

Environment management

[Environment](#), [Ecology](#)



Environment Policy & Environment Management System Driven by Its commitment for sustainable growth of power, NNTP has evolved a well defined environment management policy and sound environment practices for maligning environmental impact arising out of setting up of power plants and preserving the natural ecology. National Environment Policy: At the national level, the Ministry of Environment and Forests had prepared a draft Environment Policy (NEAP) and the Ministry of Power along with NNTP actively participated in the deliberations of the draft NEAP. The NEAP 2006 has since been approved by the Union Cabinet In May 2006.

NNTP Environment Policy: As early as In November 1995, NNTP brought out a comprehensive document entitled " NNTP Environment Policy and Environment Management System". Amongst the guiding principles adopted in the document are company's proactive approach to environment, optimum utilization of equipment, adoption of latest technologies and continual environment improvement. The policy also envisages efficient utilization of resources, thereby minimizing waste, maximizing ash utilization and providing green belt all around the plant for maintaining ecological balance.

Environment Management, Occupational Health and Safety Systems: NNTP has actively gone for adoption of best international practices on environment, occupational health and safety areas. The organization has pursued the Environmental Management System (EMUS) ISO 14001 and the Occupational Health and Safety Assessment System SHOOS 18001 at its deferent establishments. As a result of pursuing these practices, all NNTP

power stations have been certified for ISO 14001 & SHOOS 18001 by reputed national and International Certifying Agencies.

Pollution Control Systems While deciding the appropriate technology for its projects, NNTP integrates many environmental provisions into the plant design. In order to ensure that NNTP comply with all the stipulated environment norms, various state-of-the-art pollution control systems / devices as discussed below have been installed to control air and water pollution. **Electrostatic Precipitation:** The ash left behind after combustion of coal is arrested in high efficiency Electrostatic Precipitation (Esp.) and particulate emission is controlled well within the stipulated norms.

The ash collected in the Esp. is disposed to Ash Ponds in slurry form. **Flue Gas Stacks:** Tall Flue Gas Stacks have been provided for wide dispersion of the gaseous emissions (SOX, KNOX etc) into the atmosphere. **LOW-KNOX Burners:** In gas based NNTP power stations, Knox emissions are controlled by provision of Low-Knox Burners (dry or wet type) and in coal fired stations, by adopting best combustion practices. **Naturalization Pits:** correction of the effluents before discharge into Effluent Treatment Plant (DEPT) for further treatment and use.

Coal Settling Pits / Oil Settling Pits: In these Pits, coal dust and oil are removed from the effluents emanating from the Coal Handling Plant (CHIP), coal yard and Fuel Oil Handling areas before discharge into DEPT. **DE & ADS Systems:** Dust Extraction (DE) and Dust Suppression (ADS) systems have been installed in all AOl fired power stations in NNTP to contain and extract the fugitive dust released in the Coal Handling Plant (CHIP). **Cooling Towers:**

Cooling Towers have been provided for cooling the hot Condenser cooling water in closed cycle Condenser Cooling Water (OCW) Systems.

This helps in reduction in thermal pollution and conservation of fresh water.

Ash Dyke's & Ash Disposal Systems: Ash ponds have been provided at all coal based stations except Adair where Dry Ash Disposal System has been provided. Ash Ponds have been divided into lagoons and provided with garlanding arrangements for change over of the ash slurry feed points for even filling of the pond and for effective settlement of the ash particles. Ash in slurry form is discharged into the lagoons where ash particles get settled from the slurry and clear effluent water is discharged from the ash pond.

The discharged effluents conform to standards specified by CB and the same is regularly monitored. At its Adair Power Station, NNTP has set up a unique system for dry ash collection and disposal facility with Ash Mound formation. This has been envisaged for the first time in Asia which as resulted in progressive development of green belt besides far less requirement of land and less water requirement as compared to the wet ash disposal system. **Ash Water Recycling System:** Further, in a number of NNTP stations, as a proactive measure, Ash Water Recycling System (EARS) has been provided.

