



Development of Sub-Region Water Production for the Saipan Water Distribution System Model and Exploration of Scenarios for Optimal Operation



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The Saipan water distribution system has been divided into 10 sub-regions. Each region is expected to operate somewhat independently. However, due to inadequate inflow to some of the sub-regions, system leakage, and lack of knowledge of the system behavior as a whole, the system is unable to provide 24-hour water services. A stated goal of the Commonwealth of the Northern Marianas Islands (CNMI) government is to provide 24-hour water to all residents served by the Commonwealth Utility Corporation (CUC) water system. The CNMI Governor created a task force whose primary purpose is to find funding and oversee the CUC accomplishments toward the 24-hours water service goal. To assist in reaching their goals, the CUC commissioned the University of Guam, Water and Environmental Research Institute of the Western Pacific (WERI), to develop a hydraulic model of the Saipan water system and to train CUC water division staff in the use of that model.

WERI researchers have developed computerized models of each of the ten sub-regions of the CUC water system using the Haestad WaterCad water system modeling program. They also, developed a source, transmission and storage model of the Saipan water system. This included a skeleton of the existing 10-region water system models that are joined together at the boundary points. For the model to provide optimal results, it is essential to have a good knowledge of the residential and commercial demands being placed on the distribution system. This estimation has been completed by WERI and

the water usage values have been imported into the model. The next vital pieces of information required include estimates of how much water is being put into the system from each source and the most effective way of transferring this source water between the regions.

This project proposes to refine estimates of both the quantities and spatial distribution of water production from wells and springs in each sub-region and to explore the most effective means of transferring the water sources between the regions. The specific objectives of this project are:

1. To determine the amount of water production in each sub-region.
2. To locate all production sites using Geographical Information System (GIS) techniques.
3. To explore various operational scenarios for effectively transferring water throughout the regions.

The resulting improvements to the water production estimates and the transfer efficiency studies will provide the CUC water division with the capability to better identify the rates of unaccounted water throughout the system and to determine what changes in operation and system improvements are required in order to meet the goals of improved water quality and 24-hour water delivery to all of the CUC customers.