Gujarat Narmada Valley Fertilizers Company Ltd. (GNFC), is a joint sector enterprise promoted by the Government of Gujarat and the Gujarat State Fertilizer Company Ltd.(GSFC). It was set up in Bharuch, Gujarat in 1976. Located at Bharuch in an extremely prosperous industrial belt, GNFC draws on the resources of the natural wealth of the land as well as the industrially rich reserves of the area.

GNFC started its manufacturing and marketing operations by setting up in 1982, one of the world's largest single-stream ammonia-urea fertilizer complexes. Over the next few years, GNFC successfully commissioned different projects - in fields as diverse as chemicals, fertilizers and electronics.

Since inception, GNFC has worked towards an extensive growth as a corporation. A growth which respects the environment and springs from the progressive vision of GNFC.

GNFC today has extended its profile much beyond fertilizers through a process of horizontal integration. Chemicals/Petrochemicals, Energy Sector, Electronics/Telecommunications and Information Technology form ambitious and challenging additions to its corporate portfolio. GNFC has an enterprising, strategic view towards expansion and diversification

The subsidiary company Narmada Chematur Petrochemicals Ltd. (NCPL) which is producing Aniline and TDI was merged into the parent company GNFC Ltd. With effect from 15th Feb., 2007.

Details of various products manufactured by GNFC are as per adjoining table.

Products:

Plant	Installed Capacity	Units	Technical Collaborator
Ammonia	445,500	MT/Year	Air separation, Rectisol and Nitrogen wash units as well as total engineering of the integrated plant - Linde AG, Germany - Fuel Oil Gasification - Texaco, USA - CO Shift Conversion-BASF, Germany. - Ammonia Synthesis - Haldor Topsoe, Denmark.
Urea	643,500	MT/Year	Snamprogetti, Italy
Ammonium Nitrophosphate	142,500	MT/Year	BASF - Germany
Calcium-Ammonium Nitrate	142,500	MT/Year	UHDE, Germany
Methanol-I	50,000	MT/Year	ICI, UK & Linde AG, Germany
Formic Acid	10,000	MT/Year	Kemira OY, Finland
Methanol-II	100,000	MT/Year	ICI, UK & Toyo Engg., Japan
Methanol Synthsis Unit	30,800	MT/Year	ICI, UK & Toyo Engg., Japan
Weak Nitric Acid	247,500	MT/Year	UHDE, Germany
Concentrated-Nitric Acid I & II	66,000	MT/Year	Plinke, Germany
Acetic Acid	100,000	MT/Year	BP Chemicals, UK
Synthesis Gas Generation Unit	216	Million NM3 per annum	Jacob, UK and H & G
Captive Power Plant I & II	50	MWH	BHEL, India
Nitrobenzene	47,250	MT/Year	Chematur Engineering AB, Sweden
Aniline	35,000	MT/Year	Chematur Engineering AB, Sweden
Toluene Di-isocynate	14,000	MT/Year	Chematur Engineering AB, Sweden
Di Nitro Toluene	18,356	MT/Year	Chematur Engineering AB, Sweden
Meta Toluene Di-amine	11,804	MT/Year	Chematur Engineering AB, Sweden
CPP (Gas Turbine)	7.6	MWe (at ISO)	Alstom (Siemens) - UK

(ii) Energy Consumption :-

We have 4 nos. of boilers each is having capacity of 180 MT/hr and operates on coal, lignite, LSHS, natural gas and HSD. High pressure superheated steam is used for captive power generation at Fertilizer complex, whereas NG is used in Gas Turbine at Aniline TDI complex. In the year 2006-2007, 599112 MT of coal, (281124 Imported + 317988 Indigenous), 3604.88 MT LSHS, 7,72,05,511 SM^3 of natural gas was consumed as fuel in Boilers, 13260943 SM^3 of natural gas was consumed by gas turbine and 13459.41 lakhs kwh of purchased electricity was used. The cost of electrical energy during the year was Rs. 13438.56 lakhs and cost of fuel was Rs. 98887 lakhs. The increase in Energy cost is mainly due to increase in input cost and higher production levels.

The total turn over of the Company during the year 2006-2007 was Rs.2956.67 crores which is ever highest turn over so far and realised a net profit of Rs. 294.72 crores.

The Specific energy of Products at the respective Plant Battery limits for the years 2004-2005, 2005-2006, and 2006-2007 is as under :

The increase in specific energy for the year Fy 2006-2007 is mainly due to loss of production in Ammonia plant because of higher number of plant stoppges on account of technical problems faced mainly in ammonia plant during the year.

