SUMMARY

Muhammad Iqbal, *Water Resources Engineering, Department of Engineering, University of Brawijaya, October 2015. Optimization Of Release Operation Based On Storage For Hydroelectric Power Plant At Sutami Using Genetic Algorithm*, adviser : Dr. Ir. Widandi Soetopo, M.Eng. and Dr. Ir. Pitojo Tri Juwono, MT.

Hydroelectric power production (Hydroelectric Power Plant) in reservoir Sutami has an important role in order to meet the electricity needs of the people in Java and of Bali Island. In the fulfillment, will be a need an optimal production of electric power from the Hydroelectric Power Plant reservoirs Sutami, considering the rapid growth of population in Java and Bali island. Production of electrical energy in Hydroelectric Power Plant reservoirs Sutami not be separated from the releases rules on the operation of the reservoir. If the existed rules that at the reservoir for hydroelectric power Sutami optimized, the electrical energy produced will be optimized as well. One method of optimization for the settlement of the problem is with the Genetic Algorithm method which is one method of stochastic program.

This study focusing to improve reservoir performance based on reservoir storage, with objective function to optimize the average and minimum production of electric power from the Hydroelectric Power Plant reservoirs Sutami. One method of optimization for the settlement of such problems is by using a Genetic Algorithm (GA). Genetic Algorithm method is operated using a spreadsheet program Excel from Microsoft Office 2007 version (or abbreviated as MS-Exel 2007). MS Excel 2007 is a spreadsheet program that consists of sheets worksheet to zoom and procedures with Visual Basic macros to control the course of the program. This method can mimic the behavior of the system and can be used to make a decision on a series of related decisions. This is in accordance with the optimization problem of Sutami reservoir for Hydroelectric Power Plant because operating pattern Sutami reservoir depends on the time, so it needs completion in stages.

From the simulation results of operations based on reservoir, found comparison between Hydroelectric Power Plant generation energy the after optimization Sutami with existing data Sutami reservoir in 2002-2011. The optimization process is centered on the rule of detachment based chromosome reservoir as Hydroelectric Power Plant generation and verage and minimum energy as a function of the performance / function goals.

The optimization obtained an increase in the minimum annual energy generation of Hydroelectric Power Plant reservoirs Sutami 4.32 GWh (up 68.53%) and the average annual energy generation of Hydroelectric Power Plant reservoirs Sutami 14.04 GWh (up 12.86%), this optimization is also increasing value the average energy generation and minimum energy based inflow scenarios (high year, normal year, low year, and dry year) with typical division in using Weibull Methode. The optimization process that has been done, is expected to provide an overview of the optimal rules of release for operation of reservoirs in Hydroelectric Power Plant of Sutami.

Keywords : Optimization, Reservoir, Stochastic, Genetic Algorithm , Release rule based on Reservoir Storage.