



Development of Water Usage Pattern (Diurnal Demand Pattern) for Saipan Water Distribution System



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The US Environmental Protection Agency (EPA) recently stressed that the water treatment system in Saipan, CNMI is still in need of improvement. The EPA acknowledged that the lack of safe drinking water is among the top environmental challenges that the EPA found to be facing the CNMI, particularly Saipan. In a previous assessment, the EPA found Saipan to be the only municipality of its size in the United States without 24-hour water delivery. The agency reported that the water on island is not drinkable due to its high salinity, and water flows through the pipes only a few hours per day for almost half of the island's residents.

One important step in establishing 24-hour water delivery and improving water quality in the system is for the Commonwealth Utility Corporation (CUC) to have a better understanding of how their distribution system delivers water to customers and what improvements are needed to meet operational and water quality goals. 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.

In order to improve the system operation it is necessary to have a good knowledge of the residential and commercial demands being placed on the distribution system and how these demands change during the day

and during the month. Without this knowledge it is difficult to develop system operation and to calibrate the hydraulic model of the water system.

This project proposes to better refine estimates of both the quantities and spatial distribution of water demands and how these demands changes with both residential and commercial customers of the Saipan CUC water system.

The specific objectives of this project will be to:

1. Determine the average use rate for residential customers in Saipan and to determine the actual use rate for high commercial consumers;
2. Develop Diurnal demand pattern (changes of water demand during the day and month) for residential and commercial customers;
3. Export the data developed in Step 1 and 2 into the Saipan Water System hydraulic Model, and run the model in extended period simulation mode.

The resulting improvements to the demand estimates and its changes with time will provide the CUC water division the capability to: a) determine the amount of the water that is being lost through the system, b) implement various operational systems for transferring water among the 15-sub regions for providing 24-hour water service to the customers, and c) improve water system maintenance.