Battery Limit Sp. Energy Consumption of plants

Product	04-05 kWh/ ton	05-06 kWh/ ton	06-07 kWh/ ton	04-05 Mkcal/ ton	05-06 MKcal/ton	06-07 MKcal/T on
Ammonia	293.19	292.41	318.25	10.82	10.59	10.88
Urea	56.35	58.33	57.95	7.56	7.45	7.65
Meth-I	16.58	16.50	15.62	8.16	8.27	8.71
Meth-II	163.28	162.94	152.33	8.36	8.21	8.32
MSU	-	-	35.26	-	-	9.23
Methyl Fromet	-	509.62	497.49	-	6.26	6.66
Formic acid	759.02	201.74	208.04	6.44	8.75	8.97
Acetic acid	161.39	162.50	168.65	7.17	7.03	7.29
WNA	30.93	27.93	28.90	2.87	2.80	2.88
CNA-I	77.38	84.23	83.08	3.97	3.90	3.94
CNA-II	70.08	68.35	70.76	3.89	3.75	3.82
ANP	141.07	140.35	137.84	3.36	3.43	3.56
CAN	39.53	42.89	43.92	4.15	4.07	4.19
Aniline**	-	-	59.81	-	-	5.94
TDI**	-	-	1294.58	-	-	15.13

Note: Specific energy is calculated using NCV value of Fuels

** Aniline / TDI Products got added to GNFC's product list subsequent to amalgamation of NCPL with GNFC in Feb-2007

(iii) Energy Conservation committment, Policy & Organizational Set up :

At GNFC, we have a systematic energy conservation programme which not only reduces the energy consumption of various raw materials and utilities, but also continuously monitors and tracks hidden losses.

All efforts are put to minimise leakages of costly raw materials, utilities like power, boiler feed water, DM water, steam, plant air and instrument air, nitrogen etc. Possible leakages are attended immediately. Insulation survey, steam trap survey and lubricating oil survey/ monitoring are conducted regularly to control losses. Till date, Energy Audits with the help of outside consultant have been carried twice.

Conservation of energy has become a way of life among all employees of GNFC. The suggestion scheme is being operated which is designed so as to foster innovative and creative culture in the company, wherein employees are given cash award to the maximum limit of Rs. 51,001/- on 26th January & 15th August by Managing Director and Certificate.

The six approaches adopted towards energy conservation are :(1) Reliability building measures (2) Minor modification schemes (3) Operational changes (4) Integrated approach (5) On-line maintenance techniques (6) Savings in Electrical power by proper analysis.

At GNFC, energy conservation is the result of reliability improvement and integrated approach. Specific consumption of raw materials and utilities are monitored on daily, weekly, monthly and yearly basis against specified norms fixed by management. In this year and subsequently, all attempts were made at all levels to stick to the specific consumption norms in spite of plant outages due to technological challenges (Fuel Oil based partial oxidation). The specific energy will reduce if the plants are running continuously without interruption. This avoids frequent start / up shut down which consume lot of energy

without production. Close monitoring is done with the aid of computer, which has made the Energy Management Programme a success.

Improving reliability is a continuous process at GNFC. Significant number of modifications have helped in improving the reliability and continuity of the plants. Moreover, these achievements have been recognised at the national level. The various Awards won by GNFC for energy conservation are listed below :

Year	Award	Prize
1990	Ministry of Power, G.O.I.	Second.
1992	Gujarat Electricity Board	Certificate of Appriciation in Energy Conservation
1992-93	International Greenland Society	For Effective Implementation of Energy Conservation Measures
1993-94	Ministry of Power, G.O.I.	Commendation Certificate.
1995-96	Ministry of Power, G.O.I.	First.
1996-97	Ministry of Power, G.O.I.	Second.
1997-98	Ministry of Power, G.O.I.	Certificate of Merit.
1998-99	Federation of Gujarat Industries	Award for Excellence in Energy Conservation

(iv) Energy conservation Achievements :

This portion should include one paragraph write-up on each major energy conservation project implemented during the year 2006-2007.

1. Generation of Low Pressure steam (4.5 barg) from Medium Pressure condensate (15 barg) :

   In ammonia plant, Oxygen heater E202, MP -II steam condensate (15 barg) was directly connected to LP condensate system. Under this scheme, MP-II condensate was hooked up with the existing flash vessel in order to generate LP saturated steam (4.5 barg). This scheme was implemented in April-2006 shut down and resulted in steam savings equivalent of High Pressure Super Heated steam (90 bar, 500 °C) of 2718.24 MT/yr. The same when converted to primary fuel terms, works out to be 170.22 MT/yr of Indian Coal, 150.93 MT/yr of Imported coal, 1.94 MT/yr of LSHS and 41449.98 SM^3/yr of Natural Gas.

