ASSESMENT OF EFFLUENT WATER QUALITY FROM VARIOUS INDUSTRIES

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Abstract:

Waste is a by-product of life. High standards of living and even increasing population have resulted in an increase in the quality of wastes generated. That wastes releases the pollutants. Waste is generally a combination of household, commercial, agricultural, poultry, sewage etc. This is generated from the living community. Its impacts on ground water quality have become the most prominent in the recent years and many mega cities derive a major component of their domestic, agricultural, and industrial water supply from aquifers. Ground water pollution occurs when pollutants are released to ground and make their way down into the ground water. It can also occur naturally due to the presence of a minor and unwanted constituent's contaminant (or) impurity in the ground water in which case it is more likely referred to as contamination rather than pollution. Pollution can occur from on- site sanitation system, landfills, effluent from waste water treatment plants, leaking sewers, petrol filling stations or from over applications of fertilizers in agriculture. Pollution can also occur from naturally occurring contaminants such as arsenics or Florida. Using polluted ground water casus hazards to public health through poisoning or spread diseases. Different machismos have influence on the transport of pollutants such as diffusion, adsorption, precipitation, decay in the ground water. The major part of the living community in ongole depends also on ground water during the last 2decades ground water quality has emerged as one of the most important environmental issues confronting much of the world's population. Due to lack of efficient management of waste its leads to ground water in the ongole is found to be contamination in various places. Groundwater is fresh water (from rain or melting ice and snow) that soaks into the soil and is stored in the tiny spaces (pores) between rocks and particles of soil. In the present study five number of sample were collected from granite, chemical industry, hospital, milk dairy and hotels waste water discharging point. From the calculations and the estimated parameters it is concluded that all the collected samples are high in values than comparing with the standard data. The water collected from the granite areas are most polluted than other samples. The water sample collected from milk dairy area is somewhat better than other samples.

Key Words: Ground Water, Effluent Water, Water Quality, Sampling and Analysis.

1. INTRODUCTION:

Groundwater accounts for nearly 95 percent of the nation's fresh water resources. It can stay underground for hundreds of thousands of years, or it can come to the surface and help fill rivers, streams, lakes, ponds, and wetlands. Groundwater can also come to the surface as a spring or be pumped from a well. Both of these are common ways we get groundwater to drink. About 50 percent of our municipal, domestic, and agricultural water supply is groundwater. Groundwater is stored in the tiny open spaces between rock and sand, soil, and gravel. How well loosely arranged rock (such as sand and gravel) holds water depends on the size of the rock particles. Layers of loosely arranged particles of uniform size (such as sand) tend to hold more water than layers of rock with materials of different sizes. This is because smaller rock materials settle in the spaces between larger rock materials, decreasing the amount of open space that can hold water. Porosity (how well rock material holds water) is also affected by the shape of rock particles. Round particles will pack more tightly than particles with sharp edges. Material with angular-shaped edges has more open space and can hold more water. Groundwater is found in two zones. The unsaturated zone, immediately below the land surface, contains water and air in the open spaces,

or pores. The saturated zone, a zone in which all the pores and rock fractures are filled with water, underlies the unsaturated zone. The top of the saturated zone is called the water table. The water table may be just below or hundreds of feet below the land surface. Cleaning up contaminated groundwater often takes longer than expected because groundwater systems are complicated and the contaminants are invisible to the naked eye. This makes it more difficult to find contaminants and to design a treatment system that either destroys the contaminants in the ground or takes them to the surface for cleanup. Groundwater contamination is the reason for most of Superfund's long-term cleanup actions. Septic tanks leakages, Sewers leakages, Petrol tank leakages, Usage of fertilizers, Usage of pesticides, Landfills, Waste water treatment plants, Domestic /Residential waste, Mining, Cleaning of swimming pools, Hotel wastages, Hospital wastage, Chemical industries, Poultry wastage, Ice factories, Salt factories, Beverages, Fish farms, Milk factories and Naturally occurring pollutants etc were added in to the ground water and disturbing its quality.

