. Inefficiency of Cooling Tower to maintain the designed temperature difference.
3. Inefficiency of condenser tubes to maintain the heat transfer (For TG-2).
4. Inefficiency of ejectors to maintain the Vacuum.

For the above mentioned reasons the loading was restricted to 6 MW in TG-2 and 7.5 MW in TG-1.

Variations in the Parameters at Peak Load is given below:

Parameters of TG	Design data at 10 MW load	Actual data at 5.5 MW	Permissible Limits
Exhaust Hood Temperature	55°C	63°C	65°C
Vacuum	0.85 Kg/Cm^2	0.73 Kg/Cm^2	0.70
Condenser Inlet & Outlet Temp. Diff. (ΔT)°C	10°C	4.5°C	4°C

Improvement Activities done in FY 07-08 to increase the loading efficiency of the TG sets.

The total plant shutdown was taken for 8 days and the following jobs were completed.

1. Replacement of the condenser tubes.
2. Vacuum Drop Test & Checking of Any Leakage from Steam Line, Water Line & Nozzle from the Ejector Circuit.
3. Dismantling, Cleaning & Overhauling of all the Internals of both the Ejectors & Its Condensers.
4. Cleaning of Oil Cooler & Air Cooler Tubes.
5. Replacement/Revamping of Cooling Tower Internals, e.g. Spray Nozzles, V-Bar Fills etc.
6. Complete Cleaning of Sand Depositions inside the Hotwell.
7. Complete Cleaning of Top Deck & Basin of the Cooling Tower.

All the above mentioned jobs were completed in-house through our maintenance personnel and a very few through local contractors at minimum cost.

KPI's after the Project is as follows:

Benefits:

Key performance indicators	Before at 5.5 MW	After at 8.0 MW
Exhaust Hood Temperature	63°C	53°C
Vacuum	0.73 Kg/Cm^2	0.81 Kg/Cm^2
Condenser Inlet & Outlet Temp. (ΔT)°C	4.5°C	6°C

From the KPI's after the project, we are able to load both the TG sets up to 8.5 MW each. Since the upgraded running boiler is of 15 MW capacity, we achieved the peak load of 15 MW (Max Capacity) load even during peak summer seasons when the inlet Cooling Water Temperature increases by 8 degrees. This resulted in optimizing the plant load factor and utilization of existing asset of the company. As a result the withdrawal from DVC was less which incurred a recurring savings of Rs. 2.25 crs. per annum.

Total Expenditure Incurred : 22 Lakhs

Total Savings per annum (recurring) : 225 Lakhs

Sweating of Asset by Performance Optimizing

Saving in Purchased Power Bill by Rs. 2.25 crs. per annum for years to come.

Additional generation of 147 LKWH/annum with the same asset and same workforce.

Attain average load of 14 MW from 12.1 MW.

Particulars of technology imported during last five years :

