

i) Unit Profile

National Fertilizers Limited (NFL) was incorporated on August 23, 1974 by setting up two identical large capacity Fuel Oil based fertilizer plants – one each at Bathinda in the State of Punjab and at Panipat in Haryana. The installed capacity of the plant is 900 MT per day of Ammonia and 1550 MT per day of Urea. Bathinda plant was commissioned and started its commercial production on October 1, 1979. On re-organization of Fertilizer Corporation of India (FCI) and NFL, Nangal Unit of FCI was taken over by NFL on 01.04.1978.

National Fertilizers Limited, Bathinda Unit is on the anvil of sustained growth in the years ahead.

ii) Energy Consumption

Includes information on total energy consumption (i.e. coal, oil, gas, electricity and money value). Information on energy consumption in terms of percentage of manufacturing cost should also be presented. Also it should highlight the specific energy consumption for the period 2001-02, 2002-03 & 2003-04. Good Computer Graphic Presentation related to Specific Energy Consumption may also be incorporated.

LSHS or Fuel Oil is used as Feed Stock in Ammonia Plant and Coal alongwith fuel oil (as support oil) is consumed in Steam Generation Plant and in boiler for Captive Power Generation. In addition to captive power generation, NFL imports electricity from Punjab State Electricity Board to meet its power requirements. In the year 2003-2004, NFL consumed 39078 MT of LSHS/F.O. as Boiler Support Oil, 569857 MT of coal as Boiler Fuel and 312.32 Lac KWH of purchased electricity. The cost of Electricity consumed was Rs. 83.72 crores. Specific Energy Cons. of 9.720 MKCal/ MT of Urea was attained in 2003 – 2004 as compared to 10.248 MKCal/ MT in 2002-03.

Year	Sp. Energy Consumption		Energy Cost as % of manufacturing Cost.
	KWH/ MT	MKCal/ MT	%
2001-2002	-	10.615	78.97
2002-2003	-	10.247	83.03
2003-2004	-	9.720	87.57

iii) Energy Conservation Commitment, Policy and Organization Set up --
(Please include a photocopy of unit's Energy Conservation Policy, if decided)

iv) Energy Conservation Achievements

Include one paragraph write-up on each major energy conservation project implemented during the year 2003-04 only.

NFL continues to strive for excellence and gives utmost importance to energy conservation by regular monitoring, analyzing and optimizing plant operations and upkeep of plant and machinery.

NFL has a full-fledged department in the Unit committed to Energy Conservation headed by DGM(TS) reporting to CGM. A group of Engineers working in the department coordinate all matters relating to energy conservation.

- 1) In Gasification Section of Ammonia Plant the steam condensate at 40 K coming from Oil and Oxygen Pre-heaters was being routed to the Flash Drum operating at 9K pressure. The heat of the condensate at the outlet of Flash Drum was being removed by Cooling Water, which has now been utilized in the Deaerator. This has resulted in saving of about 2 MT/hr of 100K steam equivalent to about 0.025 MKCal/ MT of Urea.
- 2) In Gasification Section of Ammonia Plant After Cooler was provided at the discharge end of Oxygen Compressor for pre cooling of compressed Oxygen before it is supplied to Gasification Section where it is again preheated in Oxygen pre heaters before it is fed to Gasifiers. The After Cooler of the Oxygen Compressor has been by-passed to supply hot oxygen to Gasification Section. This has resulted in saving of about 0.015 MKCal/ MT of Urea in terms of reduction in 40K steam.

v) Energy Conservation Plans and Targets

Year	Total (Mkcal/MT Urea)
2003-04	9.72
2004-05	9.70
2005-06	9.70

vi) Environment and Safety

National Fertilizers Limited, Bathinda (A Govt. of India Undertaking), an ISO-9001: 2000, ISO-14001 & OHSAS-18001 company, is meeting all statutory requirements pertaining to Safety, Health , Environment and Pollution Control.