2. MATERIALS AND METHODS

Ground water samples were collected at the point of addition of effluents from the city. A field investigation was done before taking the water samples to overview the quality of samples in all the selected locations under city jurisdiction. Before the samples were taken, the bottles were rinsed properly with the corresponding water sample that has to be taken and the bore wells were pumped for about 5 minutes before colleting the sample into the container. They were filled completely with the water sample and closed well. The capacity of each bottle is 1L. A total of 5 number of samples were collected. After the completion of taking water samples they were stored in a cool and dark place. To estimate the quality of water we have to analyze various physical and chemical parameters in each collected sample. The parameters analyzed in the laboratory according to lab procedures, and those are Electrical Conductivity, Turbidity, p^H, Total Dissolved Solids, Total Hardness, Alkalinity, Calcium Hardness, Magnesium, Iron, Fluorides, Chlorides, Nitrites, Nitrates and Sulphates. The samples are analysed by using the standard procedures in the laboratory (APHA, 1985). The physical parameters like Temperatur, Color, Taste and Odor are also test.

3. RESULTS AND DISCUSSIONS:

The collected water samples are analyzed according to the sampling procedures listed in APHA 1985. The obtained results were compared with the standard values listed in IS 10500:2012. The standard values were listed in Table.1. The estimated parameters from the samples were listed in Table.2. Figure.1. represents the graph between the parameters and their values in collected samples.

Table.1. Water Quality Parameter Standards

Parameter	Standard Values (V_s)	Parameter	Standard Values (V_s)
E C	300 mho/lit	**Magnesium**	30 mg/lit
Turbidity	1 NTU	**Iron**	0.3 mg/lit
pH	7.5 mg/lit	**Fluorides**	1 mg/lit
TDS	500 mg/lit	**Chlorides**	250 mg/lit
TH	200 mg/lit	**Nitrites**	0.05 mg/lit
Alkalinity	200 mg/lit	**Nitrates**	45 mg/lit
Calcium	75 mg/lit	**Sulphates**	200 mg/lit
Temperature,	@ Room Temp	**Odour**	Odourless
Copper	0.15 mg/lit	**Zinc**	15 mg/lit
Colour	5 point on Co-Pt Scale	**Taste**	Tasteless

Table.2. Water Quality Parameter in Collected Samples

Place	P^H	Temp ^OC	Alkali mg/L	Turbid NTU	TH mg/L	Cu mg/L	Zn mg/L	Cond mho/L	Cl mg/L	TS mg/L	TSS mg/L	TDS mg/L
Granite	10	10.2	311	1.78	1275	0.98	0.32	3.79	39.704	4300	2920	1380
Milk dairy	9	9.5	291	2.09	120	0.65	0.91	1.54	65.05	3800	1852	1947
Hospital	9	8.4	289	1.92	103	1.05	0.65	1.35	55.5	4220	3256	963
Chemical	9	7.8	284	2.31	1045	0.81	0.98	2.76	170.8	3892	2625	1266
Hotels	10	8.5	450	2.03	490	0.25	1.5	2.42	700.6	4152	2796	1356

From the calculations and the estimated parameters it is concluded that all the collected samples are high in values than comparing with the standard data. The water collected from the granite areas are most polluted than other samples. The water sample collected in milk dairy area are somewhat better than other samples.