	Steel Division	Absorption	Status of Implementation
a)	Electrolytic cleaning line (SMS Demag, Germany)	2003	Commissioned
b)	Upgradation of 'G' blast furnace (SMS Demag, Germany)	2004	Commissioned
c)	Upgradation of HSM	2004	Commissioned
d)	Upgradation of billet caster - 1 at LD1 (Concast, Zurich)	2004	Commissioned
e)	Ladle furnace-2 at LD1 (SMS Demag, Germany)	2004	Commissioned
f)	New Rabar Mill (Morgan, USA)	2004	Commissioned
g)	Upgradation of caster at LD2 (Voest Alpine, Astria)	2004	Commissioned
h)	Imported design and engineering for hot metal desulphurization unit at LD1 (Kuettner GmbH)	2005	Commissioned
i)	Supply of imported engineering for new induced draught fans, electrics & accessories for the LD Converter GCP at LD1 (Ebara Corporation)	2005	Commissioned
j)	Adequacy checking BOF converters for augmentation of heat size at LD2 (SMS Demag, Germany)	2005	Commissioned
k)	Imported design and engineering for upgradation of Caster 2 & 3 at LD2 (VAI, Astria)	2005	Commissioned
l)	Imported design and engineering for hot metal desulphurisation unit 2 & 3 at LD2 (Kuettner GmbH)	2005	Commissioned
m)	Imported design and engineering for capacity increase of slab reheating furnace nos. 1 & 2 of HSM (Techint)	2005	Commissioned
n)	Supply of design and engineering and training for 150 tph walking beam furnace to Rebar Mill (Bricmont)	2005	Commissioned
o)	Imported design and engineering (Mother well Bridge - Clayton walker)	2005	Commissioned
p)	Supply of imported design and engineering for LD gas boosters (Howden Power Ltd. U.K.)	2005	Commissioned
q)	Supply of imported design and drawing for Technology control system at HSM (SMS Demag, Germany)	2005	Commissioned
r)	Supply of imported design and drawing for Basic level automation at HSM (Alstom, USA)	2005	Commissioned
s)	Supply of imported design and drawing for dual zinc pot at CRM (CMI, Belgium)	2005	Commissioned
t)	Supply of imported design and drawing for BAF, CRM (LOI, Germany)	2005	Commissioned
u)	Supply of imported design and drawing for 4th Stove of 'G' Blast Furnace (Paul Wurth Italia, Italy)	2006	Under Implementation
v)	Supply of imported design and drawing for 'H' Blast Furnace (Paul Wurth Italia, Italy)	2006	Under Implementation
w)	Supply of imported design and drawing for Sinter Plant No. 4 (Outokumpu Technology, Germany)	2006	Commissioned
x)	Supply of imported design and drawing for LD2 expansion project. (SMS Demag, Germany)	2006	Under Implementation
y)	Supply of imported design and drawings for convertor gas cleaning plants in LD shop 1 & 2 (SMS Demag, Germany)	2006	Under Implementation
z)	Facility for quantitative estimation of minerals through Scanning Electron Microscope (Intellection Pty. Ltd., Australia)	2006	Commissioned
aa)	Polarising Microscope with Photometer and Imaging at R&D (Leica Mikrosysteme Vertrieb GmbH, Germany and PRESI S.A., France)	2006	Commissioned
ab)	Variable Frequency Drive for Descaling Pump Motor at Hot Strip Mill (ABB, India)	2007	Commissioned
ac)	Sinter Plant No. 4, having a bed area of 204 sq mtr with ESP having lesser emission of 50 mg/ Nm^3	2007	Commissioned
ad)	Double Jaw Eye Vertical Tong for Batch Annealing Furnace at CRM	2007	Commissioned
ae)	SCADA System for Water Utilities	2007	Commissioned
af)	Quantitative Estimation of Minerals by SEM (Scanning Electron Microscope)	2007	Commissioned
ag)	XRD (X-Ray Defraction) for quantitative phase and texture analysis	2007	Commissioned

Annexure 'B' to Directors' Report

Statement pursuant to Section 217(2A) of the Companies Act, 1956 and the Companies (Particulars of Employees) Rules, 1975

