Water Quality Control Management of Water Treatment Plant. (Case Study Ramadi Water Treatment Plant)

By

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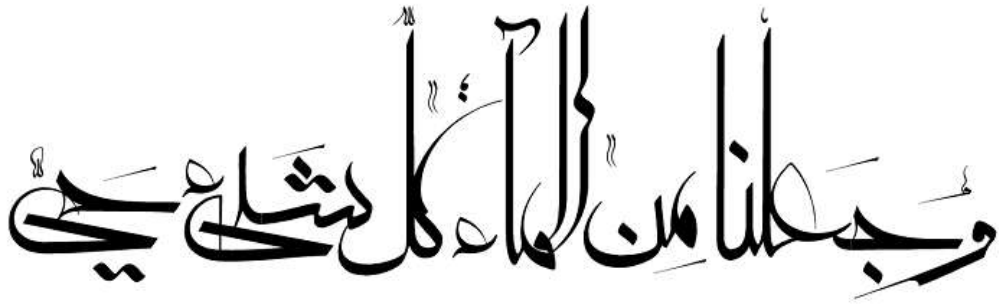

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Dedication

I dedicate this thesis to my father and mother

my lovely wife,

my daughters and son,

and to my brothers and sisters,

To all my friends especially Mustaffa Al Fahdawi & Ali Raid

To all the persons who contributed much in the success of this dissertation.

In addition, I would like to thank Hashemite Kingdom of Jordan and people for their helped and hosted me throughout the duration of my research.

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Authorization Form

I, Mohammed Olaiwi Sulaiman, Authorized Al Isra University to supply copies of my thesis to libraries or establishments or individuals on request, according to Isra University regulations.

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Abstract

In this study, quality control study of water treatment plant was investigated. Ramadi water treatment plant was chosen as a case study, this plant is located in Anbar Governorate of Iraq. Water quality control charts were developed according to the monthly data gathered in 2013 for the raw and treated water. The major purpose of this study is to develop a baseline data regarding to water quality condition and therefore, the proper management and improvement of drinking water produced from Ramadi plant. Control charts model is applied for the first time in the analysis of water quality in the case study plant. These charts can provide a clear pictorial view about the water quality parameters status of the Ramadi plant as well as Euphrates River.

Data of several water quality parameters were used in the assessment study such as temperature (°C), pH, turbidity (NTU), total dissolved solids (TSS, mg/L), Electrical Conductivity (EC, µS/cm), total dissolved solids (TDS, mg/L), hardness (mg/L as $CaCO_3$), and alkalinity (mg/L as $CaCO_3$). In addition, the present stages of treating water in Ramadi plant were discussed. This is will be helpful to find out which units can be modified or suggested for the improvement the specification of drinking water.

The water quality data were first compared with the Iraqi standards of drinking water and the results showed that approximately all the parameters within the acceptable limits except of EC and TDS in which some values were exceed the allowable limit. Despite that, control charts study revealed that the mean values of some parameters were crossed the upper and lower control limits indicating poor drinking water quality. TDS was the most parameter that crossed the control limits in many cases. These findings suggested to

install several new TDS treatment units in the Ramadi water treatment plant. The main units are Reverse Osmosis units and using dual media filters instead of sand filter. Additional optional units also were mentioned to treat the hardness and pH values. This study can be helpful to assess the drinking water in other water treatment plants.