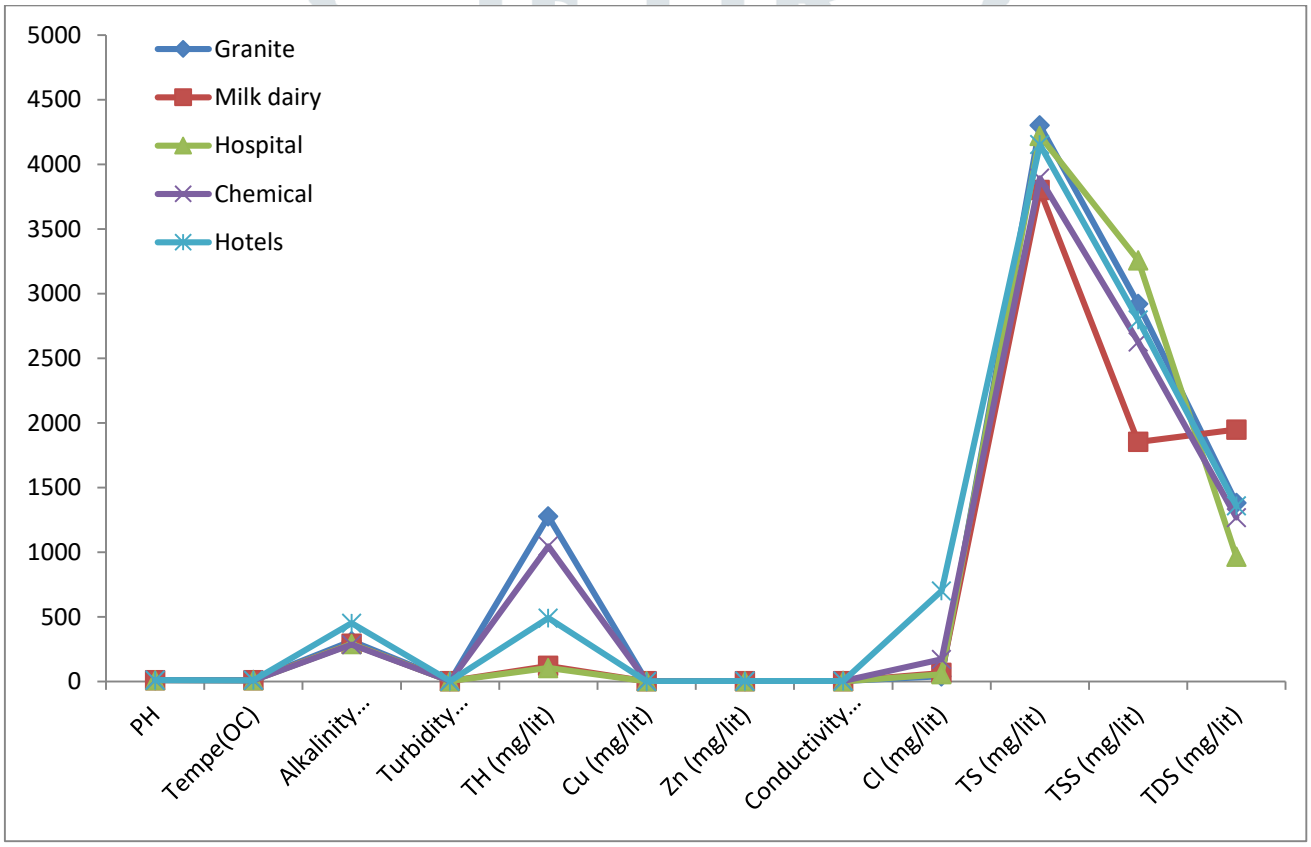

Figure.1. Water Quality in Collected Samples

4. CONCLUSIONS:

Water table conditions are of great importance for drinking water supplies, agricultural irrigation, waste disposal, wildlife habitat, and other ecological issues. Water pollution is one of the major problems facing humanity. Industrialization, urbanization, increase in human population are responsible for water pollution. Finally we conclude that the groundwater in the study area is mainly alkaline in nature. Ongole city the head quarters of prakasam district is located in Andhra Pradesh state. Hence a detailed study has been carried out. Five surface water samples were collected, and the samples were analyzed for various physical and chemical parameters such as pH, Odour, turbidity ,temperature ,zinc, copper, electrical conductivity, total solids, dissolved solids ,suspended

solids, residual chlorine, alkalinity, total hardness. The surface water is the study area is also alkaline in nature. The concentrations of physical and chemical constituents in the water samples were compared with the bureau of Indian standard and world health organization standards to know the suitability of water drinking. The study indicates that the water quality parameters exceed the permissible limits for drinking at many locations leading the unsuitable for drinking. From the calculations and the estimated parameters it is concluded that all the collected samples are high in values than comparing with the standard data. The water collected from the granite areas are most polluted than other samples. The water sample collected in milk dairy area are somewhat better than other samples.

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