



# **PRESENTATION ON**

## **ENVIRONMENT MANAGEMENT AT DIGBOI REFINERY**

**INDIAN OIL CORPORATION LIMITED  
( ASSAM OIL DIVISION )**



## DIGBOI REFINERY 1901 TO 2001

Continuing commitment towards preserving  
environment beyond 100 years.....

- ⇒ **ISO-9002/ ISO- 14001 / OHSAS Certified Refinery**
- ⇒ **Achieved International Safety Rating System level 5**
- ⇒ **Introduction of Green Fuel**



**OUR EARTH, OUR FUTURE  
- JUST SAVE IT !**

**We have not inherited the earth from our ancestors, but have borrowed it from our children**

**Let us preserve the earth for future generation**



# ENVIRONMENTAL DISASTERS DURING LAST CENTURY

- 1944 Los Angeles Smog Episode
- 1950 Poza Rica Air Pollution
- 1952 London Smog Episode
- 1953 Minamata Mercury Poisoning Episode
- 1984 Bhopal Gas Tragedy
- 1986 Chernobyl Nuclear Disaster.
- Smog over SE Asia( Asian Brown Haze)



## GLOBAL ENVIRONMENTAL TRENDS

- ➔ **Renewable resources ( forest, fresh water, coastal areas, fisheries, air) are beyond their natural regeneration capacity.**
- ➔ **Greenhouse gases are emitted at a much faster rate than these could be absorbed.**
- ➔ **Bio-diversity and bio-productivity are diminishing due to large scale human settlements, and rapid unplanned urbanization.**



## GLOBAL ENVIRONMENTAL TRENDS

- ➔ **The increasing, pervasive use and spread of chemicals are causing major health risks, environmental pollution and disposal problems.**
- ➔ **Continued heavy reliance on hydrocarbons in energy sector is an unsustainable practice.**
- ➔ **Widespread damage and change to ecosystem (acid rain, climate variability, loss of bio-diversity & bio-productivity).**



# MAJOR ISSUES

- Global Climate
- Global Warming
- Ozone Layer Depletion
- Acid rain
- Ground Water Pollution
- El Nino Phenomenon
- Bio-diversity



# GLOBAL CONCERNS

- Environment Summit at Stockholm in 1972  
( 5th to 10 th June)
- Rio de Janerio in 1992
- Kyoto Summit in 1997
- Johannesburg Summit in 2002
- COPs by United Nations Framework  
Convention on Climate Change (UNFCCC)
- 8th Conference at Delhi Oct 23 to Nov 1,2002



# INDIA'S COMMITMENT TO ENVIRONMENT



- Article 51A clause (g) states that “It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.”
- Article 48A states “The State shall endeavor to protect and improve the environment and to safeguard forests and wildlife of the country.”
- Formation of Central and State Pollution Control Boards



## LAWS REGARDING ENVIRONMENT PROTECTION

- ⇒ THE WATER (Prevention & Control of Pollution) ACT, 1974.
- ⇒ THE WATER CESS ACT 1977
- ⇒ THE AIR (Prevention & Control of Pollution) ACT, 1981.
- ⇒ THE ENVIRONMENT (Protection ) ACT, 1986
- ⇒ THE HAZARDOUS WASTE (Management & Handling) RULES, 1989 AMENDED 2000.
- ⇒ THE MANUFACTURE, STORAGE AND IMPORT OF HAZARDOUS CHEMICALS RULES 1989 AMENDED 2000
- ⇒ THE PUBLIC LIABILITY INSURANCE RULES 1991
- ⇒ THE BIOMEDICAL WASTE MANAGEMENT AND HANDLING RULES 1998.
- ⇒ THE OZONE DEPLETING SUBSTANCES REGULATION AND CONTROL RULES ,2000



# SOME FACTS ABOUT INDIA

- India has installed 2300 MW of generation capacity based on renewable sources
- Per capita emission of CO<sub>2</sub> in India - 0.25 Tonnes
- Per capita emission of CO<sub>2</sub> in USA - 5.5 Tonnes
- 25% of world population in developed country emit more than 70% CO<sub>2</sub>
- Source India Development Report 2002



# CORE ISSUES



- Govt alone cannot bring about the change. It needs involvement of common men. Industry also plays a major role . Thus to bring the entire issue of environment under control we need to address the following issues.
- Population Control and Economic growth (e.g. UN target of reducing people without sanitation by half by 2015)
- Preservation of forest ( Maintaining bio-diversity and prevention of loss of species)
- Pollution Control ( Energy Conservation and setting new targets for renewable sources of energy)



