RECYCLE OF WASTE WATER & WASTE MANAGEMENT

Summary

Reuse of wastewater for industrial and agricultural purposes has been occurring since historical times. However, planned reuse is gained importance only two or three decades ago, as the demands for water dramatically increased due to technological advancement, population growth, and urbanization, which put great stress on the natural water cycle. Reuse of wastewater for water-demanding activities, which, so far consumed limited freshwater resources is, in effect, imitating the natural water cycle through engineered processes. Several pioneering studies have provided the technological confidence for the safe reuse of reclaimed water for beneficial uses. While initial emphasis was mainly on reuse for agricultural and industrial reuses, the recent trends prove that there are direct reuse opportunities to applications closer to the point of generation. There are also many projects that have proved to be successful for indirect or direct potable reuse.

Introduction

Current water shortages and the cost associated with freshwater have made water reuse and recycling of major importance. Reused water is currently used for non-potable purpose, such as agriculture, landscape, public parks and golf course irrigation, industrial process water etc. Benefits of reuse include protection of ecosystems, reduction and prevention of pollution.

Why Waste Recycling?

It Prevents emissions of greenhouse gasses & water pollutants, minimization of pollution, Volume reduction and Sanitation of waste (composting).

WATER RECYCLING

GOAL: Improvement of health capturing valuable products (nitrogen & phosphorus) efficient use of water.

CATEGORY OF WASTE WATER REUSE

- Grey Water Reuse
- Reuse of Industrial Process Water

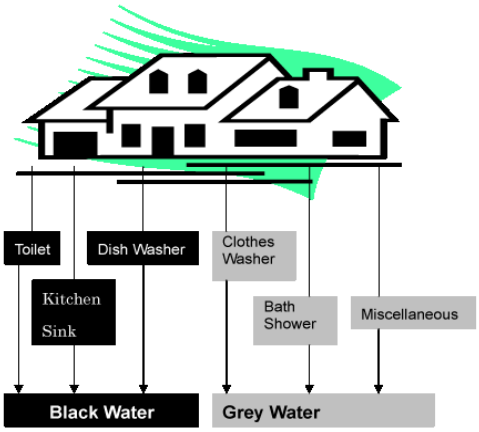

Fig.: SOURCES OF GREY WATER

REUSE OF INDUSTRIAL PROCESS WATER

BENEFITS:

Potential reduction in production costs from recovery of raw materials in the wastewater less permitting and administrative burden from the reduction in waste water toxicity and volume Heat recovery and reduced

impacts from high temperature effluent to the ecosystem.

GROUND WATER RECHARGE

Uses:

- Reduce, stop or reverse the declining ground water level.
- Protect underground freshwater in coastal aquifers against salt water intrusion from sea.
- Store surface water including flood or other surplus water for future use

POTABLE WATER

Generally raw sewage contains-

- BOD- 300 mg/l
- COD- 500 mg/l
- Organic matter
- Heavy metal
- Toxic compounds
- Pathogenic bacteria etc.

Treatment of sewage to potable water means removal of harmful components and decrease of BOD to less than 2 mg/l.

Singapore has developed such a treatment process to revive potable water (Reclaimed Water) from secondary effluent of STP.

Reuse:

Reuse of materials for the same or alternative purposes can result in high reductions in waste output. Local initiatives can promote the reuse of materials that might otherwise be discarded.

Examples

Farming materials

Reuse of oyster bags and netting.

Reutilization of organic farm wastes.

Recirculation technology

Reuse of water in a culture tank through filtration, skimming and aeration techniques.

Energy Recovery

Energy recovery methods such as anaerobic digestion, oil extraction and incineration allow for the extraction of a usable fuel source from aquaculture organic wastes.

Examples: Bio fuel

- An efficient fuel source can be extracted from fish waste with high oil content.
- Biogas Methane can be extracted from the anaerobic digestion of organic waste and used as a fuel.

Industrial Water Reuse Case Studies

INTRODUCTION

In view of the limited availability of fresh water resources and the need for their conservation, the implementation of

water recycling concepts within the framework of sustainable water management strategies is of crucial importance. Industry is increasingly implementing such concepts due to growing economic pressure, regulatory developments and supportive funding at governmental level. The benefits of wastewater reuse derive mainly from savings in the freshwater supply and a reduction in wastewater generation, including related treatment costs and sewerage charges.

Petrochemical Industry

At Jamnagar in India, the Reliance Petroleum Limited operates the world's largest grassroots refinery. The approximate capacity of the naphtha-based, cracker refinery is 18 million t/a. The wastewater reclamation plant has a capacity of 48,000 m^3/d, which makes it the biggest effluent treatment plant in India.

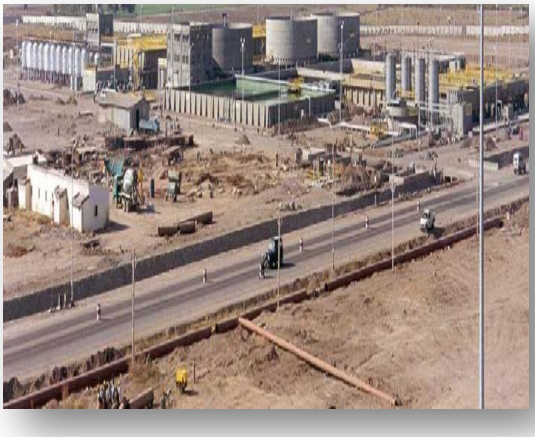

Fig.: Jamnagar Wastewater Reclamation Plant

The reclamation plant is designed for the maximum reuse of the wastewater coming from the operational units of the refinery. To achieve this goal, the wastewater is treated in three separate, identical trains, two for wastewater containing low total dissolved solids (LTDS I and II) and one for wastewater with high total dissolved solids (HTDS). The treated water is reused as make up in the fresh water cooling tower, as fire water make up and for local green belt development and irrigation.

Basically, the process consists of oil removal (API-separator and dissolved air flotation), biological treatment (bio towers with plastic packing and activated sludge process), tertiary filtration (dual media filters) and polishing with granular activated carbon. Plant operation has shown that the treated water standards can be met without any problems.

CONCLUSIONS

Wastewater reclamation and reuse are technically feasible. There is a wide range of proven technologies (conventional and advanced) available and water recycling systems can be tailored to meet specific demands. The reclamation and reuse of municipal and industrial wastewater provides a sustainable option within industrial development. As a consequence, in many cases, water recycling constitutes an economically attractive and environment friendly solution.

REFERENCE

- http://en.wikipedia.org/wiki/Reclaimed_water
- http://www.saws.org/Your_Water/Recycling/
- http://www.environment.tn.nic.in/SoE/images/WasteManagement.pdf
- S K Garg, “Water Supply Engineering”, Published By Romesh Chander Khanna, 4th Addition, Page No 723 to 728