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# "PERFORMANCE EVALUATION OF MANAKLAO WATER TREATMENT PLANT, JODHPUR (A CASE STUDY)"

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**ABSTRACT:** *Water constituted is of the most important physical environments of man and has a direct bearing on his health. Water is precious to man and therefore control of water supplies to ensure that they are pure and wholesome as one of the primary objectives of environmental sanitation. The aim of water treatment is to produce and maintain water that is hygienically safe, aesthetically attractive in an economical manner. An attempt has been made to study the* ***Performance Evaluation of Manaklao Water Treatment Plant, Jodhpur; Rajasthan, India (A Case Study)****. The normal operation period of water treatment Plant Manaklao is of 16 hours. Daily discharge is of about 35.28 MLD (1470 KLH output capacity).The Water Treatment Plant was analyzed for basic parameters of pH, Turbidity, Total Hardness, Carbonate Hardness, Chlorides, Nitrate, TDS, Fluoride from Raw and Treated Water of the WTP. The Study revealed that the characteristic of treated water from WTP meets the limit prescribed by Rajasthan Pollution Control Board.*

***Key words: -*** *Total Dissolved Solids, Water Treatment Plant, Nephelometric Turbidity Unit*

## 1.0 Introduction

Water is one of the most important parts of environment. It has direct bearing on human health. Water may be polluted by physical, chemical and bacterial agents. Therefore protected water supply is most essential to avoid health hazard. Water treatment plant improves the quality of water to make it more acceptable for a specific end-use. The end use may be drinking, industrial water supply, irrigation, river flow maintenance, water recreation or many other uses, including being safely returned to the environment. The study was conducted at Water Treatment Plant located in Manaklao at Jodhpur. Samples of Raw water and Treated water from the water treatment plant were taken and analyze it to evaluate the performance study of water treatment plant. The treatment plant has been design to treat the raw water.

## 2.0 General description of water treatment plant

Raw water after passing through cascade type aerator entered in the receiving chamber. Pre-chlorination is to be made at receiving chamber only. Then raw water measurements take place at Par shall flume followed by Alum dosing in the flume channel & mixing at Flash mixer. Then water lead to clariflocculator unit directly from distribution chamber to filter unit through clarified channel. By pass arrangement is provided on U/S of flash mixer for allowing direct entry to filters through a sluice gate. The valves at Filter water outlet, backwash water inlet, air inlet, Drain water outlet & the inlet gate are to be provided with electric actuators. The filtered water collected in pure water channel give post chlorination treatment in RCC chlorination chamber as per requirement mentioned.

### 2.1 Treatment to be provided

a) Disinfection: Pre Chlorination
b) Flocculation & Coagulation with alum
c) Clarification by settling due to gravity
d) Filtration using rapid gravity sand Filters
e) Disinfection: Post chlorination

## 3.0 OBJECTIVE OF THE STUDY

1. Performance study of water treatment plant to know the current parameters such as pH, Turbidity, Total Hardness, Carbonate Hardness, Chloride, Nitrate, Total Dissolved Solids, Fluoride of WTP.
2. Comparisons with the prescribed standard.

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## 4.0 OBSERVATION AND ANALYSIS

- The study was conducted at Water Treatment Plant located in Manaklao at Jodhpur. Samples of Raw water and Treated water from the water treatment plant were taken and analyzed it to evaluate the performance study of water treatment plant.
- The sampling of raw water was done period of one month or so to have an average characterization. The average values of pH, Turbidity, Total Hardness, Carbonate Hardness, Chloride, Nitrate, Total Dissolved Solids and Fluoride are found out to analyze the removal efficiency.

## 5.0 Methodology and Material

- Sampling Period: Samples were taken for 30 days from the Inlet or Outlet of the Water Treatment plant.
- Sampling Materials and Methods: The experimental method consists of collection of samples of raw water and treated water from the water treatment plant.
- The efficiency of the water treatment plant was examined and measuring changes in the concentration of the pH, Turbidity, Total Hardness, Carbonate Hardness, Chloride, Nitrate, Total Dissolved Solids, Fluoride of raw water and treated water.