# STEPS THAT MAY BE TAKEN

- Environmental Perception and people's awareness
- Environmental education and training
- Restrictions on exploitation on Natural Resources
- Environmental Studies
- Environmental Monitoring
- **Environmental Audits**



# ROLE OF A COMMON MAN

- Population Control
- Healthy Practice (Sewage and Sanitation)
- Conserve Natural resources
- Stop deforestation and encourage afforestation
- Conserve Energy
- Limit Automobile exhaust
- Encourage use of clean fuel (Discourage use of coal and wood as domestic fuel)
- Improve road Conditions



# NORTH EAST-



# FAVOURABLE FACTORS

- Low level of Industrialization - impact of industry is relatively lower and restricted to limited areas.
- Most of the industries located at Upper Assam use Natural gas as fuel (Low sulphur high efficiency)
- Supply of Natural gas as domestic fuel in areas where natural gas is available.
- Large forest land
- High rainfall
- Low Population
- Climatic conditions favour organised plantation based industries viz. Furniture( Cane, Bamboo, timber), paper,



# NORTH EAST - UNFAVOURABLE FACTORS

- Major sources of pollution in Cities and large towns are domestic sewage and wastes (Source of soil and ground water pollution)
- Unscientific use of chemical fertilizer and pesticides etc.
- Poor road conditions in most of the towns
- Lack of entrepreneurship
- Poverty ( Low purchasing power)



- ➔ **Environmental Protection has become an integral part of Oil Industry's business strategy.**
  
- ➔ **For an environmentally sound management strategy we must have the knowledge of :**
  - a) **Type of wastes**
  - b) **Sources**
  - c) **Quantities**
  
  - d) **Properties**
  
  - e) **Effects on Environment**
  
  - e) **Disposal techniques**



## **ENVIRONMENTAL POLICY** **of DIGBOI REFINERY**

The under-noted measures will be continued effectively to ensure that **Digboi Refinery's operation does not cause any adverse impact on the environment.**

To maintain good environment in and around Digboi Refinery having compliance with relevant environmental regulations and laws.

To strive for continual improvement in environmental performance and prevention of pollution by adopting state-of-the-art technology and by developing the skills of the employed persons through training.

To **minimise effluent generation, improve treated effluent quality, reduce solid waste generation and optimise energy consumption.**



## PRESENT PROCESS UNITS



<u>Sl.No.</u>	<u>Unit</u>	<u>Yr. Of Commissioning</u>	<u>Installed Capacity ('000 MT/Yr.)</u>	<u>Present Operation ('000 MT/Yr.)</u>
<b>A</b>	<b><u>PRIMARY</u></b>			
1.	CDU/VDU	1996	650	650
2.	LWC TOPPING UNIT	1966	42	15
	<b>TOTAL :</b>		<b>692</b>	<b>665</b>
<b>B</b>	<b><u>SECONDARY</u></b>			
1.	CATALYTIC REFORMER	1997	105	105
2.	NEW COKER	1999	170	170
3.	KTU	1932	83	83
4.	BLUE OIL DIST.	1954	89	89
5.	WAX EXT. UNIT	1928	150	165
6.	SWEATING STOVES	1928	64	64
7.	WAX HYDROFINISHING UNIT	2001	60	30
8.	WAX MOULDING UNIT	1928	36	30
9.	VRSD UNIT	2001	20	20
10.	BITUMEN PLANT	1938	23	15



## **NEW SECONDARY UNIT PROJECTS UNDER COMMISSIONING / EXECUTION**

<b><u>Sl.No.</u></b>	<b><u>Unit</u></b>	<b><u>CAPACITY</u> <u>('000 MTPA)</u></b>	<b><u>REMARKS</u></b>
1.	SOLVENT DEWAXING UNIT (SDU)	210	COMMISSIONING IN PROGRESS. WILL REPLACE EXISTING WAX EXT. & DE- OILING UNITS
2.	HYDROTREATER	139 (SK MODE) 204( HSD MODE)	WORK IN PROGRESS. COMPLETION BY MID., 2002. WILL REPLACE EXISTING KTU



## AIR POLLUTION PREVENTION & CONTROL

- - In all Boilers and furnaces Digboi Refinery uses sweet natural gas
  - Tall stacks (more than 30 meters) for proper dispersion of pollutants
  - Stack gas monitoring.
  - Monitoring of fugitive emission.
  - Technology up-gradation eliminating use of toxic liquid sulphur-di-oxide for treatment of Kerosene by hydro-treatment method is in progress. Hydrotreated HSD will reduce automobile pollution to a large extent
  - Production of lead-free petrol in Catalytic Reformer Unit to reduce automobile pollution. Also ensure low benzene in MS
  - Ambient Air Quality Monitoring around Refinery premises as per National Ambient Air Quality Standards



