

HINDALCO INDUSTRIES LIMITED (RENUSAGAR POWER DIVISION)

ORGANIZATIONAL DESCRIPTION

Hindalco Industries Limited is an integrated Aluminium Plant at Renukoot. **Renusagar Power Division** was conceived as the Captive Power Plant of Hindalco Industries Limited in 1964. Renusagar Power Plant is one of the best performing power plant in India with plant load factor and plant availability factor more than 95% and meets the power requirement of Hindalco, very effectively.

To conceptualize and realize the vision of a Captive Power Plant for Hindalco, Renusagar Power Division (RPD) was established in 1967. It is situated 35 km away from Renukoot at Renusagar in Sonbhadra district of Uttar Pradesh on the border of UP and MP in the vicinity of Rihand Lake on one side and Singrauli Coal belt on the other side.

RPD's present power generation capacity is 742 MW, the power generated at 10.5 & 13.8 KV is stepped up to 132 KV with the help of step up transformer and exported to Hindalco, Renukoot through ten (10) transmission lines. About 9.97 % of the power generated is used by Renupower as auxiliary power consumption, to run its auxiliary equipment.



VISION

To be a premium metals major, global in size and reach, with a passion for excellence.

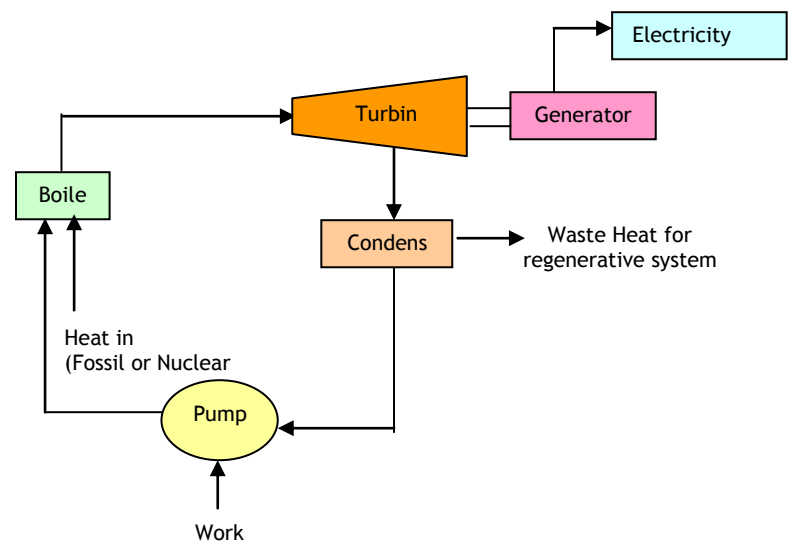
MISSION

To relentlessly pursue the creation of superior shareholder value by exceeding customer expectations profitably, unleashing employee potential and being a responsible corporate citizen adhering to our values.

Power Generation Process

The modern Lignite / Coal based steam power plants are variation of Rankine Cycle.

It consists of Boiler, Turbine, power generator, condenser and heat recovery system for improvement of thermal efficiency. The steam produced in boiler when expanded through turbine, turns the turbine coupled with power generator. The spent steam after expansion and the turbine exhaust is passed through the condenser where it get converted into the condensate water. This condensate water is again fed into the boiler through heat recovery system, thus completing the cycle of water for power generation.

