



Pemodelan Intrusi Air Asin pada Akuifer Pantai (Studi Kasus: DKI Jakarta)

Saltwater Intrusion Modeling in Coastal Aquifers (Study Case: DKI Jakarta)

Alan Wijaya – Bandung Institute of Technology, Bandung, Indonesia

Year: 2018

Tutor(s): Dr. Eng. Arno Adi Kuntoro, ST.,MT – Bandung Institute of Technology, Bandung, Indonesia

Ir. Edy Anto Soentoro G, MASc.,PhD – Bandung Institute of Technology, Bandung, Indonesia

Abstract

Some main issues related to the management of ground water resources are frequently faced by communities living in coastal areas in Indonesia, especially in the city of Jakarta, such as large population, rapid industrial and business growth, availability of groundwater resource and limitation of PAM (water supply company) capability, and Jakarta's geographic position with its aquifer system bordered by to the coastal. Those fundamental issues caused the saltwater intrusion in Jakarta to fade further into the freshwater aquifers system. The purpose of this study was to analyze the extent of the distribution of saltwater contamination to coastal aquifers in Jakarta so that it could be utilized in the policy formulation of ground water management and clean water management. The method used in this research was literature study, the data used in the form of secondary data and modeling conducted by the open source program well known as FREEWAT.

The modeling of salt water intrusion on coastal aquifer of Jakarta was conducted into five model scenarios, namely (1) reduction of 50% of groundwater use, (2) reduction of 50% of groundwater use, (3) existing groundwater use in 2012, (4) increase of 25% of groundwater use, and (5) increase of 50% of groundwater use. From the modeling results, they were obtained the distribution of saltwater contamination on each layer of the aquifer of Jakarta. In unconfined aquifer the existing condition is scenario 3 intrusion as far as 1,604 m, on scenario 1 there is an intrusion decrease of 38%, in scenario 2 there is an intrusion decrease of 13%, in scenario 4 there is an increase in intrusion by 17% and on scenario 5 increase intrusion by 25%. In upper confined aquifer, the existing condition, namely scenario 3, has occurred as much as 1.809 m intrusion, in scenario 1 there is an intrusion decrease of 23%, in scenario 2 there is an intrusion decrease of 8%, in scenario 4 there is an increase in intrusion by 19% and in scenario 5 increase intrusion by 26%. In middle confined aquifer, the existing condition is scenario 3, 1.927 m intrusion occurs, on the scenario 1 there is an intrusion decrease of 23%, in scenario 2 there is



an intrusion decrease of 9%, in scenario 4 there is an increase in intrusion by 16% and in the scenario 5 increase intrusion by 22%.

Key words: Jakarta, Intrusion, Aquifer, Groundwater, FREEWAT

The thesis is written in Indonesian language.

Author's contacts: Alan Wijaya – alanwijaya.pda@gmail.com