Sr. No.	Name	Age (Years)	Designation/ Nature of Duties	Gross Remuneration Rs.	Net Remuneration Rs.	Qualifications	Total Experience (Years)	Date of Commencement of Employment	Last employment held Designation – Period for which post held
1	Ansari N.A.	56	General Manager (Project)	30,24,348	22,04,045	B.Sc. (Engg.)	33	28.12.1974	—
2	Asokan S.	60	EIC (Titania Project) & GM (Geolo. Serv.)	30,10,915	21,68,483	B.Sc., M.Sc., Ph. D., Cer. (Computer)	33	09.12.1998	HCL Group Company, Executive Director - 3 years
3	Baijal A.D.	60	Group Director, Global Minerals	80,33,827	56,42,688	B.Sc. (Engg.) (Met.) P.G.D.B.M.	38	13.12.1969	—
4	Biswas Sandip	39	Group Head - Corporate Finance, Treasury & Investor Relations	32,28,234	23,10,691	B.Com. (Hons), ACA, ACS	15	01.04.2005	First India Asset Management Co.(P) Ltd, Head Eastern India - 3 years
5	Chatterjee Koushik	39	Group Chief Financial Officer	94,29,499	65,42,103	B.Com. (Hons), F.C.A.	12	01.08.2003	Tata Sons Ltd. - General Manager - Corporate Finance, 4 years 7 months
6	Chaturvedi U.K.	58	Vice President (TQM & CSI)	83,85,303	59,25,684	B.Sc.	38	25.10.1969	—
7	Chaudhary Chanakya	42	Chief Resident Executive, New Delhi	26,93,414	19,63,074	B.E.	19	16.12.1988	—
8	Choudhry Sanjay	51	Chief (Corporate Communication)	30,73,846	22,20,045	M.A., P.G.D.B.M.	27	16.09.2002	Coca Cola Industries - Corporate Affairs Manager, 6 years
9	Chowdhary D.M.	56	Chief (Electrical Maint.)	28,15,975	20,65,322	B.Sc. (Engg.), P.G.D.B.M.	32	20.03.1976	—
10	Das Binod Kumar	50	Chief (Sinter Plant)	29,35,226	21,21,447	B.Tech., M.Tech.	28	01.08.1980	—
11	Deshpande D.P.	51	Chief (Coke, Sinter & Iron)	26,51,116	19,34,945	B.Tech., P.G.D.B.M.	29	01.01.1979	—
12	Dhar G.S.	55	Chief (Raw Material Project Chattisgarh & Jharkhand)	24,46,016	17,92,954	B.Tech.	31	07.02.1977	—
13	Divaker Chavala	55	General Manager (Jharia)	28,90,524	21,02,035	B.E.	32	27.01.1977	Singereni Collieries Company Limited
14	Garg C.P.	65	Sr. Consultant Pilot	27,58,985	19,53,199	B.Com.	45	13.08.2007	Jagsons Airlines. Pilot, 11 Months
15	Ghose P.K.	38	Chief RM Project	25,35,495	18,75,331	B.Tech.	16	01.07.1991	—
16	Ghosh Santanu	51	Chief (Project Engg.)	28,92,472	20,99,135	B.E.	27	01.08.1980	—
17	Gupta Bhagwat Das	66	Sr. Consultant Pilot	39,12,203	26,89,398	M.Com, LLB (Part 1)	37	17.06.2006	Uttaranchal Govt. - Govt. Pilot- 7 months