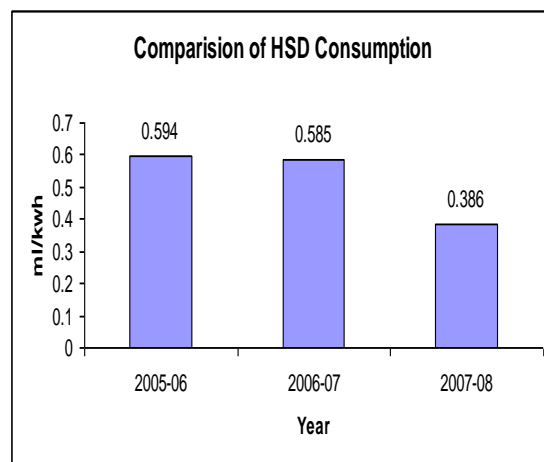
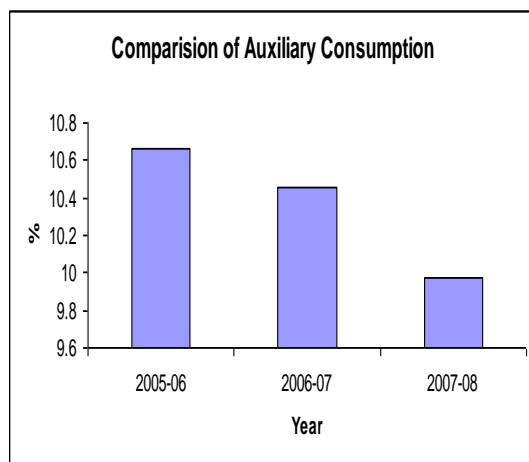


Renupower is a coal based thermal power plant. Its coal requirements are met through transportation of coal from Jingurdah Coal Mines (of NCL) by two Arial Ropeways (ARW). Approximately 65% (8000 MT per day) of coal requirement of Renupower is transported by ARW, remaining quantity (approximately 5000 MT per day) is transported from different mines of NCL / CCL etc.