2. P 1901 A-H (ammonia cooling water pumps) discharge NRV size increasing from 24" to 32" and NRVs replaced from check valve type to Flap type :

   The flap type of NRV are offering pressure drop of 0.03 bar against 0.3-0.4 bar pressure drop of check valve type NRV. This modification has resulted reduction in 0.191 bar of pressure drop for the total 35000 m^3/hr of cooling water flow. The electrical energy saving realized works out to be 18.41 lacs kWh/Yr.

3. DM Water supply pump Impeller trimming :

   DM water supply pump P-1845 D & C impellers trimmed to 272 mm as discharge valves were remained throttled. Power savings realized in P1845 D is of 25 kW and in P1846 C is of 10 kW. Annualized power savings worked out for both the pumps is 0.68 lacs kWh .

4. Service Water Pump P1711B Replacement with P1803A :

Service water pump P 1711B was found to be operating at efficiency of 52 % as per the ERDA audit. The same was replaced with redundant degaser pump P1803A and efficiency improved to 78 %, resulting into power saving of 6 kW

5. Performance Evaluation of Clariflocculator feed water Pumps P-1712 & P 1731:

At Raw Water Treatment Plant, 3 pumps were operating to cater @ 2000 m^3/hr of water to clariflocculator. After adjusting the clearances, pump performance improved and instead of 3 pumps, 2 pumps are operated for the same quantity of water.

6. Steam Condensate Recycling in TDI plant :

In TDI plant low pressure steam condensate collection system has been implemented to improve condensate recycling.

7. Energy Savings Measures in Electrical Systems :

During the FY - 2006-2007, following LTG transformers installed :

Boiler : 100 KVA Lighting Transformer commissioned on 10.01.2007, Energy savings Realized : 153 kW

Urea : 100 KVA Lighting Transformer commissioned on 22.03.2007, Energy savings Realized : 68 kW

Ammonia : 250 KVA Lighting Transformer commissioned on 25.02.2007, Energy savings Realized : 68 kW

(v) Energy conservation plans and targets:

GNFC is targeting to reduce specific energy consumption by implementing following schemes.

a. Installation of medium pressure Pre-Decomposer and Pre-Concentrator in Urea plant at an estimated cost of about Rs.2200 lacs. This is expected to reduce specific energy of Urea by 0.08 Million Kcal per MT of Urea.
b. Installing energy efficient impeller in Superheater primary air fan C1301 in ammonia plant which expected to save 34 kW.
c. Order is placed for 9 MW windmill at the cost of Rs. 55 Crore.
d. Replacement of impellers of cooling water pumps of Ammonia plant with new energy efficient impellers to reduce the energy consumption.
e. Agreement has been signed for installation of S-50 catalyst basket in ammonia plant to increase conversion per pass, reduce recycling and saving in energy. Installation is expected by 2008/2009.
f. Methanol-II plant revamp is being carried out with installation of Isotheramal Reactor to improved the productivity and reduce the Specific energy of the product.
g. Order has been placed with M/s Linde Germany for installation of Molecular Sieve unit in Air Separation Unit of Ammonia plant which is expected to reduce specific air consumption for oxygen production and reduce the number of plant outages on account of leakages in the existing Revex system
h. GNFC is actively considering the Installation of 33 MW Gas Turbine based Co-Generation plant and proposals are under evaluation to improve overall efficiency of power generation and reduce steam consumption.

i. Replacement of existing main water supply pumps P-1751 with New energy efficient pumps is expected to reduce power consumption as well energy bill significantly.
j. Dry Fly Ash collection for direct sale scheme under active cosideration. This will save on power and water.
k. Methanol product transfer pump MGA-508 replacement with Newly sized energy efficienet pump.

With implementation of energy conservation measures as above, there will be energy saving, However, it is difficult to quantify at this stage as various factors including plant operation influence the same. By implementation of above measures, reduction of steam and power consumption will be achieved along with the increased reliability of plants.

