

NARMADA COLLEGE OF MANAGEMENT - 737



INDUSTRY VISIT TO
GNFC-BHARUCH

Details About Visit:

Date: 7th September, 2014

Total Students: 37 (First Year)

Faculty Coordinators: Mr. Kunal Mojidra and Mr. Kanu Raval

Industry visited: G.N.F.C. Plant at Bharuch

Total five plant were visited:

1. D.M. Water Plant
2. Ammonia Plant
3. Methanol Plant
4. Ammonium Nitro Phosphate Plant
5. Urea Plant.

COMPANY OVERVIEW



Gujarat Narmada Valley Fertilizers & Chemicals Limited. (GNFC), is a joint sector enterprise promoted by the Government of Gujarat and the Gujarat State Fertilizers & Chemicals 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.



Board Of Directors		
Dr. Varesh Sinha	IAS	Chairman
Dr. Rajiv Kumar Gupta	IAS	Managing Director
Shri D. J. Pandian	IAS	Director
Shri G. C. Murmu	IAS	Director
Dr. Hasmukh Adhia	IAS	Director
Shri Atanu Chakraborty	IAS	Director
Dr. TT Ram Mohan		Director
Prof. Arvind Sahay		Director
Shri Chandrasekhar Mani		Director

CHEMICAL DIVISION

GNFC has kept pace with changing times and its vision is always focused on growth. Even as the Company was implementing its fertilizer complex, plans were underway for expansion and diversification in related areas. This resulted in the setting up of core chemical and petrochemical plants such as Methanol, Formic Acid, Nitric Acid and Acetic Acid.

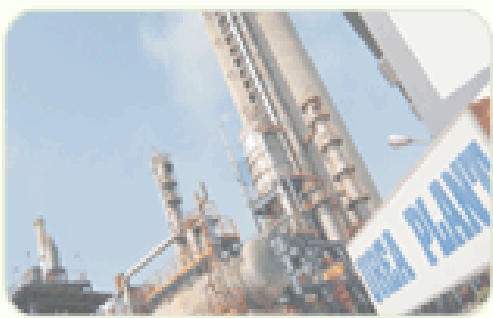
These industrial chemicals are used by a wide range of manufacturers, processors and chemical operators in India and even abroad. While Methanol finds applications in chemicals, resins etc., Formic Acid is used mainly in rubber, textiles, tanneries and pharmaceuticals industries. Both Methanol and Formic Acid are regularly being exported to international markets



FERTILIZER DIVISION

GNFC started fertilizer manufacturing and marketing operations by setting up in 1982, one of the worlds largest single-stream ammonia-urea fertilizer complexes.

GNFC today is one of the leaders in fertilizer industry. The company is engaged in manufacturing and selling fertilizers such as Urea, Ammonium Nitrophosphate and Calcium Ammonium Nitrate under the umbrella NARMADA. GNFC has to its credit one of the largest Ammonia plant, a reference plant in the world of fuel oil based technology along with the world's largest single stream Urea plant.



1

• TRAINING CENTER

GNFC has a full-fledged training and development facility for human resources, which is equipped with audio-visual systems, computer laboratory and conference rooms.

2

• GNFC FERTILIZER SERVICES

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3

• GNFC CHEMICALS SERVICES

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4

• INFORMATION TECHNOLOGY

(n)Code Solutions - An IT Division of GNFC (n)Code Solutions offers Digital Certificates that can integrate with applications such as emails, workflow, enterprise wide applications, or secure VPNs. The Digital Certificates can be used by individuals, corporates and governments to secure online B2B/B2C applications and other online transactions.