In the EARS, the effluent from ash pond is circulated back to the station for further ash sluicing to the ash pond. This helps in savings of fresh water requirements for transportation of ash from the plant. The ash water recycling system has already been installed and is in operation at Ramadan, Similar, Errand, Tattler Kantian, Tattler Thermal, Gallon, CORBA and

Vindicating. The scheme has helped stations to save huge quantity of fresh water required as make-up water for disposal of ash.

Dry Ash Extraction System (DATES): Dry ash has much higher utilization potential in ash based products (such as bricks, aerated autoclaves concrete blocks, concrete, Portland poignant cement, etc.). DATES has been installed at Unchain, Adair, Similar, Ramadan, Singulars, Gallon, Freak, Tattler Thermal, CORBA, Vindicating, Tattler Kantian and BETS. Liquid Waste Treatment Plants & Management System: The objective of industrial liquid effluent treatment plant (DEPT) is to discharge lesser and cleaner effluent from the power plants to meet environmental regulations.

After primary treatment at the source of their generation, the effluents are sent to the DEPT for further treatment. The composite liquid effluent treatment plant has been designed to treat all liquid effluents which originate within the power station e. G. Water Treatment Plant (WET), Condensate Polishing Unit (COP') effluent, Coal Handling Plant (CHIP) effluent, floor washings, service water drains etc. The scheme involves collection of various effluents and their appropriate treatment centrally and re- circulation of the treated effluent for various plant uses.

Ramadan, Similar, Kampala, Singulars, Errand, Vindicating, CORBA, Johann Kandahar, Abridged, Freak, Gallon and Tattler Kantian. These plants have helped to control quality and quantity of the effluents discharged from the stations. Sewage Treatment Plants & Facilities: Sewage Treatment Plants (Steps) sewage treatment facilities have been provided at all NNTP stations to take care of Sewage Effluent from Plant and township areas.

In a number of NNTP projects modern type Steps with Clarifications, Mechanical Agitators, sludge drying beds, Gas Collection Chambers etc have been provided to improve the effluent quality. The effluent quality is monitored regularly and treated effluent conforming to the prescribed limit is discharged from the station. At several stations, treated effluents of Steps are being used for horticulture purpose. Environmental Institutional Set-up

Realizing the importance of protection of the environment with speedy development of the power sector, the company has constituted different groups at project, regional and

Corporate Centre level to carry out specific environment related functions. The Environment Management Group, Ash Utilization Group and Centre for Power Efficiency & Environment Protection (CANTEEN) function from the Corporate Centre and initiate measures to mitigate the impact of power project implementation on the environment and preserve ecology in the vicinity of the projects. Environment Management and Ash Utilization Groups established at each station, look after various environmental issues of the individual station.

Environment Management During Operation Phase Antic's environment friendly approach to power has already gone to show results in conservation of natural resources such as water and fuel (coal, oil & gas) as well as control of environmental pollution. As already mentioned earlier, NNTP has chalked out a set of well defined activities that are envisaged right from the project conceptualization stage so that during the entire life cycle of the power plant, NNTP is fully compliant with various environment regulations and a

pristine environment and ecological balance is maintained in and around its power station and townships.

Following is brief description of some of the measures taken during the operation phase of the stations. Performance enhancement and up-gradation measures are undertaken by the organization during the post operational stage of the stations. These activities have greatly helped to minimize the impact on environment and preserve the ecology in and around its power projects. These measures have been enumerated as follows.

Monitoring of Environmental Parameters: A broad based Environment Monitoring Programme has been formulated and implemented in NNTP.

All pollutants discharged from the power plant such as stack emission, ash pond effluent, main Line effluent, domestic effluent and Condenser Cooling Water (OCW) effluent are monitored at the stipulated frequency at the source itself and at the points of discharge. In addition to the above, ambient air, surface water and ground water quality in and around NNTP plants are regularly monitored to assess any adverse impacts as a result of operation of the power plant.

On-Line Data Base Management: In order to have better control on pollution and to achieve effective environment and efficient environment information system on the plant operational and environmental performance parameters at all three levels i.e. Generating Stations, Regional Headquarters and Corporate Centre. In consideration of the above, a computerized programme, namely " Paraguayan Monitoring System" - MS, which could

provide reliable storage, prompt and accurate flow of information on environmental performance of Stations was developed and installed in NNTP.

