Abstract

The performance of Al-Hussain city water treatment plant is not evaluated previously and it's represented the biggest project at Karbala with the design capacity 194.4 MLD. Therefore, this plant is studied; the problems and their solutions are clarified.

The turbidity data of raw, settled, and filtered water are analyzed. Also the chlorination process and the plant operation are also studied. Samples collection continued from January to August, 2005. 1400 tests are done. Then the data are analyzed statistically.

For raw water turbidity analysis, it was found that turbidity values varied between 16 NTU and 68 NTU and this means that the design of conventional treatment (coagulation, flocculation, sedimentation, and filtration) was warrant. Also it was seen high value of turbidity during the April month that due to cleaning process at Al-Hussainiya cannel.

Regarding settled water turbidity analysis, it was found that coefficients of clarifiers were approximately equal to each other. It was found that for clarifier No.1, that there were 28 observations out of 50 observations less than or equal to 10 NTU. This gave a probability of compliance of 0.56. For clarifier No.2 had a probability of compliance of 0.58. From paired sample T-test that it was used to attain the main objective of this study regarding the turbidity removal efficiency, it was found that the efficiency of clarifier No.1 is statistically equal to efficiency of clarifier No.2. From box plot, it was found clarifier No.1 has had less variation in settled water turbidity than clarifier No.2 (approximately operation at constant rate).

Regarding filtered water turbidity analysis, it was found that high fluctuated in turbidity values and this variance for each filter approximately was coincided. It was found that filter No.1 better than the filter No.2 from the hand of

operation, where the probability of compliance for turbidity samples ≤5 NTU (aesthetic limit) was 0.52 for filter No.1 and 0.42 for filter No.2. From T-test, it was found that efficiency of filter No.1 is statistically equal to filter No.2.

For residual chlorine concentration analysis, it was found that the residual chlorine concentration values at plant varied between (1.6-2.1 mg/l) and these values were normally distributed.

Other findings are reported here in this study.