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"Waste water to Drinking Water using Retreatment Plant"

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Abstract – Ichalkaranji city having water scarcity problem. The estimated amount of water required is 1.6 TMC per year. Requirement more than current water supply. For this government initiated a project under "Amrut yojana scheme". A water conveyance system from a Warana river from Danoli village. The estimated cost of project is 68 corer. But this project is under certain issues, due to the farmers hereby river Warana refuses to give water and strikes against this projects.

In this paper we give solution to that problem faced by Ichalakaranji city other cities having such type of problem. for this solution of this problem we purify waste water which is hugely generated by Ichalakaranji city after purification by using retreatment plant attached to the sewage treatment plant. it is useful for domestic industrial irrigational purpose.

Key Words: Retreatment plant, Drinking water,

1. INTRODUCTION

Clean water is an essential requirement of human life, which is required for various purposes. And also waste water is also important in many areas of world which recurring draughts. The importance of waste water treatment is important because it helps to protect river from waste water directly thrown into the river.

Due to rapid growth of population on the technological and industrial hub, the waste water generation is increased. There is need to treat the waste water effectively among the primary treatment process, which can't treat water efficiently which causes the salvation like problem when it is used for irrigation. so, in this paper we give the efficient treatment unit for waste water treatment by using retreatment plant after conventional sewage treatment plant.

In this project we give the solution on the problem faced by Ichalkaranji City, Which is the requirement of water for the Domestic and Industrial water demand, that is not fulfilled by the current water supply system and the source of water which is panchganga river is not capable of excess demand due to its large pollution. So we create a "Retreatment Plant" module to purify waste water upto the domestic water supply standards. Currently Ichalkaranji has a sewage treatment plant which treats wastewater 20 million litres per day, which is then after flown into river or used for the irrigation purpose, but this treatment is not sufficient in treating the water as per domestic water supply quality standards.

We proposed a Retreatment Plant against the conventional STP, To treat the water as per the Standard supply parameters. This is helpful in not consuming the natural water resources also in decreasing the water pollution by not throwing waste water in the natural resources.

1.1 Objectives

1. Study of parameter of waste water and water after treatment in sewage treatment plant.
2. To design retreatment plant to the treated waste water by sewage treatment plant.

1.2 Observations

Physical characteristics
1. Colour
2. Odour
3. Taste
4. Turbidity.

- **Test values on outlet of STP**

Parameters	Result	Unit
PH	7.56	
Total suspended solid (TDS)	59	Mg/lit
Total dissolved solid (TDS)	372	Mg/lit
Dissolved oxygen (DO)	10.5	Mg/lit
Biological Oxygen demand(BOD)	18	Mg/lit
Chemical Oxygen demand (COD)	82	Mg/lit
Chloride	60.54	Mg/lit
Alkalinity	56.5	Mg/lit
Oil & Grease	0.042	Mg/lit

- **Standard parameters of water**

Parameters	Result	Unit
PH	6.5 to 8.5	
Colour	5 to 25	Hazen unit
Odour	Unobjectinable	
Teste	Agreeable	

Turbidity	5to10	NTU
Total Hardness	300 to 600	Mg/lit
Chloride	250 to 1000	Mg/lit
Dissolved Solid	56.6	Mg/lit

3. Details of retreatment plant.

3.1 process of retreatment plant.

1. Microfiltration - Suspended solids, minute particles, viruses.

2. Reverse osmosis- Semi permeable membrane with very small pores filter the water so that only water molecules pass through.

3. Ultraviolet disinfection -As an additional barrier to ensure the safety of the product water.

3.2 Parts of retreatment plant.

1. Sediment filter.

2. carbon filter

3. Reverse osmosis.

4. mineral cartridge

5. UV disinfection chamber.

6.Diphragam pump.

7. blossom multipurpose water pump.

3.2.1. Sediment Filter : Water filters are very important. These are designed to remove chemicals, suspended solids and turbidity .These are sieving devices .

3.2.2. Carbon Filter : Carbon filter uses activated carbon to remove contaminants and impurities.

3.2.3. Reverse osmosis : Reverse osmosis removes inorganic contaminants, radium, natural organic substances and pesticides. It is effective when used in series with multiple units. In RO, semi permeable membrane to remove ions molecules and larger particles from water.

3.2.4. Mineral cartridge : It consist of Coral sand, mineral ceramics, Alkaline ceramics, Super Ceramics and Activated carbon. It is the membrane separation process using pore size of approximately 0.03 to 10 microns, a molecular weight cut off greater than 10,00,000 daltons and relatively low operating feed water operating pressure of approximately 100 to 400 KPA(15 to 60 psi). Materials removed by MF includes sand, silt, clays,etc.

3.2.3. Booster pump : A booster pump is a machine which will increase the pressure of fluid. It is driven by electric motor.

3.2.4. Booster pump

4. Test conducted on sample.

Test on sewage water
1. PH
2.chloride
3.alkalinity
4.DO
5.BOD
6.COD
7.TDS
8.TOTAL SUSPENDED SOLID

Tests on treated water.
1.PH
2.CHLORIDE
3. ALKALINITY
4.HARDNESS
5.BOD
6.COD
7.COLOURE
8.ODORE
9.TASTE
10.TURBIDITY

5. Model of Retreatment Plant

6. Test result of treated water

- **Retreatment Plant Outlet Waste Water**

Parameters	Result	Units
PH	6.2	
Hardness	225	mg/lit.
Dissolved oxygen (DO)	6.89	mg/lit.
Chloride	162.36	mg/lit.
Alkalinity	104	mg/lit.
Acidity	3.625	mg/lit.

- **Retreatment Plant Outlet Pure Water**

Parameters	Result	Units
PH	6.12	
Hardness	40	mg/lit.
Dissolved oxygen (DO)	5.91	mg/lit.
Chloride	14.889	mg/lit.
Alkalinity	52	mg/lit.
Acidity	1.7	mg/lit.

Conclusion

By adopting such techniques for waste water at large capacities and to supply it for various purposes, eliminates the water scarcity problems to the cities like Ichalkaranji. We tested water under the model of Retreatment plant, it achieves standard water parameters for potable, domestic and irrigation requirements.

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