This software facilitates direct transfer of environment reports and other environment related information from stations to the Regional Headquarters and Corporate Centre. The MS has already been implemented at Corporate Centre, the Regional Headquarters and most of the Stations. This system has helped in achieving continuous improvement in Antic's environment performance through improved monitoring and reporting system by using the trend analysis and advanced data management techniques.

Environment Reviews: To maintain constant vigil on environmental compliance, Environmental Reviews are carried out at all operating stations and remedial measures have been taken wherever necessary. As a feedback and follow-up of these Environmental Reviews, a number of retrofit and up-gradation measures have been undertaken at different stations. Such periodic Environmental Reviews and extensive monitoring of the facilities carried out at all stations have helped in compliance with the environmental norms and timely renewal of the Air and Water Consents.

Upgrading & Retrofitting of Pollution Control Systems: In order to keep pace with the changing norms and ensure compliance with statutory requirements in the field of pollution control, NNTP keeps an open mind for Renovation and Modernization (R & M) and Retrofitting and Upgrading of pollution monitoring and control facilities in its existing stations. It is important to mention that such edification/retrofit programs not only helped in betterment of environment but also in resource conservation.

High efficiency Electro-static Precipitation (Esp.) of the order of 99.5% and above have been provided at NNTP stations for control of stack particulate emissions. However, the Esp. of a number of stations were built prior to the promulgation of the Environment (Protection) Act, 1986 and notification of emission control standards under this Act. Remedial measures have already been taken up and implemented to improve the efficiency of the existing Esp. at various NNTP stations.

ESP. performance enhancement programmer by adopting advanced microprocessor based Electrostatic Precipitated Management System (MOMS) was installed at its power stations at Singurs, Ramadan, CORBA, Freak, Errand, Vindicating and Unchain. Additional Esp. were retrofitted in the older power stations, namely at Updater and Tattler Thermal. As a result of the above retrofits, the emission of Suspended Particulate Matter (SUM) has been brought down appreciably at the above stations and is maintained within the present statutory limit of 150 MGM/NM.

In new projects, the Esp. have been designed for a maximum remissive outlet dust emission of 50 MGM/NM to meet the likely stringent emission norms in the near future. Resources Conservation With better awareness and appreciation towards ecology and environment, the organization is continually reduce wastes. Some of the measures include. ; Reduction in land requirements for main plant and ash disposal areas in newer units. Capacity addition in old plants, within existing land. Reduction in water requirement for main plant and ash disposal areas through recycle and reuse of water.

Efficient use of Fuel (Coal, Natural gas and Fuel oil) and Reduction in fuel requirement through more efficient combustion and adoption of state-of-the-art technologies such as super critical boilers

Waste Management Various types of wastes such as Municipal or domestic wastes, hazardous wastes, Bio-Medical wastes get generated in power plant areas, plant hospital and the townships of projects. The wastes generated are a number of solid and hazardous wastes like used oils & waste oils, grease, lead acid batteries, other lead bearing wastes (such as garrets etc. , oil & clarifier sludge, used resin, used photochemical, asbestos packing, e-waste, metal scrap, wastes, electrical scrap, empty cylinders (refillable), paper, rubber products, canteen (bio-degradable) wastes, budding material wastes, silica gel, glass wool, fused lamps & tubes, fire resistant fluids etc. These wastes fall either under hazardous wastes category or non-hazardous wastes category as per classification given in Government of India's notification on Hazardous Wastes (Management and Handling) Rules 1989 (as amended on 06. 1. 2000 & 20. 05. 2003). Handling and management of these wastes in NNTP stations have been discussed below.

Municipal Waste Management: Domestic or municipal waste is generated in households at townships. This waste is segregated into bio-degradable and nonprogrammable wastes at source itself in different colored containers and thereafter the two types are disposed separately. Bio- degradable waste is spread uniformly in identified low lying areas and thereafter it is covered with soil for use later as manure after composting.