## 6.0 Results and discussion

The observations of various tests conducted at site laboratory of water treatment plant at Manaklao for one month all parameters calculated on daily, average & weekly basis are as following. Test Results & Graphs showing variation in results of raw water at inlet & receiving chamber and treated water at outlet are as follows:

**Table6.1: Average Analysis Report of Raw Water and Treated Water**

| S.No | Parameter | Unit | Raw Water | Treated Water |
|---|---|---|---|---|
| 1. | pH | - | 7.70 | 7.10 |
| 2. | Turbidity | NTU | 2.66 | 0.44 |
| 3. | Total Hardness | Mg/L | 257 | 107 |
| 4. | Carbonate Hardness | Mg/L | 257 | 107 |
| 5. | Chloride | Mg/L | 94 | 31 |
| 6. | Nitrate | Mg/L | 2.14 | - |
| 7. | TDS | Mg/L | 143 | 96 |
| 8. | Fluoride | Mg/L | 0.25 | 0.11 |

Similarly the observations were observed every 5 days and the average of the results are as above

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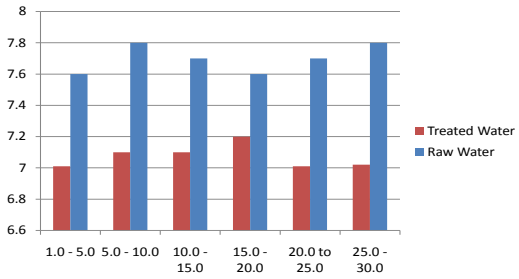
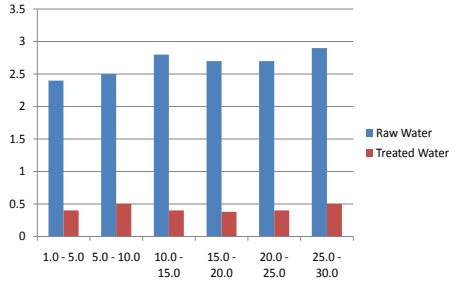
**Variation of pH**