It has promoted a portal called www.nprocure.com offering end-to-end electronic procurement services provider. (n)Code also designs and builds world class data center infrastructures. (n)Code also offers a wide range of Security Services which include Managed IT Services & Secure Infrastructure design & building Services

(A) PRODUCTION PERFORMANCE OF GNFC PLANTS FOR THE YEAR 2013-2014

PLANTS	ACTUAL (MT)	CAPACITY UTILIZATION (%)
Ammonia	608,279	136.54
Urea	696,428	109.35
Methanol-I	18,224	36.45
Methanol-II	145,347	77.27
MSU	5,606	18.32
Methyl Formate	26,304	115.37
Formic Acid	20,492	204.93
Acetic Acid	155,236	155.24
WNA-I	291,183	117.65
WNA-II	123,322	123.32
CNA-I	32,871	99.61
CNA-II	35,120	106.43
CNA-III	53,504	107.01
Ammonium Nitrophosphate (ANP)	188,865	132.54
Calcium Ammonium Nitrate (CAN)	44,348	31.12
Aniline	40,473	115.64
Toluene Di-isocynate (TDI)	16,317	116.55
Nitrobenzene (NB)	57,881	122.50
MTD	13,678	115.88
Ethyl Acetate	52,088	104.18

(B) DESPATCH/SALE PERFORMANCE OF GNFC PLANTS FOR THE YEAR 2013-2014

DESPATCH / SALE	ACTUAL MT
Urea	681,505
Methanol	85,043
Methyl Formate	1,377
Formic Acid	21,024
Acetic Acid	123,050
WNA	99,354
CNA	68,111
ANP	189,474
CAN	45,805
AN Melt	127,087

Calcium Carbonate	91,385
Aniline	40,497
TDI	17,014
MTD	47
NB	3,564
HCl	42,475
Ethyl Acetate	50,613

RAW MATERIAL
• Coal
• Rock Phosphate
• Furnace Oil
• Caustic Soda Lye (47-50%)
• Benzene (Specifications)
• Toluene (Specifications)
• Sulphuric Acid (Specifications)
• Chlorine (Specifications)
• Hydrated Lime (Specifications)
• Anti Caking Agent (Specifications)
• Special Denatured Spirit (Specifications)
• Mild Steel Structural Item as Beam,Channel,Angles,Plates
• M.S. Tor steel CTD & TMT-bars of diff. sizes from 8mm to 32mm dia
• Ordinary Portland Cement

PLANT – 1 D. M. PLANT

In GNFC, the first plant which the group visited was the Demineralised process plants.

Mr. N. P. PATEL, Utility Manager, gave brief explanation about how he handles the whole plant and what kinds of procedures were carried out by in the whole plant.

There are total three component of it utility required by GNFC.

1. Water

Most of the water used in production of chemicals is known as D.M.(Demineralised) Water. For Different purposes, water is purchased.

They purchases water for industrial purpose of about rs. 17.50/ Cubic meter and the cost of drinking water are rs. 4.50/ Cubic meter. Daily GNFC Consumes 40000 Cubic meter water out of which only 2900 Cubic meter is drinking water, remaing is for industrial purpose.

Industrial purpose water is processed in Demineralised process plants.

D. M. Plant:

There is a water pump house of GNFC and they supply water to GNFC Company. In this raw water there is much type of impurities present. So, they firstly remove all positive and negative impurities like calcium, sulphate, iron and chloride.

Then after all water is stored in boiler. The waste water is reused again by the process of recycling. This is continuous process.

2. Air,

There are two types of Air i.e. Raw Air and Instruments Air.

- 1) Raw Air directly use for consumption
- 2) Instruments Air, which is made from Raw Air through removing Dust, Oil, and Moisture, Instruments Air is used for automatic operation of Valve and Machinery.

If the supply of air plant are stop than all plant were stop working.

GNFC has buffer devices for failure prevention. The reserve stock of air is good enough to last for 7 minutes.

3. Power

GNFC generates its own power and even excess power is provided to the neighbourhood villages and industries.

PLANT 2: AMONIA PLAINT

Ammonia plant is considered to be the mother plant of GNFC. GNFC has a credit of having one of the largest ammonia plant, a reference plant in world of fuel, oil based technology along with world's largest single stream urea plant.