The segregated non bio- degradable waste is disposed off separately in other identified low lying areas and is spread out uniformly. **Hazardous Waste**

Management: NNTP being a proactive organization, the handling and disposal of hazardous wastes are done as per the Hazardous Wastes (Management & Handling) Rules 1989 (as amended in 2003) guidelines issued by Government of India for the treatment, storage and disposal of hazardous wastes. Scientific study on management and handling of hazardous wastes was carried out at a few NNTP stations to adopt the best practices so that there is a complete compliance with statutory requirements.

In NNTP stations, the Hazardous Wastes (Recyclable) are sold / auctioned to registered recyclers / refiners. The other hazardous wastes such as the activated carbon resins, used drums hazardous) chromium (Cry-all electrolytes, used petrol-chemicals, asbestos packing, used torch batteries, ribbon, toners / cartridges, mixed wastes (waste oil, water & cotton) filters, earth contaminated with synthetic oil (FAQ) glass used & sodium silicate, lamps & tubes etc. Fall under the category of Hazardous Wastes (Non-Recyclable).

These wastes are small in quantity and are stored in properly identified locations. As per the notification, hazardous wastes (non-recyclable) are to be sent to State Pollution Control Board (SPEC) approved common treatment storage and sates get generated from hospitals and they include urine bags, human anatomical wastes, plaster of Paris waste, empty plastic bottles of water & glucose, blood & chemical mixed cotton, blood & urines tubes etc. These wastes are segregated and are placed in buckets of different colors as per the notification for Bio-Medical Waste (Management & Handling) Rules.

The segregated bio-medical wastes are either disposed through the SPEC approved agency or they are treated in autoclaves before disposal into bio-medical waste disposal pits. The treated bio-medical waste is spread uniformly and covered with 10 CM thick soil in bio-medical waste disposal pits. Land Use / Bio- diversity As a policy, NNTP lays special emphasis on land use and Bio-diversity by way of development of green belts, energy plantations, reclamation of abandoned Ash Ponds and EIA and ecological monitoring in the project areas and its surroundings.

Reclamation of Abandoned Ash ponds: The reclamation of abandoned ash pond sites is a challenging task. NNTP has reclaimed temporary ash disposal areas at some of its projects namely Ramadan, Tattler Thermal, Errand, Singlars and Unchain wrought plantation and converted these sites into lush green environments. Extensive plantations have also been undertaken on dry ash mound at NNTP-Adair. It is planned to reclaim all the abandoned ash disposal areas by plantation.

Green Belts, Forestation & Energy Plantations: What's more, in a concerted bid to counter the growing ecological threat, NNTP is undertaking forestation programmer covering vast areas of land in and around its projects.

Appropriate forestation programmer for plant, township and green belt areas of the project have been implemented at all projects. In order to enhance green cover in the areas around our projects, as a responsible corporate citizen, NNTP till date has planted more than 18 million trees at its projects throughout the country.

The forestation has not only contributed to the aesthetics but also has been serving as a 'sink' for the pollutants released from the station and thereby protecting the quality of ecology and environment in and around the projects. Thrust has also been given to bio-diesel plantation and around 4.8 lakh energy plants including Panorama and Catastrophe have already been planted. A pilot project for extraction of seeds from these bio-diesel plants has also been set up.

Ecological Monitoring & Scientific Studies NNTP has been a leader in the industrial sector of India in undertaking scientific studies related to thermal power generation. NNTP has pioneered several scientific studies in collaboration with national/ international institutions to develop an environmental databanks e. G. Detailed Astrologically Studies to understand the impact of ash pond lactate on ground water and Ecological Impacts Monitoring through Remote Sensing Data have been carried out at its operating stations as issued below.

Environment Impact Assessment Studies: Environmental Impact Assessment (EIA) Studies are inevitably undertaken to evaluate potential negative impacts as well as to formulate Environmental Management Plans to overcome the identified impacts. Based on the recommendations of Environmental Impact Assessment Study and Environmental Management Plan (MEME) and the conditions Pollution Control Boards, These studies consists of impact assessment in the area of the land use, water use, socio-economic aspects, soil, hydrology, water quality, meteorology, air quality, terrestrial and aquatic ecology and noise.