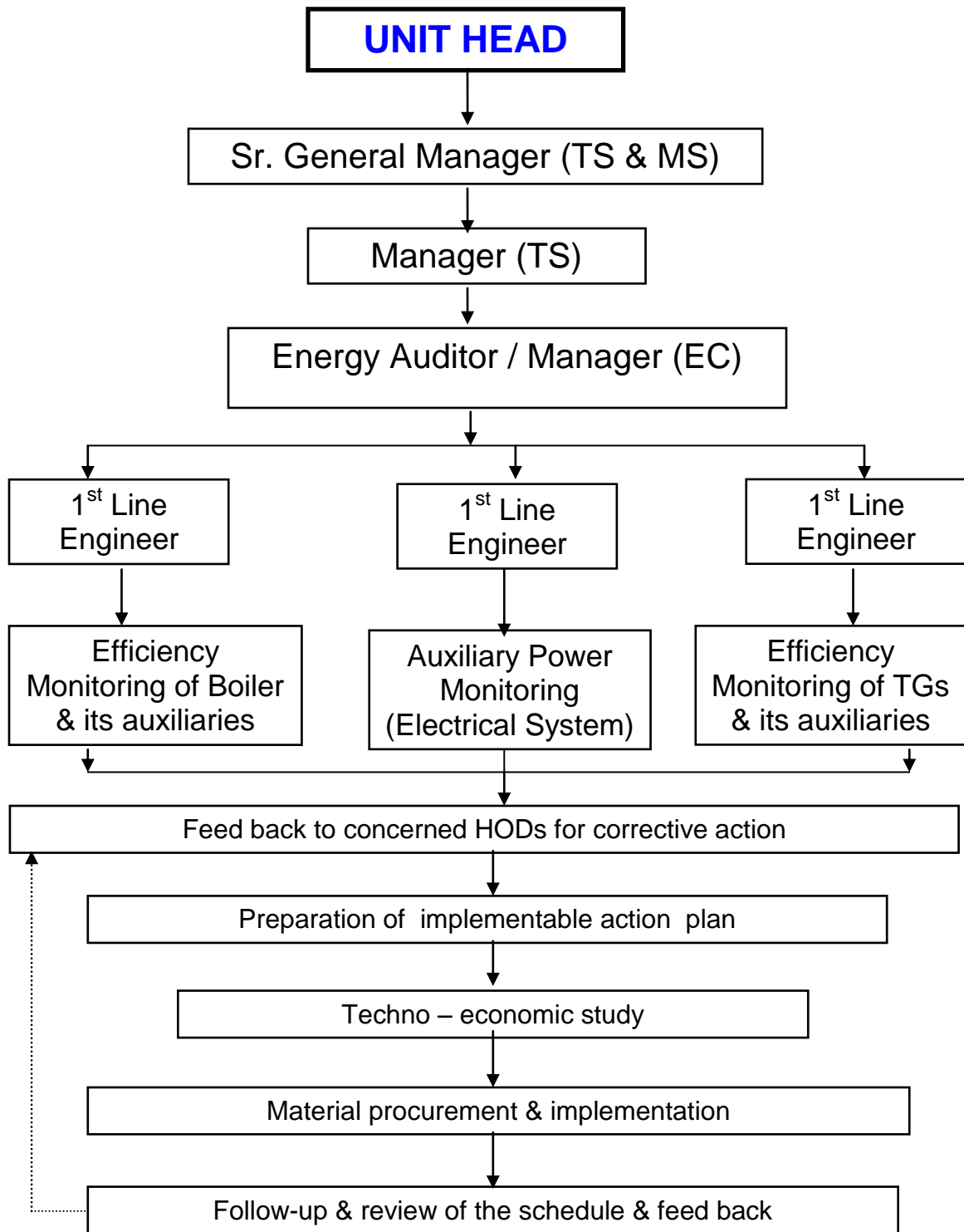
Energy Consumption Pattern

Various energy conservation measures has been taken during last 3 yers. There is steady decline of Electrical Energy & HSD Consumption. Last 3 years, energy consumption figures are appended below which indicate continual reduction in energy consumption over last 2 years due to our untiring efforts to conserve it by implementation of various Energy conservation measures and ideas to install energy efficient equipments / system.

DESCRIPTION	UNIT	2005-06	2006-07	2007-08
Electrical Energy	Kwh/kwh	0.1066	0.1046	0.0997
Thermal Energy -HSD	Rs/kwh	0.02	0.02	0.01
Thermal Energy - Coal	Rs/kwh	1.11	1.11	1.08
Total manufacturing cost	Rs/kwh	1.53	1.54	1.55
Energy as a % of total cost of production	%	73.75	73.52	70.96



Energy Conservation Team Structure





ENERGY MANAGEMENT POLICY

Renusagar Power Division (Hindalco Industries Limited), Renusagar, Sonebhadra, is committed to demonstrate excellence in Energy Management Performance so as to optimize Energy Consumption on continual basis. To achieve this, we are committed for :-

- **Monitoring and Control of consumption of Energy through effective Energy Management System and periodic Energy Audits.**
- **Continuous Up gradation of process with energy efficient & eco-friendly technology to optimize the energy cost.**
- **Optimize resource conservation particularly Raw Material, Energy, Water, Oil & promote Pollution Prevention.**
- **Promoting & Propagating Energy Awareness amongst all the employees.**
- **Bench marking our performance with the best and endeavoring to be ahead in the world.**
- **Comply with all applicable legislation in letter & spirit.**

We shall make this policy available to all the employees and public

Renusagar
15.02.2007

(JYOTIRMAY BHAUMIK)
JOINT PRESIDENT (POWER)

Energy Conservation Achievements

Major Energy Conservation projects implemented during 2007-08 are as :-

1. Boiler #4 revamped with efficient Tubular Air Pre Heater (TAPH) for improving Boiler Efficiency by 2.0%. Boiler capacity was also enhanced from 275 TPH to 302 TPH to operate with TG #4. Thus additional generation of 6 MW achieved.

Investment : 5487 Rs Lacs
Saving : 149 Rs Lacs
Additional gen. : 50 MU/Year



2. Oxygen Analyzers installed in Boiler # 5 & Spare for optimizing combustion air thereby improving boiler efficiency by 0.4% in each boiler.

Investment : 22.50 Rs Lacs
Saving : 57 Rs Lacs



3. 4 Nos. Variable Frequency Drives (VFDs) Installed ID & PA fans during R&M of Boiler #4, thus reducing the auxiliary consumption by 500 kW

Investment : 250 Rs Lacs
Saving : 73 Rs. Lacs



4. Replaced old inefficient Boiler Feed Pumps of Unit #3&4, reducing auxiliary consumption by 390 kW

Investment : 145 Rs Lacs

Saving : 31 Rs Lacs



5. 10 Sets inefficient Cooling Tower Fan blades made of GRP replaced with energy efficient FRP material blades in TG #9&10, thereby reducing auxiliary consumption by 250 Kw.