They get nitrogen from air. They separate nitrogen and hydrogen from air, coal and crude oil. They also sell liquid nitrogen to AMUL COMPANY. The installed capacity of ammonia is 445500 MTA. The production performance of ammonia plant for year 2013-14 is actual 608.370 MT and capacity utilization 136.54.

FORMULAE:

1. $4\text{NH}_3 + 5\text{O}_2 = 4\text{NO} + 6\text{H}_2\text{O}$.
2. $2\text{NO} + \text{O}_2 = 2\text{NO}_2$.
3. $3\text{NO}_2 + \text{H}_2\text{O} = 2\text{HNO}_3 + \text{NO}$.

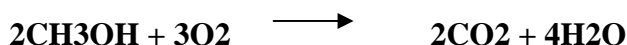
PLANT 3 – METHANOL PLANT

What is Methanol?

Methanol is the simplest alcohol and is a light, volatile, colourless, flammable liquid with a distinctive odour very similar to that of ethanol.

Methanol is also known as methyl alcohol, wood alcohol, wood naphtha or wood spirit is a chemical with formula CH_3OH .

Methanol burns in oxygen, including open air, forming carbon dioxide and water.



The maximum capacity of GNFC for the product of Methanol is 350 MT and they actual producing the 300 tonnes.

They are using the yellow pipe for identification of methanol and crude methanol.

GNFC also produce crude Methanol, in which 70% are methanol and other 24% are water. After the completion of whole process they get 99.9% pure methanol.

GNFC buying raw material for producing methanol from Gandhar. Then reforming at 800°C temperature with steam. They get as output from reforming process at following forms:

- Hydrogen
- Methane
- Carbon dioxide
- Carbon monoxide.

For the heat recovery helps in converting temperature from 800°C to 60°C.

Uses of Methanol:

1. Acetic Acid
2. Paints
3. Refrigerant
4. Pesticides
5. Paper treatment
6. Synthetic resins
7. Coolant for automotive and aircraft engineering
8. Insecticides

Technology use for Methanol:

1. Low pressure
2. Low temperature technology ICI, UK.

What is Formic acid?

Formic acid is the simplest carbondioxylic acid. Its chemical formula is HCOOH or HCO₂H.

In formic acid there are 85% of formic acid and 15% water.

Scientific Formulas:

CO + Methanol → Methyl Format

Sulphur + water → Formic acid

CO + Methanol → Methyl format

Methyl format + H₂O → Formic acid + Methanol.

PLANT 4 – NITRO PHOSPHATE COMPLEX

- Basically GNFC has two products
 - ❖ Fertilizer
 - ❖ Chemical
- Nitro phosphate is a fertilizer product.
- Nitro phosphate is made of followings:
 - ❖ Ammonia
 - ❖ Air

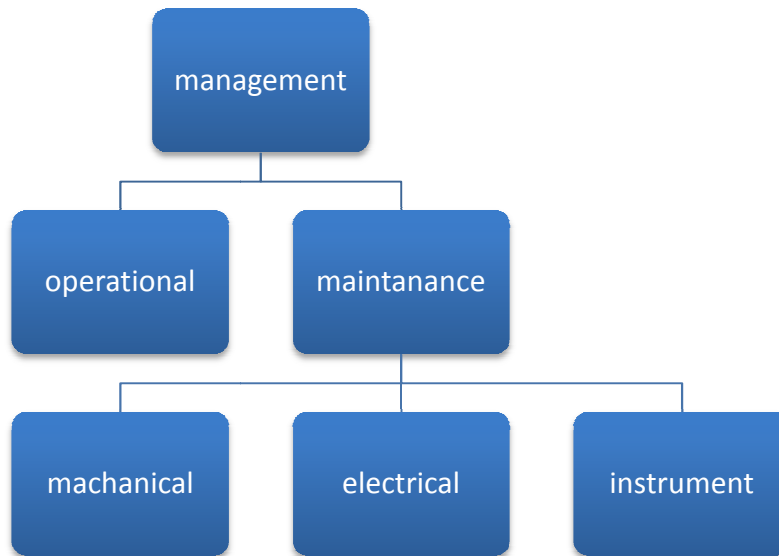
(ammonia + air)= nitric acid

- The process of nitro phosphate involves acidifying phosphate rock with nitric acid to produce a mixture of phosphoric acid and calcium nitrate.

