VISAKHAPATNAM STEEL PLANT – RASHTRIYA ISPAT NIGAM LIMITED
Visakhapatnam (Andhra Pradesh)

Unit Profile

Rashtriya Ispat Nigam Limited is the corporate entity of Visakhapatnam Steel Plant. The steel plant is located 26 km south of Visakhapatnam city. The company also has a blast furnace grade limestone captive mine at Jaggayapeta, a captive mine for dolomite at Madharam, a manganese ore captive mine at Cheepurupalli. All the captive mines are located in the state of Andhra Pradesh. It has also got a mining lease for river sand in river Champavathi.

Sl. No.	Department	Unit	Capacity
1	Coke oven	3 coke oven batteries of 67 ovens each, of height 7 m, with 100% dry quenching.	2.261 Mt of blast furnace coke
2	Sinter plant	2 sinter machines with 312 sq.m grate area	5.256 Mt gross sinter
3	Blast furnace	2 nos. 3200 cum blast furnaces with bell less top equipment and cast house slag granulation	3.4 Mt hot metal
4	Steel melting shop	3 nos. 133 cum LD converter with 6 nos. 4 strands bloom casters	3.0 Mt liquid steel 2.82 Mt cast bloom
5	Light and medium merchant mill	7 stands continuous billet mill and 26 stands 2 strands continuous bar mill with tempcore facility for rebar rolling	1.857 Mt billets 0.710 Mt bar products
6	Wire rod mill	4 strands 61 stands continuous mill with stelmor cooling	0.850 Mt wire rods
7	Medium merchant and structural mill	20 stands continuous mill	0.850 Mt medium structural products

Fig 1 : Main facilities of the plant

The main facilities of the plant are detailed at Fig 1. The plant has a capacity to produce 2.656 Mt of saleable steel of which 2.410 Mt is finished steel.

Besides receiving raw materials from the captive sources, the steel plant meets its iron ore requirements from Bailadilla mines of National Mineral Development Corporation, coking coal requirements through imports and coal washeries of Coal India Limited, SMS grade limestone through imports, quartzite requirements through purchase and boiler coal from the coal mines of Mahanadi Coal Limited.

The product profile of the plant comprises of wire rods, rounds, reinforcement bars (rebars), angles, channels, beams, squares, billets and blooms. The product profile also includes basic grade pig iron, granulated slag, coal chemicals and other by-products. The plant also exports power to AP Transco from its captive power plant.

The steel plant has many technological features, which are unique amongst the steel plants in the country. The company is a pioneer in introducing many new technologies in the country. The production of TMT rebars by tempcore process is a shining example in this respect. Because of high level of technology existing throughout the plant, the company has a very good manufacturing capability to meet the needs of various customers.

Human resource initiatives at RINL are closely linked to the corporate strategy of the organisation. It has exemplary industrial relations where the entire work force (both executives and non-executives) works as a well-knit team for the progress of the company. Participative management, by involving cross-section of the employees, in development of the policy and strategy is actively implemented in the company. The productive wholesome environment provides an atmosphere of growth, both for the employees as well as for the company.

With the availability of the positive growth environment, the company is registering a steady and consistent up trend in the performance. It is achieving both incremental improvements as well as breakthrough improvements in its various performance measures. The theory of *"success begets success"* is very much visible here.

Exceeding of up rated capacities, which once seemed to be impossible, is a reality today. Records are being created only to be broken again. The company's rating amongst the largest steel producing companies in the world, as published by IISI is continuously improving (72 in CY 2000, 68 in CY 2001 and 67 in CY 2002).

Energy Consumption

Steel making is energy intensive in nature and hence uses various types of energies for reduction of oxides and process heating. The main energy inputs are boiler coal (for power generation), furnace oil (in re-heating furnaces and boilers) and diesel. The electricity requirements were met from captive generation as well as imported from Grid. Surplus electricity is exported to grid. 96% of by product gases (Coke oven gas, Blast Furnace gas, LD gas) generated during the process of steel making at various stages are used for process heating. By-product liquid fuel (coal tar fuel) is used in kilns. The total energy consumption of main inputs and their monetary value during the last three years is given at Fig 2. The percentage of energy consumption in terms of manufacturing cost, for which coking coal and coke is considered in the energy bill,

Type of fuel	Unit	2001-02	2002-03	2003-04
Coking coal	t	2992194	3196471	3158374
Coke	t	107842	100422	268817
Boiler coal	t	1376766	1367060	1381524
Furnace oil	KL	1409.3	396	966
Diesel	KL	2311.553	2842.9	2274
Electricity purchased	Lakhs KWH	332.09	848.58	904.88
Electricity exported	Lakhs KWH	2490.2	1647.1	1180.2
Electricity consumption	Lakhs KWH	17676.5	18836.1	19545.7
Monetary value of energy consumed				
Coking coal	Rs.lakhs	86313	100471	99820
Coke	Rs.lakhs	4547	6216	21583
Boiler coal	Rs.lakhs	12776	13021	13539
Furnace oil	Rs.lakhs	130	39	112
Diesel	Rs.lakhs	367	571	277
Electricity purchased	Rs.lakhs	2562	5347	6183.79
Electricity exported	Rs.lakhs	4883.3	3261.3	2382.8
Energy cost	Rs.lakhs	101812	122403	139133
Manufacturing cost	Rs.lakhs	278186	308544	344017
% energy consumption in manufacturing cost		37	40	40