Investment : 65 Rs Lacs

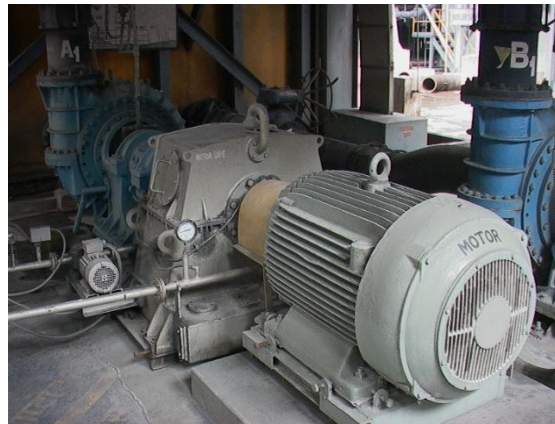
Saving : 20 Rs Lacs



6. V-Belt pulley drive system replaced with fluid coupling in Ash Slurry Pump thus reducing auxiliary consumption by 120 Kw

Investment : 11 Rs Lacs

Saving : 14 Rs Lacs



Energy Conservation Planned & Targets: Some of major energy saving projects planned to be implemented during 2008-09 & 2009-10 are listed below :-

Sl No	Description	Energy value	Saving Rs Lacs	Investment (Rs.Lacs)
1.	Revamping of Boiler #3	42117 mkcal	266*	5487
2.	Installation of VFDs in PA & ID Fans of Boiler #3	41 Lakh kWh	73	250
3.	Use of Thermaact Powder in Boiler #8	19843 mkcal	140	61
4.	Installation of VAM	9.4 Lakh kWh	17	74
5.	Replacement of HPH-2 of TG #1	8182 mkcal	34	109
6.	Erection of raw water header for reducing operation of Ash water pumps	2.4 Lakh kWh	6	19
7.	Replacement of Condensate Extraction Pumps of Unit #3&4.	1.1 Lakh kWh	2	41
8.	Removal of one stage impeller of Condensate Extraction Pump of Unit #9&10	0.8 Lakh kWh	2	Nil (To be done during TG overhauling)
9.	Installation of stream side filter in Cooling Towers	2.5 Lakh kWh	4	14
10.	Installation of DM Water Flow meters	2450 mkcal	9	18
11.	Procurement of dirty pitot tube	2186 mkcal	8	10
12.	Modification of APH of Spare Boiler	52807 mkcal	320	232

* 6 MW additional generation not included in saving

ENVIRONMENT & SAFETY

The company has also established high standards in Safety, OHSAS-18001 & Quality, certified by M/s.DNV. Our company also received various prestigious awards and recognition at National level at various forum like Greentech Awards, Rajiv Gandhi Quality Awards etc.

AIR POLLUTION ABATEMENT

RPD has been very cautious since its inception to control pollution caused in power generation activities. Adequate measures have been taken to control air pollution.

- Stack Emission

In all the boilers including spare latest micro processor controlled and most efficient ESPs having an efficiency of more than 99.85 % are installed to limit the particulate emission within the permissible limit. Online monitoring also installed for close watch on stack emission.

- **Low NOx Burner**

For the control of formation of Nox, low Nox burners have been installed in all the new units. This programme is being extended in old units under revamping.

- **Dust Control Techniques in Coal Handling Plant**

Adequate measures have been taken at Coal Handling Plant to minimize the pollution in coal storage, handling and crushing activities.

Chemjet dust suppression system has been installed in crusher house at all coal transfer points and in the coffin boxes to minimize dust pollution during coal crushing. Each dust suppression system is capable of spraying the minimum essential quantity of moisture mixed with appropriate wetting agents called MST compound to minimize dust.

Air is being sucked at all feed and transfer points at a velocity several times greater than the conveyor speed and is passed through bag filters thereby ensuring that any dust generated is not allowed to escape out of the machine and the coal dust pollution is minimized. This coal dust laden air is passed through bag filters from where clean air is passed through and coal dust is collected and disposed off in coal bonkers.

All bunkers and tunnels are properly ventilated with the help of forced draft air fans.