BRIEF PROCESS DESCRIPTION

AMMONIA PLANT

Ammonia is the key intermediate product for manufacture of urea. Ammonia plant was supplied by Toyo Engg. Japan to produce 900 Tc/day of Ammonia based on partial oxidation of Residual fuel oil/LSHS by SHELL GASIFICATION process. The plant is laid out in single stream except for the three gasification units. The raw synthesis gas from the gasifier is further processed for H₂S removal by low temperature RECTISOL PROCESS and then sent to CO shift section to convert CO to H₂ and CO₂. The process gas is then fed to CO₂ removal section where CO₂ is removed by low temp. Rectisol process. The decarbonated gas is sent to Nitrogen wash unit for final purification by scrubbing with liquid nitrogen at (-) 190 DEG C & 37 kg/cm²g pressure. After final purification in nitrogen wash unit, Hydrogen and Nitrogen ratio in synthesis gas is maintained @ 3:1 and is compressed to 190 kg/cm²g and ammonia synthesis is carried out in HALDOR TOPSOE Loop employing radial flow converter. The oxygen requirement for partial oxidation in gasification process, nitrogen requirement for synthesis gas and utility nitrogen, liquid nitrogen for nitrogen wash unit are produced in an air separation unit having a capacity to process 140000 Nm³/hr. of feed air.

UREA PLANT

Urea plant is designed to produce 1550 TPD urea based on MITSUI TOATSU TOTAL RECYCLE C IMPROVED PROCESS. Ammonia and CO₂, the raw material for manufacturing urea are received from Ammonia Plant and are compressed to a pressure of 250 kg/cm² and is fed to the reactor operating at a pressure of 230 kg/cm² and 200 deg.C. The reactants are partially converted into urea and the solution at the exit of reactor contains about 30% urea. The unconverted ammonia and CO₂ are recovered in three stages and recycled back to Reactor. The solution at the end of 3rd stage contains about 70% urea solution and fed to the Crystallizer where solution is concentrated under vacuum and urea is crystallized. Urea crystals are separated in the centrifuges and conveyed to the top of Prilling Tower through the pneumatic duct. The crystals are melted by indirect heating with steam & molten urea is sprayed through Acoustic Granulators in Prilling Tower where it is cooled by air during its fall and further cooled on the fluidized bed at the bottom of Prilling Tower. Urea from Urea plant is conveyed through a set of conveyors to Bagging Plant for storage/dispatch.

SULPHUR RECOVERY PLANT

Sulphur is obtained as byproduct from the hydrogen sulphide bearing Claus gas from Rectisol section of Ammonia Plant. Sulphur Recovery plant serves dual purpose i.e. obtaining a useful product and at the same; time combating pollution. Sulphur recovery plant has a designed capacity of 26.5 TPD and employs claus process. Recovery is affected in a two stage catalytic reactor.

STEAM GENERATION PLANT

To meet the requirement of process steam, 3 nos. of boilers at a capacity of 150x3 Te hr. have been installed. The boilers generate super heated steam at 106 kg cm² pr. And 495 C temp. The primary fuel used to produce steam is pulverized coal. Fuel oil is used as support oil.

OFF SITES AND UTILITIES

To meet the off-sites and Utilities requirement of the plant, 4 nos. of Instt. Air Compressors at a capacity of 1400 NM³/hr (Each) have been installed. Besides this, a Service Air Compressor at a capacity of 1400 NM³/hr has also been installed. Two booster compressor each of 2000NM³\hr capacity were also installed.

To meet the boiler feed water requirement, DM plant at a capacity of 450 M³ hr has been installed. At the time of installation of CPP, another train of DM Plant at a capacity of 150 M³/hr has been installed.

CAPTIVE POWER PLANT

To meet the power requirement, Captive Power Plant at a capacity of 2x15 MW was installed in 1988. To meet the steam requirement for the Turbo Generators, a boiler at a capacity of 230 MT/ Hr. was also installed. The boiler fulfils the entire requirement of the steam for the turbo generator and additional steam is supplied to the Fertilizer Unit.

EFFLUENT TREATMENT PLANT

The unit is facilitated with modern type of effluent treatment plant; where the ammonia and urea borne liquid effluent as well as sewerage generated in the Township and Factory is treated through Micro Biological Process. The outlet water from the effluent treatment plant meets the MINAS norms,

Sulphuric acid is used for regeneration of the Cation units (DM Plant) used for demineralising of the water for use as Polish water, which is ultimately used for the production of Steam in the boilers. The steam is used as process steam for manufacture of urea.

BATHINDA PROJECT BLOCK DIAGRAM

