Recommendations
RECOMMENDATION

The rapid economic growth achieved by most of the developing countries after globalization has adversely affected the quality of the environment and has become a major threat to sustainable development. Although no significant impact of industrial effluent is observed in groundwater of industrial area as yet but mitigation measures need to be adopted to avoid future contamination of groundwater.

Following are some policy suggestions to achieve environmentally sustainable industrial development

• **Integrated Production Approach:** Through vertical integration, the units can adopt effective environmental management steps to meet the standards. In an integrated unit, the pollution abatement cost has become a part of its overall manufacturing cost and therefore the burden is less. Moreover an integrated unit has to think about social accountability and image building.

• **Cleaner Production (CP) Technologies:** The introduction of CP technology in the manufacturing process may be the only effective long range solution for reducing the pollution problems and achieve sustainable development. Adequate efforts from the concerned agencies are required towards the widespread application of CP.

• **Strict Enforcement:** The role of the Pollution Control Board is critical in pollution management and it should strictly enforce all the pollution control regulations. There should be proper regulations for the production and dumping of effluents produced as a result of industrial activities in the area.

• **Economic Instruments:** The burden of treatment cost, particularly the variable costs, is more for the smaller units. Hence the introduction of subsidies to small units for treatment will serve as an incentive towards the proper functioning of the plants.

• **Treatment of Industrial waste water:** The different types of contamination of wastewater require a variety of strategies to remove the contamination.
a. Solids removal
b. Oil & grease removal
c. Removal of biodegradable organics.
d. Activated sludge process
e. Trickling filter process
f. Treatment of other organics
g. Treatment of acid & alkalis
h. Treatment of toxic materials

As per the latest research it is concluded that, it is not anaerobic or aerobic treatment, but a combination of the two types of the technologies that give an optimum configuration for those wastewater treatment applications where the organic impurities are at a relatively higher concentration.

Now days the industries are using INTEGRATED FIXED FILM ACTIVATED SLUDGE (IFAS) SYSTEM.

In this system two stage biological treatment comprising stone or plastic media trickling filter (also known as packed bed biotower) followed by activated sludge process based aeration tank, followed by secondary clarifier have been in operation.

Another modification of above configuration that has been implemented in newer industrial wastewater treatment systems is fluidized media bioreactor (also known as moving bed bioreactor (MBBR)) in lieu of biotower followed by activated sludge process.

This hybrid process of fluidized media and activated sludge process taking place in a single aeration tank is known as Integrated Fixed Film Activated Sludge (IFAS) process.
THE COMMON ADVANTAGES OF ALL OF THE ABOVE DESCRIBED CONFIGURATIONS ARE AS FOLLOWS:

- Fixed film media provides additional surface area for biofilm to grow on it and degrade the organic impurities that are resistant to biodegradation or may even be toxic to some extent.
- The overall efficiency of two stage biotreatment system is better than activated sludge process alone.
- Fixed film processes are more effective in nitrification of the wastewater than activated sludge process.
- The overall foot-print for a fixed film process based system is smaller than the activated sludge process system.
- Due to less sludge wastage, the sludge handling and dewatering facility is smaller compared to the activated sludge process.

COMPARING IFAS WITH OTHER CONFIGURATIONS I.E. BIOTOWER FOLLOWED BY ACTIVATED SLUDGE OR MBBR FOLLOWED BY ACTIVATED SLUDGE, FOLLOWING ADVANTAGES FOR IFAS CAN BE HIGHLIGHTED:

- It can be easily incorporated in the existing activated sludge system to meet additional processing capacity requirement and/or stricter discharge regulations without the need of additional concrete tanks.
- Foot-print of IFAS is smaller.
- Capital and operating cost for IFAS is lower.

Based on these above advantages, it can be inferred that IAFS technology is superior to other aerobic biological treatment technologies in terms of overall life cycle cost and returns to the owner.

It can be concluded that the above mentioned technology can be recommended for both the industrial areas to prevent further ground water contamination. Although further research is required to get see the effectiveness of the technology.
Following are the proposed recommendations to improve the ground water quality of the area:

- Effective measures (proper legislation, implementation of environmental laws etc.) should be adapted to reduce the deleterious contributions of point sources that degrade the water quality of industrial area especially, focusing on those water quality attributes that are contributing to major deterioration of ground water and their concentration above the prescribed environmental standards.

- Strict criteria should be developed and applied to treat the effluents at their generation site.

- Waste treatment plants should be established for the effective treatment of industrial and municipal waste.

- All industrial units should be encouraged to adopt the effluent treatment techniques at the source and those units which are violating and discharging their effluent without treatment should be punished.

- There should be a regular monitoring of industrial units.

- People belonging to various segments of the community (stakeholders) should be encouraged to highlight the groundwater pollution problems and educate people about the deleterious effects of pollutants on ecosystem and their harmful impacts on human life.