18	Gupta Peeyush	39	Chief (Marketing & Sales - Flat Products)	24,12,045	17,65,120	B.E., M.B.A.	15	01.01.1993	—
19	Hariharan S.	55	Chief (3MT Expansion Project)	24,32,583	17,89,221	B.Sc. (Engg.)	34	29.12.1973	—
20	Iyer Ramesh B.	42	Chief (LD#3 & TSC)	26,86,351	19,53,781	B.E.	19	01.07.1988	—
21	Jha Bimlendra	40	Executive-in-Charge (Growth Shop)	27,71,810	20,35,475	B.Tech., P.G.D.B.M.	17	02.07.1990	—
22	Jha Dwarika Nand	48	Chief (Blast Furnace), Kalinganagar Project	27,98,753	20,60,082	B.Sc. (Engg.), PGD (Mgmt.)	27	01.08.1980	—
23	Jha Hridayeshwar	52	Vice-President (Long Product)	33,38,945	24,06,185	B.Tech., M.Sc. (Engg.), P.G.D.B.M.	29	01.01.1979	—
24	Jha Varun K.	56	Vice-President (Chattisgarh Project)	69,04,033	48,25,983	B.Tech. (Hons)., P.G.D.B.M.	35	03.10.1972	—
25	Kamra Vivek M.	40	Executive-in-Charge (Tubes)	27,84,639	20,28,919	B.Tech. Management Prog.	18	01.07.1989	—
26	Kharkar Hemant C.	51	Vice-President	57,29,904	40,32,022	B.E., (Met.), P.G.D.B .M.	28	22.01.1980	—
27	Kumar Ashok	46	Chief (I M T G)	29,84,089	20,95,567	B.Tech.	23	01.07.1984	—
28	Kumar Sanjay	45	Chief (G Blast Furnace)	27,03,756	20,16,601	B.Tech., P.G.D.B.M.	23	02.07.1984	—
29	Kumar Suresh	50	Chief (Mechanical Maintenance)	24,88,215	18,12,215	B.Tech., P.G.D.B.M.	28	01.08.1980	—
30	Lal Mohan	55	Chief (Manufacturing), Long Product	26,13,068	18,97,825	B.Sc. (Engg.), P.G.D.B.M.	29	09.01.1978	—
31	Makashir WG.CD.S.	61	Sr. Consultant Pilot	42,91,884	30,98,488	M.Sc. (Defence Studies)	40	02.09.1997	Indian Air Force, Wg. Commander - 12 Years
32	Mangal Rajiv	40	Chief Marketing & Sales, Wire Division	24,39,932	17,93,409	B.E., P.G.D.B.M.	18	01.07.1989	—
33	Mani R.	50	Chief (Corporate and International Taxation)	24,03,879	17,79,601	B.Com., C.A, I.C.W.A.I	25	18.10.1982	—
34	Mishra A.K.	55	Chief (CRC - West)	24,67,168	18 ,04,343	B.Sc. (Engg.)	31	04.11.1976	—
35	Misra Abanindra M.	56	VP (RM)	58,99,366	42,11,830	B.E., M.B.A.	34	29.12.1973	—
36	Misra Arun	42	General Manager (OM & Q)	25,53,177	18,94,501	B.Tech.	19	01.07.1988	—
37	Misra N.K.	52	Group Head - Mergers & Acquisition	33,56,115	24,33,284	B.Sc., A.C.A.	27	21.02.1981	—
38	Mokashi S.	50	Chief Information Technology	33,82,012	24,22,033	B.Tech., P.G.D.B.M.	26	01.02.1982	—
39	Mukherjee Dr. T. *	65	Dy. Managing Director (Steel)	1,87,97,616	1,27,16,092	B.E. (Met.), M. Met. (Sheffield), Ph.D. (Sheffield)	40	17.05.1971	British Steel Corpn., Asst. Manager, New Product Dev., 1 year - 6 months