Plant	Capacity	Licensor	Engineering	commissioned
Weak nitric acid(60%)	630 MT/ revamped to 750 MT	M/S UHDE germeny	m/s u/l bombay	March 1990- april 2000
Weak nitric acid(62%)	300 MT	M/S UHDE germeny	m/s u/l bombay	July 2011
Concentrated nitric acid 98.5%(20:20:0)	100 MT	M/S plink germeny	m/s plink germeny	Oct 1989
Concentrated nitric acid (95.5%)	150 MT	M/S plink germeny	m/s plink germeny	May 2011
Ammonium nitro phosphate (20:20:0)	475 MT	M/S BASF GERMENY	m/s plink bombay	Sep 1998
Calcium Ammonium Nitrate(25% nitrogen)	475 MT	M/S UHDE GERMENY	Msu/l bombay	Aqug 1990

- The calcium Ammonium Nitrate (25% nitrogen) plant is the most hazardous and dangerous plant.
- Nitro phosphate working on the basis of following policies:
 - ❖ It is a continuous plant.
 - ❖ Synchronize all equipment and consume lot of material.
 - ❖ Achieve maximum efficiency
 - ❖ It has steam, gas, power for production and focused on minimum wastage.

At the end of the process, get the solid ammonium nitro acid. For this plant, need proper management for desire output. So that their management should be as follows:



- Operational:
 - Each plant have 400-500 equipments.
 - All department co-ordinate each other.
 - Operational department must have co-ordinate with marketing department.
- Competitors:
 - Deepak fertilizer industry (taloda-maharashtra)
- Strategy:
 - Consistency in quality and supply.
- Cause of accident:
 - Unsafe acts
 - Unsafe condition

Products produced in the plant

plant	Capacity	licensor	Engineering	Commissioned
Weak nitric acid(I)60%	630MT/Revamped to 750 MT	M/s uhde Germany	M/S uil Bombay	March 1990/ April 2000
Weak nitric acid(II)62%	300MT	M/s uhde Germany	M/S uil Bombay	July 2011
Concentrated nitric acid(I) 98.5%	100MT	M/s plinke Germany	M/s plinke Germany	Oct 1989
Concentrated nitric acid(II) 98.5%	100MT	M/s plinke Germany	M/s plinke Germany	Jan 1999
Concentrated nitric acid(III)	150MT	M/s plinke Germany	M/s plinke Germany	May 2011

98.5%				
AMM.nitro phosphate (20:20:0)	475MT	M/s BASF Germany	M/S uil Bombay	Sept 1990
Calcium ammonium nitrate(25% nitrogen)	475MT	M/s uhde Germany	M/S uil Bombay	Aug 1990

Another product produced was Calcium Ammonium Nitrate. The production of this product has been banned by government since last five year as it was too hazardous. Four persons were killed and several injured in a major blast that took place in the nitro-phosphorus plant of the Gujarat Narmada Valley Fertilizers Company Ltd (GNFC) here on Tuesday night. So for this reason the plant has been banned by the government since last 5 years.

PLANT 5 – UREA PLANT

It is the mother plant of the company.

Urea = Ammonia (NH_3) + CO_2

Technology: Snap till Italy

Application : Fertilizer

Control System : D.C.S. (Distributed Control System)

Urea produces in liquid form and converted in to Solid form in Sprilling tower at -33 degree temperature.

Production Cost per M.T. is 28000, gov. provide subsidy of 22000 and remaining spend by the farmer.

Conclusion:

- Overall the visit of G.N.F.C. is good knowledge gaining visit.
- During the visits it has been observed that all plants are inter-connected with each other and many dependents on others. And All the plants are controlled by control room.
- For gaining organizational activity detailed practical information, this visit is very beneficial for us.