These studies are conducted before starting the construction as well as after operation of the plant and gives comprehensive status of the environment as existed before construction as well as in the post operational stages of the project. The EIA involves stage-by-stage evaluation of various parameters which affect the environment. Based on EIA study, wherever required, specific scientific studies are also conducted to scientifically assess the likely impact of the pollutants on the sensitive flora and fauna in the surroundings, as also, to take preventive and mitigation measures, wherever required.

Apart from project specific EIA studies, Regional Environmental Assessment studies have been conducted for Integrated Development of Singurs, CORBA and Ramadan areas. Such studies are of first of their kind in India and probably very few such studies have been undertaken in other countries. Socio-economic Studies: Detailed socio-economic studies are undertaken to establish the socio-economic status of project affected persons and rehabilitation and resettlement plans are drawn in consultation with the state government.

Rehabilitation and resettlement options include land for land (subject to availability), limited Jobs with NNTP and annotators and self employment schemes. In addition, NNTP also undertakes community development activities in the surrounding villages. Ecological Monitoring Programmer: NNTP has undertaken a comprehensive Ecological Monitoring Programmer through Satellite Imagery Studies covering an area of about 25 SMS radius around some of its major plants. The studies have been conducted through

National Remote Sensing Agency (MRS.), Hydrated at its power stations at Ramadan, Freak, CORBA, Vindicating, Errand and Singulars.

These studies have revealed significant environmental gains in the vicinity areas of the reject as a result of pursuing sound environment management practices. Some of these important gains which have been noticed are increase in dense forest area, increase in agriculture area, increase in average rainfall, decrease in waste land etc. In general, the studies, as such, have revealed that there is no significant adverse impact on the ecology due to the project activities in any of these stations.

Such studies conducted from time to time around a power project have established comprehensive environment status at various post operational stages of the project. Geo-hydrological Studies: NNTP has conducted several astrologically studies of the ash disposal areas at its projects (Singulars, Errand, Vindicating, CORBA, Freak and Tattler) through reputed institutions like Indian Institutes of Technology, Roorkee; Indian Institutes of Technology, IIT Bombay, Centre for Studies on Man and Environment, Calcutta. All these studies conclude that the leaching of heavy metals from ash occurs only under pH 4 or below.

In practice, the pH of the ash water is either neutral or alkaline (7 or above) and hence the leaching of heavy metals is highly unlikely. Use of Waste Products & Services -Ash Utilization Ash is the main solid waste which is put into use for various products and services. NNTP has adopted user friendly policy guidelines on ash utilization. In order to motivate facilities and

incentives. These include free issue of all types of ash viz. Dry Fly Ash / Pond Ash / Bottom Ash and infrastructure facilities, wherever feasible.

Necessary help and assistance is also offered to facilitate procurement of land, supply of electricity etc from Government Authorities. Necessary techno-managerial assistance is given wherever considered necessary. Besides, NNTP uses only ash based bricks and Fly Ash Portland pozzolanic cement (APPC) in most of its construction activities. Demonstration projects are taken up in areas of Agriculture, Building materials, Mine filling etc. The utilization of ash and ash based products is progressively increasing as a result of the concrete efforts of these groups.

Advanced / CEO-friendly Technologies NNTP has gained expertise in operation and management of 200 MM and 500 MM Units installed at different Stations all over the country and is looking ahead for higher capacity Unit sizes with super critical steam parameters for higher efficiencies and for associated environmental gains. At Spat, higher capacity Units of size of 660 MM and advanced Steam Generators employing super critical steam parameters have already been implemented as a green field project.

Higher efficiency Combined Cycle Gas Power Plants are already under operation at all gas-based power projects in NNTP. Advanced clean coal technologies such as Integrated Gasification Combined Cycle (IGCC) have higher efficiencies of the order of 45% as compared to about 38% for conventional plants. NNTP has initiated a techno-economic study under SOUSED / SAID for setting up a commercial scale demonstration power plant

by using ICC technology. These plants can use low grade coals and have higher efficiency as compared to conventional plants.