# AMBIENT AIR QUALITY DATA



Parameter	Standard	Actual			
		Station 1	Station 2	Station 3	Station 4
	mg/m <sup>3</sup>				
SPM	150	47.3-82.3	51.0-83.5	47.5- 71.8	48.6- 61.3
NO <sub>x</sub>	30	6.3-13.5	6.6 -13.9	6.3-9.2	6.1-8.4
SO <sub>2</sub>	30	BDL-26.8	BDL-1.0	BDL-19.0	BDL-13.0
CO	1000	BDL	BDL	BDL	BDL
NH <sub>3</sub>	400	BDL	BDL	BDL	BDL
RPM	75	31.0-37.0	35.0-39.0	41.0-47.0	24.0-31.0

BDL - Below Detectable Limit



# WATER POLLUTION PREVENTION AND CONTROL

- Primary treatment and effluent collection facilities like segregated storm water and oily water channels, API Separators and collection sumps
- Secondary treatment facilities- ETP
- Close monitoring of treated effluent receiving water bodies.
- Recycling of treated effluent to the Refinery



## TREATED EFFLUENT TEST DATA



Parameter	MINAS Std.	Typical range
pH	6.0 - 8.5	6.6 – 7.1
Oil & Grease mg/lt.	10.0	7.8 – 10.0
Phenol, mg/lt.	1.0	0.27 – 0.38
Sulphides, mg/lt.	0.5	0.11 – 0.29
BOD, mg/lt.	15.0	13.7 – 15.0
TSS, mg/lt.	20.0	18.0 – 20.0



# GROUND WATER MONITORING

<u>Parameter</u>	<u>Test Results</u>
pH	6.0 - 7.6
Conductivity, Mmhos/cm	179-352
Total Hardness, mg/lit.	8.2 - 125
Chloride, mg/lit.	1.61 - 38.25
Turbidity, NTU	1.1-12.5
Iron, mg/lit.	0.21-3.14
Sulphate, mg/lit.	22 - 45
Oil & grease, mg/lit	BDL
COD, mg/lit	55 - 62
Phenol, mg/lit.	BDL
TDS, mg/lit.	156 - 233



# SOLID WASTE MANAGEMENT

- Upgraded technology - discontinuation of generation of Acid Tar, Spent Earth, Spent Bauxite by introduction of **Wax Hydrofinishing**
- Oily sludge treatment facilities
- Drying of weathered Sludge to make solid fuel
- Sludge incinerator
- Bio remediation



## ON GOING EFFORTS FOR IMPROVEMENT

- Installation of Hydrotreater to replace KTU and improve Diesel quality
- Installation of Solvent Dewaxing unit to minimise hydrocarbon loss and also to replace outdated technology
- Upgradation of Effluent treatment plant
- Bio remediation of oily and acidic sludge



# AFFORESTATION

- AOD has taken conscious steps of afforestation inspite of the fact that digboi has greenary all around it. A total of 27141 nos of tree saplings have been planted during last ten years
- Digboi is attempting to build up a natural reserve particularly for birds
- Tree plantation in all AOD installations is a regular feature



# POPULATION CONTROL

- MORE POPULATION- MORE POLLUTION

During the year 2001-2002 **Family Planning measures taken at AOD Hospital** compared to the Dist and state are as follows

	AOD	TSK Dist	STATE
STER.	243	3553	26413
Others	245	1235	89094

## Community Family Planning Programme

	2001-02	Since 1984
Camps held	6	84
Family Planning Operations	238	5916

## No of births at AOD Hospital has reduced significantly

Year	1994	2001	Avg of last 3yrs
No. of births	317	242	203
Crude Birth rate/1000	12.68	9.68	8.12
Corresponding figure for Assam	Rural	28.5	
	Urban	20.2	



## OTHER RELATED ACTIVITIES

- EIA Study by external agency
- Awareness among local community by way of celebration of World Env. Day, Energy Conservation and Oil Con. fortnight.
- Participatory approach for Environment management through local NGOs
- Extensive in-house and external environmental and energy audits



# CONCLUSION

- Set up industry with clean technology (e.g. Natural gas or hydel etc. based)
- Economic growth
- Clean mass transportation system
- Organized afforestation (bamboo based, medicinal plants, Plants with potential for bio diesel)
- Bring unorganised sector under scrutiny



Thank you