Fig. 2

though these are mainly used as raw materials, is also detailed in Fig.2.The specific energy consumption. And petrol-fuel consumption for the last three years is detailed at Fig 3 and Fig .4

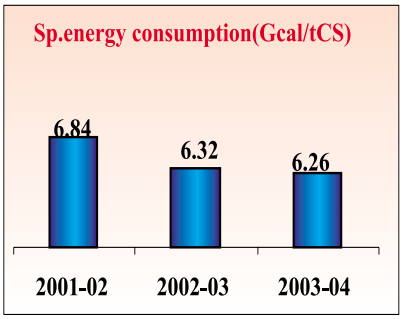

Fig.3

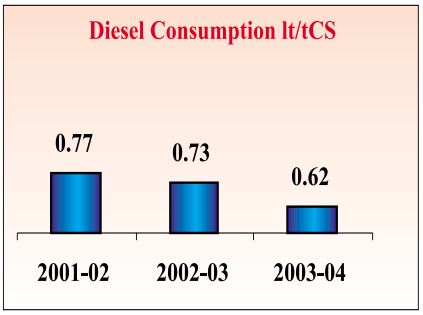

Fig.4

Energy Conservation Commitment, Policy and Set up

RINL has focussed on energy conservation in the design stage itself by adopting various types of waste energy recovery facilities like coke dry quenching, back pressure turbine station, gas expansion turbine station, LD gas recovery system, Supervisory control and data acquisition system, evaporative cooling systems etc. These facilities are contributing significantly in reducing the wastage of energy.

The commitment to energy conservation has reflected in the energy policy of RINL where in it is committed to reduce specific energy consumption by 1% per year up to 2010AD.

The energy conservation activities are reviewed at Apex level on regular basis through various review meetings (Co-ordination meetings, cost control meetings). To monitor energy conservation activities, RINL has Energy Management Department headed by Joint General Manager. He is also the Designated Energy Manager of the company. The Energy Management Department monitors the levels of specific energy consumption on daily basis and provides base line information to top management for initiating appropriate action. RINL follows a cost effective energy conservation policy. Improving process management and increasing waste energy recovery from the existing facilities (CDCP,BPTS,GETS,ECS etc) by actively involving people is the strategy adopted for conservation of Energy. Invovement of people at working level in large numbers is achieved by formation of Departmental Energy Teams (DET).The team consists of people from all functional disciplines(Mechanical, Operation, Electrical & Instrumentation etc). QIP's are formed for energy conservation as a part of ISO-9000 and management objectives are taken on energy conservation as a part of ISO-14001.Awarenss on conservation of energy at various levels is brought through month long energy conservation celebrations. Employees are empowered by encouraging suggestions and quality circles. RINL has successfully implemented strategy of minimizing petrofuel consumption by augmenting by product gases generation as well as usage.

To strengthen energy conservation movement at RINL,22 Departmental Energy teams(DET) have been constituted in major energy consuming departments. The Energy consumption of these departments constitute 95% of the total energy consumption of the plant. Senior Executives of EMD coordinate the energy conservation activities in these departments. The day to day performance of DET's are monitored by concerned Head of Department (HOD). The Joint General Manager is overseeing the activities of energy coordinators, DET's and Energy Conservation Cell.

Energy Conservation Achievements

During the last three years, RINL implemented 210 energy saving ideas generated from various sources, resulting in 8.5% reduction in specific energy consumption .

Some of the energy conservation projects implemented during the year are:

Injection of reversal pause coke oven gas into blast furnace gas by providing inter-connection at axis-35.

Electricity conservation at raw material handling plant by minimizing idle running of cone crushers, starting of yard conveyor motor (co-34) in delta and running in star, replacement of oversized motor at coneyor-57, replacement of oversized motor at coneyor-53.

- Reduction of electricity consumption at CRMP kilns by plugging air leakages, by contact cooler modification, lighting circuit modification at MCC & LCSS of CRMP
- Reducing electrical energy consumption of water supply system by automation of pumps at pump house-26, keeping one aerator in 'stand by' mode at 9 MLD pump house, avoiding double pumping at treatment plant no: 3
- Increasing usage of BF gas intake to boilers, Optimizing fuel consumption at boilers by improvement in performance of secondary air pre heater of boiler-2, 3,5.
- Reducing steam consumption at turbo blower-3 by improving the performance of 2nd stage intercooler as well as improving vacuum of condenser of turbo blower-3
- Reducing steam consumption at turbogenerator-3 by improving vacuum of condenser from 0.69 kg/Sqcm to 0.85 kg/Sqcm