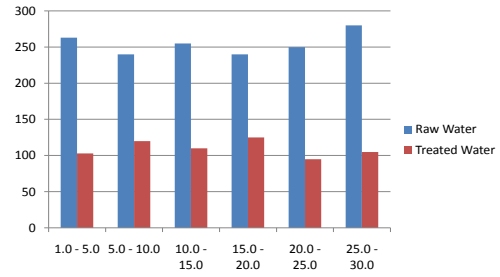

**Number of Days**

**Turbidity (mg/L)**



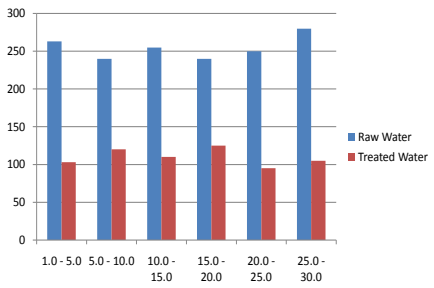

**Number of Days**

**Total Hardness (mg/L)**



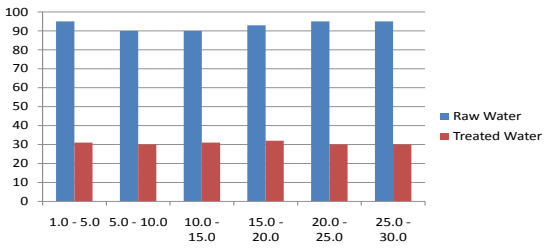

**Number of Days**

**Carbonate Hardness (mg/L)**



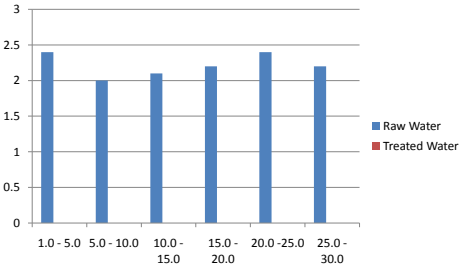

**Number of Days**

**Chloride (mg/L)**



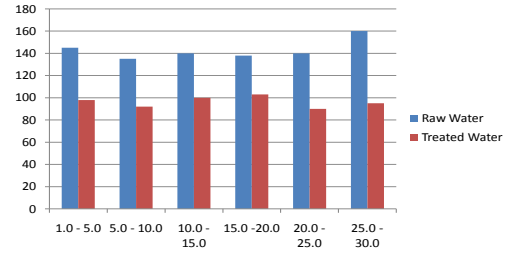

**Number of Days**

**Nitrate (mg/L)**



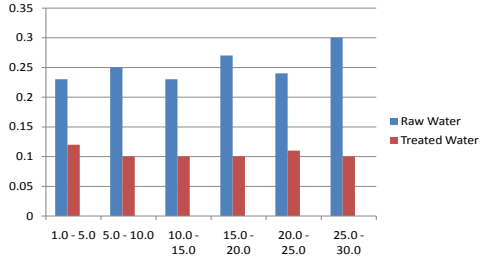

**Number of Days**

**TDS (mg/L)**




**Number of Days**

**Fluoride (mg/L)**




**Number of Days**

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## 7.0 CONCLUSION

On the basis of various test conducted at site laboratory on daily weekly basis average result obtained and represented though tables and graphs the following conclusion have been made drawn.

1. The average pH of raw water at the inlet of the receiving chamber is 7.70.after treatment the PH of treated water is 7.10.Therefore we can conclude that the treatment of water is satisfactory and the pH value of treated water is acceptable.

2. The average Turbidity of raw water at the inlet of the receiving chamber is 2.66 NTU. After treatment the turbidity of treated water at out is 0.44 NTU.

3. The average total hardness of raw water at the inlet of receiving chamber is 257 mg/L. Total hardness of treated water at the outlet is 107 mg/L.

4. The average chloride content of the raw water is 94 mg/L. The average chloride content of treated water at the outlet is 31 mg/L.

5. The average Nitrate content of raw water is 2.14 mg/L. The Nitrate content is totally removed after treatment of water.

6. The average total dissolved solids of the raw water are 143 mg/L. It is found that the average total dissolved solids of treated water are 96 mg/L

7. The average Fluoride content of raw water is 0.25 mg/L. The average fluoride content of treated water is 0.11 mg/L.

8. In bacteriological analysis of treated water is found that Coli form bacteria are not detectable and the Residual Chlorine is 0.20 mg/L which are acceptable as standard drinking water.

From the above study it is conclude that in the physical, chemical analysis and bacteriological analysis of treated water samples of the treated water obtained from the water Treatment plant at Manaklao, Jodhpur is as per standards potable drinking water Requirement. All the parameters of treated water were under permissible limits given by **RAJASTHAN POLLUTION CONTROL BOARD.**

## 8.0 REFRENCES

1. Public health engineering (part-I) EB Phelps & CJ Velj (John Wiley and sons, New York-2011)
2. Water supply and sewage EW Steel and TJ Mc Ghee (Mc Graw Hill Book Co, New York-2014)
3. Water supply engineering FE Turneaure and HL Rusell John Wiley & Sons, New York-2013
4. Elements of water supply and waste water disposal GM Fair and JC Geyer (John Wiley & Sons, New York-2011)
5. Water and waste water engineering Vol I&II GM Fair and JC Geyer (John Wiley & Sons,New York-2012)
6. Analysis of flow in water distribution networks P.R Bhave (Technomic Publishing Co-2013)
7. Water supply and waste disposal WA Haedenbergh and EB Rodie (Allied publishers Pvt Ltd,New Delhi – 2014)

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