(vi) Environment , Occupational Health & Safety and Quality :

GNFC has remained focused on environment since its inception. GNFC has invested about **Rs. 80.44** Crores in pollution control equipment.

a. GNFC has obtained ISO 14001 certification on 31st Jan., 2002 by implementing Environmental Management System. Re-certification of the same has been obtained in Jan., 2005. Further to that, ISO 14001 system was upgraded as per new version ISO:14001-2004. The validity of current ISO-14001 is till Jan-2008. This underlines GNFC's commitment for continuously improving its operation on environmental front.
b. Despite the complicated process technology for various plants, GNFC has been always striving ardently to meet and better the pollution control norms This is done through various measures like waste reduction, resources conservation, recycling, energy conservation, implementing

cleaner production, exploring The pollutants ultimately going to atmosphere are within the prescribed limits.

c. Environment Audit of the company is carried out with the help of external party namely National Productivity Council, Gandhinagar.

- GNFC initiated actions for obtaining OHSAS: 18001 after the successful audit which was carried out in July 2007 by M/S TUV NORD Germany, and has been certified for OSHAS - 18001. The certificate is issued on 5th September,2007 and is valid upto 4th September, 2010.
- GNFC being certified company for ISO:14001, Gujarat Pollution Control Board, Gandhinagar has extended validity of uniform consent for 1 more year i.e. July 2009 (To operate its plants). ISO - 14001 certificate is valid upto January - 2008.
- After the amalgamation of subsidiary NCPL with GNFC since 15th February, 2007, GNFC is also holding Quality Certificate for Aniline / TDI group of plants. The current Quality Management System Certificate issued by TUV NORD - Germany is valid till March - 2009. Next audit is due in June - 2008.

  The combined Policy for the Environment, Occupational Health & Safety, and Quality is enclosed herewith.

GNFC
Fertilizing the Future

Gujarat Narmada Valley Fertilizers Company Limited

P.O. Narmadanagar, Bharuch

ENVIRONMENT POLICY

We at Gujarat Narmada Valley Fertilizers Company Limited, Bharuch are engaged in the manufacturing of Fertilizers, Chemicals and Petrochemicals with a mission to contribute to the national development and we commit ourselves to:

- Ensure continual improvement in environmental performance of our works through proactive Environmental Management System.
- Comply with applicable legal and other requirements related to environmental aspects.
- Enhance productive utilization of fly ash and other wastes and explore feasibility of recovering value added products from wastes.
- Conserve the resources particularly fuel oil, lubricating oils, coal, rock phosphate, benzene, toluene, chlorine, natural gas, water, steam and power by fixing and improving consumption norms.
- Integrate the concept of cleaner production (pollution prevention & effective waste disposal) in all managerial decisions.
- Ensure involvement of all employees and contractors in effective implementation of Environment Management System through training and awareness.
- Promote awareness amongst local surrounding community for preservation and maintaining clean environment.

OH & S POLICY

We at Gujarat Narmada Valley Fertilizers Company Limited, Bharuch are engaged in the production of Fertilizers, Chemicals and Petrochemicals and committed to provide safe & healthy working environment to all employees as an integral part of our business performance. We are, therefore, committed to:

- Comply with all relevant legal and other requirements related to Occupational Health and Safety (OHS).
- Carry out all operations and activities in such a way so as to prevent/ minimize OHS hazards at the first place and/or control by following safe operational practices.
- Ensure continual improvement in our occupational health and safety performance by institutionalizing proactive OHS work culture and enhancing our OHS management systems.
- Ensure involvement of all employees and contractors through effective communication by providing training and awareness for effective implementation of OHS management system.
- Integrate OHS criteria at the planning stage for new projects, expansion of existing plants and procurement of new equipments/ chemicals/ services.
- Conduct regular work place monitoring, preventive health surveillance to ensure high standard of occupational health.
- Reduce accidents and harm to environment, people and property.

QUALITY POLICY

We at Gujarat Narmada Valley Fertilizers Company Limited, Bharuch are engaged in the manufacturing of Fertilizers, Chemicals and Petrochemicals. We strive to achieve utmost customer satisfaction by delivering quality products. To accomplish the above, we are committed to:

- Continually upgrade manufacturing process and technology & strive for enhancement in overall productivity.
- Develop, implement and continually improve the effectiveness of the Quality Management System in accordance with the requirement of ISO-9001:2000.
- Impart training to employees for continual improvement in their performance.
- Comply with the statutory requirements related to products.

Bharuch
07 April, 2007

Balwant Singh
Managing Director

Safety management:

1) GNFC is now conducting safety audit of its plants once in two years. In the year 2004, safety audit was carried out through National Safety Council, an external agency. Safety Audit for the year 2005 was carried out through M/S PDIL September, 2005. Last safety audit was carried out by M/S PDIL in January - 2007.