- Reducing cold blast consumption in Blast Furnaces from 1282 Ncum/thm to 1211 Ncum/thm by minimising wastage of air through muffler chamber.
- Reducing power consumption in blast furnaces by installing vacuum contactors for BF slag granulation motors and space heaters for SGP motors.
- Optimising electricity consumption at CDCP mill fans by optimising number of fans in operation.
- Recycling of Metallurgical waste, LD slag in sinter plant by improving coordination with field machinery department.
- Reducing power consumption at MMSM from 96 Kwh/tip to 91 Kwh/tip by reducing field currents of 9 nos 1700 kw dc motors and 11 nos of 1100 kw dc motors during non rolling period.
- Reducing electricity consumption at chilled water plant-4 by adjusting the blade angle from 50° to 45° during dry season. Reducing electricity consumption at compressor houses by rationalisation of pressure for various customers.

Energy Conservation Plans and Targets

The following projects are planned for implementation during the next 3 years, as given at Fig 5.

- Auxiliary fuel injection in Blast Furnaces.
- Additional stream for LD gas recovery
- Upgradation of SCADA

Fig 5: Energy conservation projects

Environment and Safety

Environment protection measures have been incorporated in the design stage itself with an investment of Rs 488 cores. The major environment protection facilities are detailed at Fig 6.

- Elaborate dust extraction systems at all production units
- Mechanical, Biological and Chemical Treatment Plant for treating toxic effluents.
- Sewage treatment plants for effluent treatment

Fig6: Environmental protection facilities

The commitment towards Environment is enunciated through the company's Environment Policy. A copy of the same is enclosed. RINL obtained ISO 14001:1996 for Environmental Management System.

Solid waste recycling has been given prime importance in RINL. Some of the fresh initiatives taken during the year at RINL are given at Fig 7. With this the solid waste recycling increased from 76% to 78%.

- Recycling of Anthracene oil
- Recycling of Medium hard pitch
- Recycling of BF gas sludge into Sinter plant
- Recycling of GCM sludge
- Usage of LD slag in Sinter plant, Blast Furnaces, Steel Melt Shop.

Fig7: Solid waste recycling

As a commitment towards Safety and occupational health, RINL is following occupational health and Safety Management Systems (OHSAS: 18001:1999). Towards, this, RINL has formulated Occupational health and safety policy .The Occupational health Service and Research Centre is carrying out many activities as part of Occupational health and safety policy. RINL has been awarded OHSAS: 18001, 1999 certificate in the month of April 2002.

The efforts of RINL are being recognised by various forums. In addition to National Energy Conservation Award in Integrated Steel Sector, RINL has been bestowed with Prestigious "Prime Ministers Trophy-2003" for Steel Industry for overall improvement . Some of the major awards received by RINL are given at Fig.8

- Energy Conservation Awards (continuous) by Ministry of Power.
- PM Trophy for Best Steel Plant
- MOU award
- SCOPE Award
- Environmental awards
- Safety awards
- Quality awards
- Quality circle awards
- Raj bhasha awards
- Best tax payer award
- Best management award

Fig 8. *Major Awards*

The Effectiveness of Energy Efficiency Movement at RINL has been recognised internationally. The International Iron and Steel Institute, Brussels in its Publication of Global Sustainability Report lauded the efforts of RINL in Energy Conservation. The Extracts of this publication is given below :

"The commitment of top management as well as the participation of employees has facilitated energy conservation at Rashtriya Ispat Nigam Limited's (RINL's) Visakhapatnam Steel Plant (VSP) in India. The company appointed a designated Energy Manager in 2002, thus giving further momentum to energy conservation efforts. Employees were motivated to save energy and to suggest ways in which energy efficiency could be improved by actively participating in Samalochana (an internal communication forum) and quality circle projects.

Energy conservation measures put into effect at little or no cost over the past three years at VSP have resulted in significant energy savings. Through the improvement of the calorific value of

coke oven gas, the reduction of fuel gas consumption, increasing blast furnace gas utilization in thermal power plant, optimisation of coke consumption in blast furnaces, the installation of vector control for conveyors and stackers, and other measures, the energy intensity of crude steel at the plant was reduced from 28.6 GJ per tonne in 2001 to 26.2 GJ per tonne in 2003."

Today RINL is moving forward with an aura of confidence and with pride amongst its employees, who are determined to give their best for the company, so that it can scale higher and higher heights.

Ramvir Singh Raghav
Ph. Office : 27184340, 27151800, 27157052, 27190658, 27108686 (Direct) Ext. 23 & 24
Fax : 011-27108686
Resi. : 27105668, 27157051
Mobile : 9810011807
ABHINAV PRINTS
Offset Printing ● Laser Typesetting ● Graphic Designing ● Scanning & Processing ● Lamination
WZ-48, Shakurpur Village, Opp. 'M' Block Market, Shakurbasti, DELHI - 110 034 ● E-mail : vyaparbharati@vsnl.net