Sr . No.	Name	Age (Years)	Designation/ Nature of Duties	Gross Remune-ration Rs.	Net Remune-ration Rs.	Qualifications	Total Experi-ence (Years)	Date of Commence-ment of Employment	Last employment held Designation – Period for which post held
40	Murty V.S.N.	56	Chief Financial Controller (Corporate)	32,38,061	22,69,822	B.Com., C.A.	31	01.06.1976	—
41	Muthuraman B.	63	Managing Director	2,81,63,738	1,91,78,231	B.Tech (Met.), P.D.G.B.M.	41	14.11.1966	—
42	Nair Radhakrishnan	48	Chief Human Resource Officer	37,89,146	27,73,807	B.Com., PGD (PM&IR)	23	01.04.2007	Tata Sons, Vice President, 5 years
43	Narayan Om	57	Vice President (Shared Services)	59,74,900	42,28,331	B.Sc. (Engg.), P.G.D.B.M.	33	03.10.1974	—
44	Nerurkar H.M.	59	Chief Operating Officer (Steel)	98,02,881	67,51,922	B.Tech. (Met.)	36	01.02.1982	U.M.I Ltd., Manager (QC) - 5 Years
45	Ojha Awadhesh Kumar	56	General Manager (W B)	27,47,751	20,20,854	B.Sc. (Engg.)	32	01.08.1975	—
46	Prasad Avinash	60	Advisor to MD	58,03,622	40,51,227	B.E. (Met.)	36	14.06.1971	—
47	Pathak H.G.	49	Executive-in-Charge (Wire Division), Mumbai	28,27,192	20,68,977	B.Tech.	26	01.07.1981	—
48	Pathak Sudhansu	46	Chief (LD2 & SC)	24,78,212	18,11,226	B.E., P.D.G.B.M.	23	02.07.1984	—
49	Pattanaik S.K.	48	Chief Resident Executive, Bhubneshwar	26,76,416	19,47,943	B.E.	24	01.07.1983	—
50	Prakash Sunil	54	Chief (Manufacturing), Flat Product	25,53,342	18,55,313	B.Tech.	15	14.05.1992	—
51	Purohit Sushil Kumar	45	Pilot	32,35,626	22,78,288	L.L.B.	15	03.04.2006	Ran Air Limited, Pilot, 1 month
52	Rammurty N.	57	Chief Strategic Project Procurement	24,21,975	18,06,963	B.Sc. (Engg.), P.G.D.B.M.	34	03.01.1974	—
53	Rattan G.S.	60	Executive-in-Charge (Bearings)	27,52,296	19,99,794	B.Sc. (Engg.)	29	10.11.1978	—
54	Ray Dr. Banambar	60	General Manager (Medical Services)	37,83,785	27,21,405	MBBS, MD	28	01.03.1980	—
55	Roy S.K.	55	Chief Project Blast Furnace H	30,45,815	22,22,447	B.Sc. (Engg.)	31	19.03.1977	—
56	Sahay Anup	46	Chief Corus Integaration	26,13,942	19,18,476	BA (Hons), P.G.D.B.M.	21	01.07.1986	—
57	Sarangi B.N.	57	Chief (Employee Training & Development)	26,80,695	19,60,110	BA, PGD (Mgmt.)	38	20.12.1969	—
58	Sastry C.V.	44	Chief (F P Tech. Group)	25,31,722	18,65,301	B.E., P.D.G.B.M.	22	15.07.1985	—
59	Sen Anand	48	Vice-President (Flat Products)	73,40,924	51,51,572	B.Tech. (Hons.) MET Engg., P.G.D.B.M.	26	27.07.1981	—
60	Sengupta Dipankar	62	Advisor to MD	46,68,529	30,85,479	B.E.	40	01.02.2006	—
61	Sengupta Partha	50	Vice President (Corporate Services)	40,38,080	28,94,512	B.Tech. (Metallurgical)	27	01.08.1980	—
62	Seth Sunil	47	Chief (M & S - LP)	28,46,869	20,63,990	B.Sc.	24	08.08.1983	—
63	Singh Arun Narayan *	61	Dy. Managing Director (Corporate Service)	1,24,85,922	83,96,952	BA (Hons) Pol Science	37	05.10.1990	Deputy Inspector General of Police, Bihar- 6 years
64	Singh R.P.	55	General Manager (IR)	26,24,566	19,10,588	B.Com., PGD (PM & IR)	30	14.04.1977	—
65	Singh Ram Prit	63	Vice President (Engineering & Projects)	87,44,440	61,17,271	B.Sc. (Engg.) (Mech.)	42	01.03.1996	SAIL & R I N L,General Manager (Project) - 30 years
66	Srikanth R.	45	General Manager (Raw Mate-rial Projects)	34,37,184	25,01,521	B.Tech., M.S. (Engg.), Ph. D.	23	10.02.1997	Penn State University USA, Research Assistant-6 Years
67	Tiwari Kalika	57	Pilot	25,36,457	17,93,953	B.Sc .	25	01.06.2006	I.S.W.P., Chief Pilot ,15 years
68	Venugopalan T.	55	Chief Technology Officer	33,25,133	24,11,689	B.Tech (Met. Engg.), M.Tech (Ind. Metallurgy with Metal Casting Specialization), Ph.D (Metallurgical Engg.)	30	04.05.2001	Ispat Ind. V. P. (Technical Services) - 4 Years
69	Verughese K.K.	56	Chief (Corporate Audit)	29,06,213	21,03,661	B.Sc. C.A.	31	23.12.1976	—

Notes : (1) Gross remuneration comprises salary, allowances, monetary value of perquisites, commission to the Directors and the Company's contribution to Provident and Superannuation Funds but excludes contribution to Gratuity Fund on the basis of actuarial valuation as separate figures are not available.

(2) Net remuneration is after tax and is exclusive of Company's contribution to Provident and Superannuation Funds and monetary value of non-cash perquisites.

(3) The nature of employment in all cases is contractual.

(4) None of the employees mentioned above is a relative of any Director of the Company.

* Indicates earnings for part of the year.

On behalf of the Board of Directors

RATAN N. TATA
Chairman

Mumbai, 26th June, 2008.