2) Over and above this, GNFC internally carries out safety surveys of hazardous areas for leakage detection, mock drills, training programs on emergency preparedness, First Aid, Use of Fire equipments to minimize the chances of eventualities.

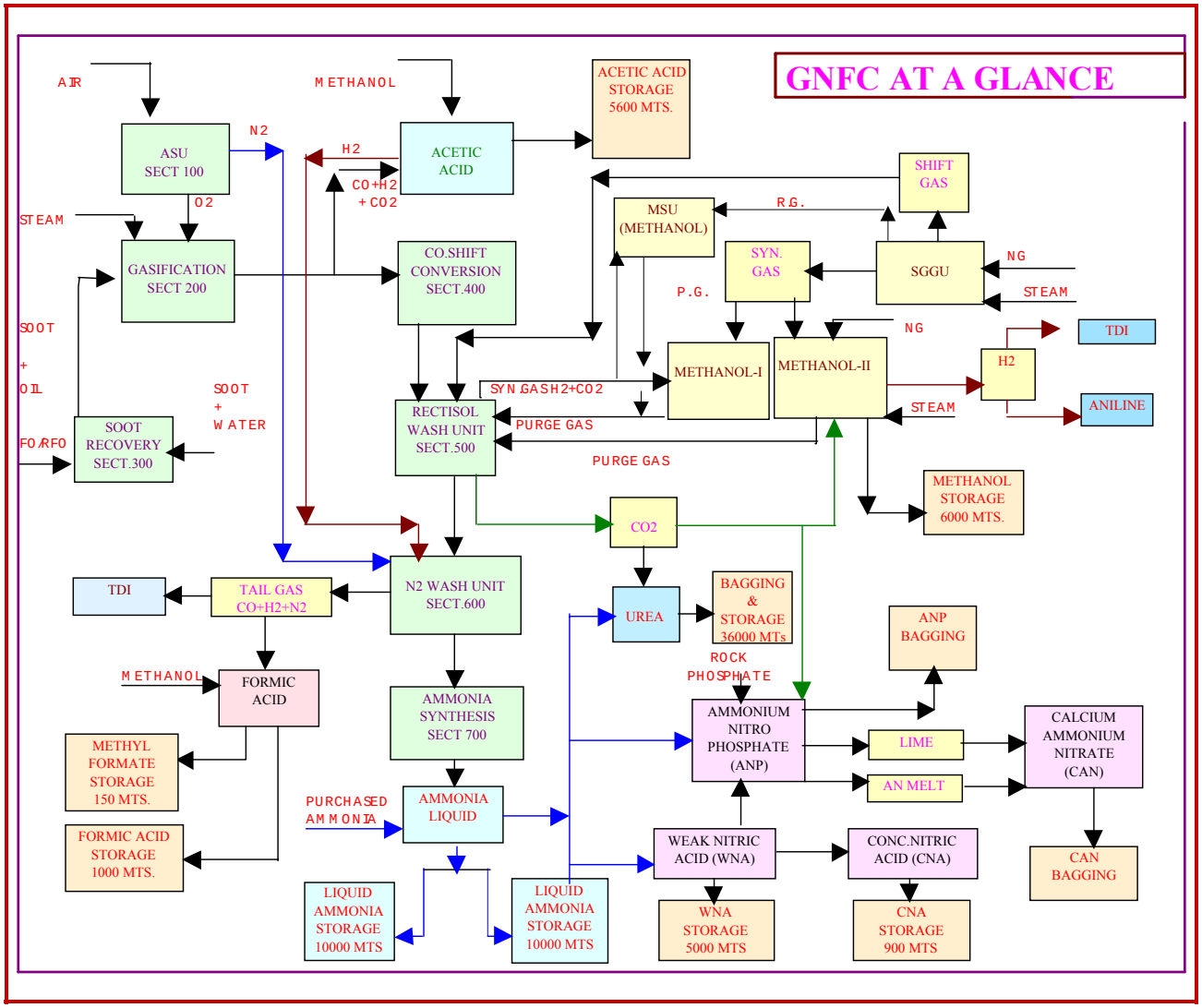
3) Fire and Safety department regulary inspects, monitors and ensures implementation of safe working practices in all plants.

4) For new modifications, revamps and new projects, Hazop study is carried out and Hazop recommendations are implemented.