Apart from above, coal heap is covered by tarpaulin to avoid possibility of blown coal dust. Water sprinklers have also been installed all around the periphery of coal yard to suppress the blown coal dust during storms.

- **Dust Suppression at Ash Pond**

Our ash pond is a submersible type ash pond i.e. more than 80 % of the area always remains wet all the times. The balance area and for roads at ash bund, water sprinkling system has been set up because of which top surface of ash bund remains wet. This prevents the flying of ash and dust thus maintaining the ambient air quality standards well below the prescribed limits.

WATER UTILISATION (ZERO DISCHARGE)

- **Sewerage Treatment Plant**

For treating the entire domestic sewage of plant and colony the sewage treatment plant has been set up in the year 1992 and further upgraded in the year 2002 with the ultimate capacity of 500 m³/ hr. The entire treated water is utilized in developing green cover around the plant and colony. A part of treated water is used for makeup in the cooling towers, which helps in economizing water intake.

- **Effluent Treatment plant**

The discharges from the D M Plant, Boiler blow down, Filter back wash, Coal handling plant area, Floor wash etc. are sent to ETP. The ETP was constructed in the year 1993 and upgraded in the year 2002 with the ultimate treatment capacity of 300 m³/Hr. The treated effluent is sent to emergency reservoir and in turn pumped to the plant for utilization. The sludge so formed is pumped to the slurry sump for final disposal to the ash dyke.

- **Ash Water Recovery Plant**

The ash from the slurry is settled down in the pond and the water is being taken into the Ash Water Recovery Plant through decantation wells. After treatment the entire water is pumped back to the ash plant and is reused. This plant was constructed in the year 2003.

All the plant waste water thus is properly treated and recycled in order to achieve ZERO DISCHARGE and in no case water is discharged out side.

- Noise

There are some equipments which produce noise requiring dampers / acoustic enclosures such as turbo - generators, compressors, F D fans, P A fans, Boiler etc. Suitable noise redundant enclosures have been installed over the turbines and suitable enclosures cabins have been provided for workers in noisy areas. Silencers in P A fans and F D fans of boiler has been installed.

Ear muffs are issued to staff and workmen, who some times have to enter high noisy areas for working in machines. Proper maintenance of all the equipments are regular feature at RPD.

- Ground Water Pollution Control

The main source of ground water contamination is seepage from ash ponds. RPD has taken initiatives in the beginning of construction of ash dyke by laying 500 micron thick LDPE (Low Density Poly Ethylene) film at the bottom and 250 micron thick film on the slopes of the ash pond to prevent ground water contamination.

Apart from above, the entire system operates under close loop cycle for continuous use.

- Solid Waste

At thermal power plants solid waste is generated in the form of ash and sludge.

- Ash Utilization

A) SUPPLY TO CEMENT COMPANIES

Fly ash is collected in the Electrostatic Precipitators hoppers are evacuated into ash silos in dry form. From silo it is being taken by cement plant for making Portland Pozzolana cement. Dry fly ash is available free of cost to nearby cement manufacturers and clay brick manufacturers.

B) BRICK MAKING PLANT

A FAL-G brick making plant has been commissioned by RPD in January 1996 for producing FAL-G bricks with the capacity of producing 10000 bricks per day and 600 blocks per day. Apart from brick/block making value added items like flower pots are also manufactured.

- Sludge

Sludge is mainly generated from raw water treatment plant, effluent treatment plant and sewage treatment plant. Sludge from raw water treatment plant and effluent treatment plant are disposed off in ash pond in the form of slurry and sludge from sewage treatment plant is used as manure for the development of green belt.

Prevention of Fire Incident/Accident

Risk assessment was carried out by TATA AIG. Onsite Emergency Preparedness Plan was also prepared with the help of TATA AIG. Mock drills plan is made in the beginning of the year for identified emergencies. Frequencies of the mock drill of identified emergencies have been decided considering history of incidents, potential hazards and consequences. Follow up drills are conducted after each mock drill for the gaps identified.

Best Safety Practices at Renusagar

1. Safety induction and orientation training to all new employees and contract workmen. Gate pass for the contract workmen is issued after safety training has been imparted and Green Card is issued.

Safety training is imparted to officers & staff at the time of joining during their orientation programme.

