

## MODULE –II

### Environmental pollution

#### 2.11 Pollution case studies



**MODULE –II****ENVIRONMENTAL POLLUTION****2.10 Pollution case studies****Air pollution: Bhopal gas tragedy**

The careless siting of industries and relatively poor regulatory controls leads to ill health in the surroundings. The Bhopal gas tragedy on December 2nd 1984, where Union Carbide's Plant leaked 43 tons of Methyl Isocyanate and other substances, used in the manufacture of pesticides is one of the worst industrial accidents in the recent past. Of the 5,20,000 people who were exposed to the gas - 8,000 died during the first week and another 8,000 later. The impact of the survivors is visible even today.



***Fig 2.10.1 Bhopal gas tragedy plant***

***Source: Environmental science & Engineering by Gilbert.M***

## CHERNOBYL REACTOR INCIDENT

On April 25, 1986, Russian engineers and scientists begin preliminary tests on Chernobyl power plant's 4th reactor. In order to control the experiment, the automatic control system was shut down. After some work, stability was reached at very low power outputs. Unfortunately, manual control of the water pressure wasn't maintained. The reactor began to create excess heat. Without the automatic control, the control rods couldn't be reinserted in time; a deadly chain reaction had begun. Within a matter of 3-4 seconds, the reactor went from 5% output to 100 times its normal level.

The water in the reactor flash-boiled, creating an explosion that leveled thousands of tons of concrete and steel, including the housing for the reactor. The steam carried almost 70% of the nuclear material out of the reactor into the surrounding environment. Several thousand volunteers died on the scene, and it is estimated that 7,000 to 10,000 volunteers died in total, considering short and long-term effects. Thousands of miles from the scene, the birth defect rate became double the world average.



*Fig 2.10.2 Chernobyl reactor*

*Source: Environmental science & Engineering by Gilbert.M*

It is also estimated that 150,000 were put at risk for thyroid cancer, and over 800,000 children were put at risk of contracting leukemia. 2 million acres of land (1/5 of

the usable farmland in the Ukraine) was, and still is, completely unusable. It remains difficult to determine the scope of the disaster; radiation resulting from the event was detected all over the globe. It is estimated that it may cost up to \$400 billion and will take up to 200 years to correct the damage done to the area, and to compensate those affected by the meltdown.

## **WATER POLLUTION**

### **ARSENIC POLLUTION IN GROUND WATER**

An example of groundwater pollution caused by excessive extraction is that fluoride contamination. It has spread across 19 states and across a variety of ecological regions ranging from the Thar desert, the Gangetic plains and the Deccan plateau. Source: When the bedrock weathers the fluoride leaches into water and the soil. surfaced during the last three decades - extraction of groundwater which has resulted in the tapping of aquifers with high fluoride concentrations was noticed during 1970s and the 1980s when there was massive state investment in rural water development for irrigation as well as for drinking. Encouraged by state subsidies on diesel and electricity, people invested in diesel and submersible pumps in a bid to extract groundwater through borewells. This policy aggravated the fluoride problem. Effects: combines with the bones as it has an affinity for calcium phosphate in the bones. Excess intake of fluoride can lead to dental fluorosis, skeletal fluorosis or non-skeletal fluorosis. Correction: - Defluoridation plants and household water treatment kits are stop-gap solutions. (Ref: Sushmitha Baskar & R.Baskar)

### **MARINE POLLUTION IN TAMIL NADU: OCEANS NOT SPARED**

Industrial pollution has threatened the natural habitats of pearls in the pearl banks of Tuticorin coast in the Gulf of Mannar. It has affected fish and other organisms as far as 30 kms south of Tuticorin due to effluents released from chemical industries. Tannery

wastes have caused the pollution of coastal waters from Chennai to Vedaranyam. The effect of diversity of phytoplankton ecology of mangrove estuaries of Tuticorin is greatly affected by industrial effluents. The Chennai coastal waters showed high levels of pesticides like DDT, lindane, endosulphan and heptachlor. The bioaccumulation of these pesticides in marine organisms could pose major health hazards.

### **SOIL POLLUTION : COCA COLA SOFT DRINK BOTTLING UNIT**

The Coca cola bottling unit at Palakkad district at Kerala, discharged large amount of sludges. These sludges are used as fertilizer by the nearby farmers.

But, analysis of sludge showed that it contains, toxic metals like cadmium & lead. Analysis indicates that, the level of these toxic elements would pollute the land, local water supply and the food chain.

### **MARINE POLLUTION (GULF WAR)**

Gulf war took place in Kuwait from Jan 16- Feb 26, 1991 between Iraq & USA.

During the war, American fighters dropped nearly a lakh of bombs, and forced the Iraq army to withdraw from Kuwait. During the retreat of Iraq, they have set fire nearly 700 oil wells of Kuwait.

Most of the oil wells are on shore of the sea, oil from oil well spills out into the sea. The floating oil over sea H<sub>2</sub>O covered nearly, 80 km long 25 km wide area.

The burning of oil wells continued nearly for 10-months. Burning of oil wells released large amount of pollutants like CO<sub>2</sub> & SO<sub>2</sub> into the atmosphere.

### **Effects**

- (1) Nearly one million birds have been killed due to oil slick.
- (2) It change the desalination plant as in effective.