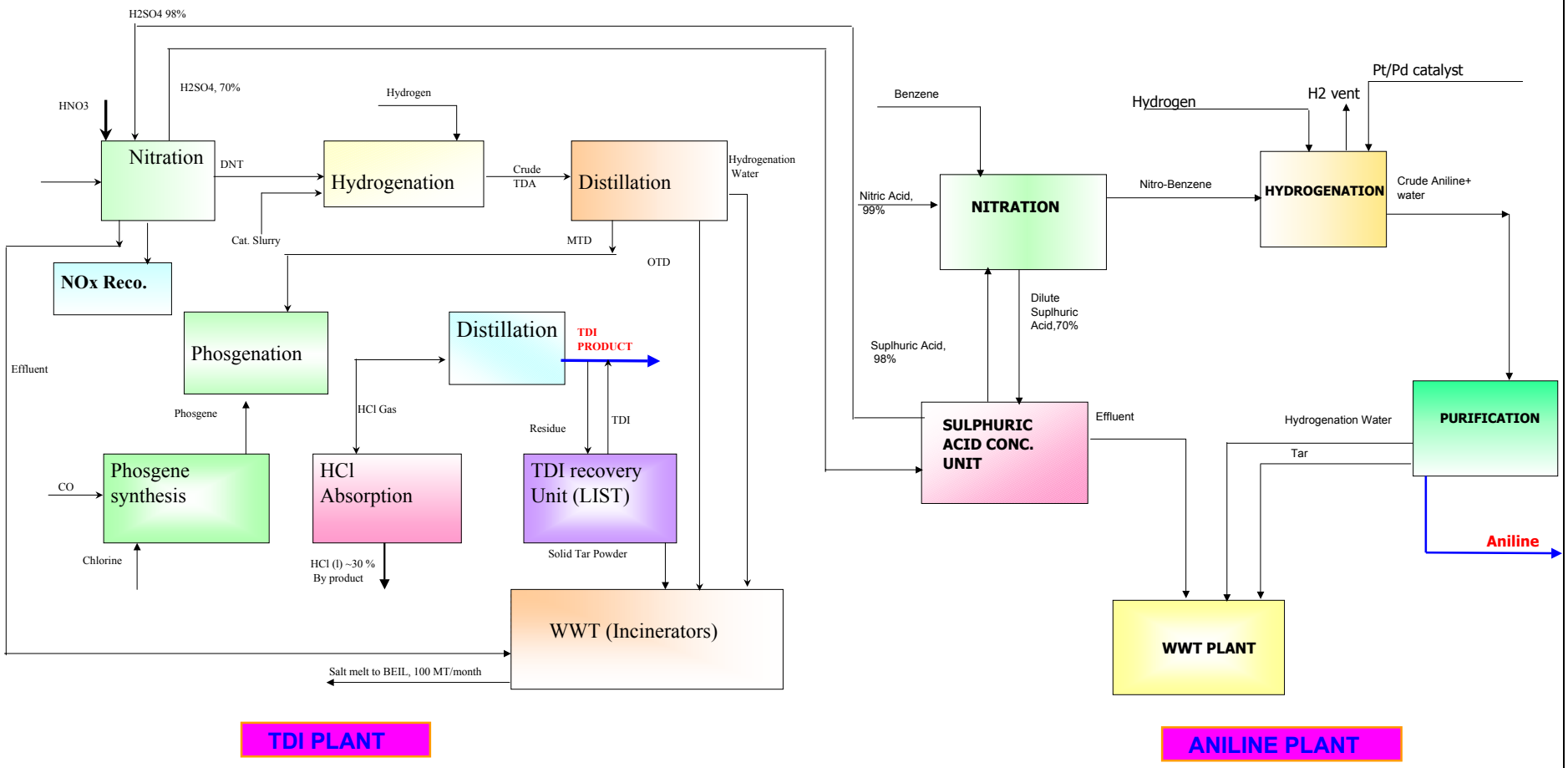
The consent order received from G.P.C.B. for the year 2006-2007 is enclosed for your ready reference.

21. Whether any dispute pertaining to statutory requirements of safety and pollution control is pending with any Government agency. If yes, give details.

Ans. There is no dispute pertaining to requirements of safety and pollution control.


