Advanced Technique of Drinking Water Treatment Plant

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Abstract - *Today's water treatment plants are applied for water conservancy projects, emerged by the technology of automation control system to ensure safe, continuous, high quality water supply to municipal and for multi-purpose usage. The objectives of any water supply system are to supply safe whole some water in adequate quantity at convenient points and at reasonable cost to the users. Potable water treatment is one of the most challenging and complex systems that municipalities need to deal with considering limited resources. This study developed a decision support system in a water treatment system capable of supporting the operator to make informed decisions about the best course of action for using multiple water resources. This system consists of a process operation and diagnosis to calculate historical and real-time data to optimize water blending ratios and diagnose each water treatment unit. According to the decision support system, the operator can easily organize calculated and analyzed data and as such can expect long-term operational and analytical benefits in terms of economic, social, and environmental effects in the future.*

Key Words: ***Filtration, aeration, Screening, Sedimentation, disinfection, water treatment, Drinking water, Model, etc.***

1. INTRODUCTION

One of the most important natural resource in the world is Water, and life cannot exist and most industries could not operate without water. Most of the fresh water bodies all over the world are getting polluted due to unplanned urbanization, industrialization and anthropogenic activities. Therefore, providing safe and reliable source of water is thus an essential prerequisite for the establishment of a stable community.[1] Around the world and in many countries, some of potable water have become contaminated and that is due to the growing of population, which increased the economic activities and industrialization and that led to create an increased demand for fresh water in addition to the severe misuse of natural resources. As a result of that, the quality of surface waters have got a great awareness around the world and therefore, many researchers have studied to evaluate the performance of the water treatment plants and on how to improve the quality of drinking water.

2. DRINKING WATER TREATMENT TECHNOLOGIES

As already stated, drinking water quality in the world varies widely due to several Factors, such as the heterogeneity of the countries Characterizing this region, the different climate

Conditions, available natural, economic and water Resources, among others. Strictly related to these factors, technologies applied for drinking water treatment vary country by country. A list of the main specific treatment processes associated with the main water pollutants is shown in Table 1.[4]

Water pollutant	Treatment technology
Salinity	1.Membrane filtration (Nano filtration, reverse osmosis, electro dialysis) 2.Ion exchange
Settleable solids	1.Screen filter 2.Sedimentation 3.Sand filtration
Colloids	Coagulation and flocculation
Fecal bacteria	Disinfection
Iron and manganese	Chemical oxidation (air/oxygen, chlorine etc.) Biological filters
Organic compounds	Chemical oxidation (air/oxygen, chlorine, ozone etc.) Activated carbon adsorption
Nitrogen compounds (ammonia, nitrates, nitrites)	1.Stripping (suitable only for ammonia) 2.Biological filters 3.Membrane filtration (Nano filtration, reverse osmosis, electro dialysis) 4.Ion exchange
Arsenic	1.Chemical precipitation 2.Activated carbon adsorption (iron oxide carbon) 3.Membrane filtration (Nano filtration, reverse osmosis, electro dialysis) 4.Ion exchange
Cyanobacteria (or other algal blooms)	1.Micro-screen filter 2.Chemical oxidation 3.Coagulation and flocculation 4.Sand filtration
Cyanotoxins	Activated carbon adsorption
Heavy metals	Chemical precipitation

Table 1. Main water pollutants versus main treatment technologies

Fig -1:Model of Drinking Water Treatment Plant.

3. CONCLUSION

Water is essential to sustain life, and a satisfactory (adequate, safe and accessible) supply must be available to all. Improving access to safe drinking water can result in tangible benefits to health. A properly designed plant is not only a requirement to guarantee safe drinking water, but also skillful and alert plant operation and attention to the sanitary requirements of the source of supply and the distribution system are equally important. Performance of any water treatment plant is an essential parameter to be evaluated to understand its operation, working and efficiency. This study concluded that only after performance evaluation of any water treatment, the defects and problems can be known and can lead to further betterment of the plant. The water quality of any water body is deteriorated Due to domestic and industrial discharges without treatment. To analyses the condition of any water body, water quality index claimed suitable term to evaluate variations in quality of water.

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