Safety training is imparted to all new workmen at the time of their joining in the department.

2. Involvement of all employees in safety promotional activities.
 - Safety Week Celebration
 - Safety Model Competition
 - Safety Shield Competition
 - House Keeping Competition
 - Safety Case Study Competition
 - Safety Quiz Competition
 - Safety Poster Competition
 - First Aiders Competition
 - Safety Play
 - Demonstration on Fire Fighting Equipments
3. Involvement of colony residents and school children in safety promotional activities like - Safety Speech Competition, Safety Poem Competition and Safety Poster Competition
4. Recording and analysis of unsafe practices, unsafe conditions and Nearmiss incidents in each plant.
5. Contractors safety management:
 - A detailed Safety Code of Conduct for Contractors is in place, which is mandatory part of all contract documents to ensure all safety norms at contract sites.
 - Group Risk Assessment of all contract jobs is taken up by concerned department before awarding contract and safety precautions are taken accordingly.
 - Structured Safety Training Programmes are being organized for all Contract Workmen and Staff and also at the site itself by the Safety Personnel/departmental engineers.
 - All contractors are required to get their Tools & Tackles tested by the concerned department before taking to job site.
 - Periodic meetings are organized with Contractors to review the Safety issues of the site.
 - Safety code for Visitors and Transporters are in place and they are allowed in side plant only after briefing of plant layout and safety instructions.
6. Circulation of safety bulletins among employees in Hindi for on the job safety and off the job safety.
7. Surprised Night safety vigilance by Safety Department.

Awards & Recognition

Various recognition systems are in place for involving employees and keeping their morale high for contributing in all spheres of work and life, such as :

Individual Awards / Rewards

- Renupower Ratna Award
- Award for safety suggestion competition, safety speech competition.
- Award for case study competition, Best first aiders competition
- Attendance award
- Security award
- QC Facilitator award
- QC leader of the year
- Trainer of the year
- 25 years service award - Silver plate
- Various awards for game & sports
- At group level - Award for outstanding business leader, Exceptional contributor and young achiever

Team Award / Rewards

- Bhagidari Award
- Award for best safety performance - at department level - Safety Shield
- Award for safety model competition
- Good house keeping competition
- Award for accident free at department level
- QC Award - Best Quality Circle of the company, Best QC of the department (Plant)
- Best Kaizen by WCM Small group
- Sport Reward - Winners of departmental tournaments in Cricket, Volleyball, Basketball, Kabaddi etc.

Some of the prestigious awards at National level in last five years, to its credit are as follows :

- Aditya Birla Planet Award for Excellence in Community Work - 2002
- FICCI Award - 2002 for outstanding achievement in Rural Development
- Asian CSR Award - 2003
- Greentech Safety Gold Award in Occupational Health & Safety - 2004
- Greentech Environment Excellence Silver Award - 2005
- IMC Ram Krishna Bajaj National Quality Award (Commendation Certificate) - 2005
- Rajiv Gandhi National Quality Award (Commendation Certificate) - 2006

- IMC Ram Krishna Bajaj National Quality Award (Certificate of Merit) - 2006
- Greentech Environment Excellence Silver Award - 2007
- IMC Ram Krishna Bajaj National Quality Award (Performance Excellent Special Award) - 2007

Environment clearance

Photocopy of various clearances are also enclosed for ready reference:

- Bio medical waste Management obtained on 01.04.2007 from UPPCB : Ref G01176/BM-80/2007-08/8
- MOEF clearance obtained on 28.11.2001 for capacity enhancement from 581.7 MW to 741.7 MW : Ref. J.13012/23/98-IA.II(T)
- UPPCB clearance obtained on 22.03.2001 for capacity enhancement from 581.7 MW to 741.7 MW : Ref. G.19804/C-2/N.O.C./3227/2001
- Water Consent obtained on 18.03.2008 from UPPCB (Being issued every year. The current consent is enclosed) : Ref.F.30090/C-2/Shahmati Jal 861/2008
- Air Consent obtained on 18.03.2008 from UPPCB (Being issued every year. The current consent is enclosed) : Ref.F.30089/C-2/Vayu Pradushan/370/2008