GNFC AT A GLANCE
AIR
METHANOL
ACETIC ACID STORAGE 5600 MTS.
ASU SECT 100
N2
H2
ACETIC ACID
CO+H2 +CO2
SHIFT GAS
MSU (METHANOL)
R.G.
STEAM
O2
SYN. GAS
SGGU
NG
GASIFICATION SECT 200
CO.SHIFT CONVERSION SECT.400
P.G.
STEAM
NG
TDI
SOOT + OIL
METHANOL-I
METHANOL-II
H2
SYN GAS H2+CO2
SOOT + WATER
RECTISOL WASH UNIT SECT.500
STEAM
ANILINE
FO/RFO
SOOT RECOVERY SECT.300
PURGE GAS
PURGE GAS
METHANOL STORAGE 6000 MTS.
CO2
TDI
TAIL GAS CO+H2+N2
N2 WASH UNIT SECT.600
UREA
BAGGING & STORAGE 36000 MTs
ANP BAGGING
METHANOL
FORMIC ACID
ROCK PHOSPHATE
AMMONIA SYNTHESIS SECT 700
AMMONIUM NITRO PHOSPHATE (ANP)
LIME
CALCIUM AMMONIUM NITRATE (CAN)
METHYL FORMATE STORAGE 150 MTS.
AN MELT
PURCHASED AMMONIA
AMMONIA LIQUID
FORMIC ACID STORAGE 1000 MTS.
WEAK NITRIC ACID (WNA)
CONC.NITRIC ACID (CNA)
CAN BAGGING
LIQUID AMMONIA STORAGE 10000 MTS
LIQUID AMMONIA STORAGE 10000 MTS
WNA STORAGE 5000 MTS
CNA STORAGE 900 MTS

BLOCK DIAGRAM FOR ANILINE & TDI



BRIEF DESCRIPTION OF PROCESS OF GNFC PLANTS

1. AMMONIA :-

Air is separated into oxygen & nitrogen in Air separation unit. Partial oxidation of fuel oil with oxygen & steam takes place at 85 bar pressure & 1400 °C into two gasifiers using M/s Texaco's technology. Soot water is mixed with naphtha in Carbon extraction unit. CO is Converted into CO_2 in CO shift conversion unit using BASF sulphur active catalyst. In The Rectisol wash unit, physical absorption takes place with methanol in which CO_2 , H_2 & H_2S are removed. CH_4 ,CO rich free gas is obtained in Nitrogen wash unit. Ammonia Synthesis is of M/S Haldor Topsoe technology in which synthesis reaction takes place at 210 bar pressure and 430 ^{0}C using Iron Oxide catalyst. Ammonia is sent to Urea & Nitro-Phosphate group of plants.

2. UREA :-

Urea is produced by using M/s Snamprogeti, Italy technology using Ammonia stripping process. Ammonia & CO_2 reaction takes place in Urea reactor at 150Kg/cm^2 and 180 °C. Urea Purification and recovery takes place at 18 ata & 4.5 ata pressure. Urea solution is Concentrated from 70% to 99.7% by vacuum evaporation. Urea prills are formed in the Urea Prilling tower in which cold air flowing from the bottom causes its solidification.

3. METHANOL :-

Methanol is prepared from Natural Gas & CO_2 using ICI technology.
Methanol is Prepared in a series of four major steps :

a. Desulphurisation of Natural gas.
b. Preparation of methanol synthesis gas by steam reforming.
c. Compression and methanol synthesis at 62 bar pressure & 240 °C.
d. Methanol distillation for the removal of lighter & heavy impurities.

Methanol Synthesis Unit (MSU) was commissioned in July - 2006 to enhance Methanol production capability. It uses synthesis gas from the rectisol wash unit of Ammonia plant, desulfurizes, compresses upto loop pressure and fed to the 4 bed adiabatic reactor. The crude methanol produced from MSU is sent to Methanol -I / II plants for distillation

4. FORMIC ACID :-

Formic Acid process consists of a methyl formate synthesis from CO gas and methanol. Reactor effluent is sent to a hydrolysis separation. The bottom containing waste and Formic acid is sent to the product purification section in which 85% pure formic acid produced.

5. ACETIC ACID :-

Acetic acid is produced by the carbonylation of methanol. In the manufacturing process There are three main steps :

a. Reaction section in which CO & Methanol reacts at 28 bar pressure and 185°C.
b. Purification section in which acetic acid is separated from mixture of liquids.
c. Light ends Recovery section in which MeI is recovered.

6. WEAK NITRIC ACID :-

Weak nitric acid is manufactured by application of "UHDE Dual Pressure Process" in which Ammonia gas is oxidised with oxygen present in air at 4.4 bara pressure and then it is absorbed with water at 10.8 bara pressure in absorption tower to produce 60% Nitric acid.

7. CONCENTRATED NITRIC ACID :-

Concentrated nitric acid is manufactured by using Extractive distillation process wherein Sulphuric acid absorbs water from weak nitric acid to produce 98.5% concentrated nitric acid vapour which is condensed later on and stored in the tank.

8. AMMONIUM NITROPHOSPHATE :-

Ammonium nitrophosphate is manufactured by digesting Rock phosphate with Nitric acid to form intermediates such as Wet lime, AN melt and NP acid in first section of the processing. NP acid and AN melt are further mixed together in pre decided proportion followed by neutralisation with Ammonia to form NP melt slurry which is granulated to produce ANP granules having N:P 20:20.

9. CALCIUM AMMONIUM NITRATE :-

Calcium Ammonium nitrate is manufactured by granulating dry lime and AN melt in Pug mill type granulator to produce CAN granules having N : 25%.

10. ToluneDi Isocynate (TDI):

Toluene is nitrated in presence of mixed acid (Dilute H2SO4 [70 – 80%] and concentrated HNO3 [98% min]) to Di-nitro toluene and water. This nitration reaction takes place in the pump nitration circuit in few seconds. After nitration washing is done with Process water and Caustic to have pure DNT for storage in emulsion. During this operation Acidic water (Yellow water) and basic water (Red water) is generated which is sent to incinerator for further treatment.

MTD is manufactured by hydrogenation of DNT in reactor called hydrogenator, using catalyst slurry containing Pd/Pt particles. After removing catalyst particles (Pd/Pt and C) in thickener, the TDA/Water solution is further distilled to remove water and OTD to have pure MTD product. In the process Hydrogenation water is generated which is sent to incinerator for treatment.

The CO and Cl2 are reacted in presence of activated carbon catalyst to produce Phosgene gas. This phosgene is dissolved in ODCB in the phosgenation loop. MTD, from the MTD storage tanks, is mixed with hot ODCB and the mixture is then fed to the MTD/ODCB solution-drying column to remove water and ammonia content of the MTD. After drying the MTD is diluted with ODCB and fed to phosgenation reactor. The crude TDI/ODCB solution from the pipeline reactor discharges to a separator where by-product HCL gas and excess phosgene are separated from the solution. Phosgene is absorbed with chilled ODCB and the HCl gas is

absorbed in water to produce 30% HCl solution. The ODCB, TDI and TAR are separated by distillation and solvent is recovered and recycled back to the system. After purification of TDI it is taken to storage tanks.

11. Aniline :

Benzene is nitrated in presence of mixed acid (H2SO4 & HNO3) to form Nitrobenzene; Spent acid. This nitration reaction takes place in the pump nitration circuit in few seconds. After nitration washing and distillation is being done with process water and Caustic to have pure NB for storage. During this operation Acidic water (Yellow water) and basic water (Red water) is generated which is sent to effluent treatment plant for further treatment.

Aniline is manufactured by hydrogenation of NB and Hydrogen in reactor called hydrogenator, using catalyst slurry containing Pd/Pt catalyst. After removing catalyst particles (Pd/Pt and C) in thickener, the Aniline/Water solution is further distilled to remove water and other impurity to have pure Aniline product. In the process Hydrogenation water is generated which recycled to maintain temperature of reactor and remaining water is being sent towards effluent treatment plant.

Sulphuric Acid treatment plant is being used to concentrate the spent acid, which is generated from NB and DNT plant. In this section, spent acid is preheated in pre-heater and concentrated up to 85 % and after it is being sent to stripping column for further concentration and spent acid is being concentrated up to 96 % in this column. Nox that is being generated from spent acid is being absorbed in Nox column and effluent water is being sent towards effluent treatment plant.

GNFC

Gujarat Narmada Valley Fertilizers Company Limited

P.O. : NARMADANAGAR , BHARUCH

Energy Policy

We, the employees of Gujarat Narmada Valley Fertilizers Company Ltd. (GNFC), undertake the responsibility and commit ourselves to conservation of energy through following steps. :

- ✓ Regular Monitoring of consumption of raw materials and utilities for each product with respect to targets set.
- ✓ Carry out survey from time to time to identify the energy saving potential for reduction of energy consumption.
- ✓ To explore the possibilities of waste heat recovery wherever feasible.
- ✓ Use of Energy Efficient and economically viable alternatives in selection of equipment / machines / systems / technology / processes where ever possible.
- ✓ Comply with all applicable legal and regulatory requirements including Energy Conservation Act 2001.
- ✓ Creating awareness about energy conservation among all employees.

Managing Director

Feb - 2005