

Comparing Multiple Membrane Filtration to the Conventional Swimming Pool
Treatment Method

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Executive Summary

The purpose of this study was to investigate and compare the environmental effects of two swimming pool treatment methods, a conventional treatment method in a multiple membrane filtration (MMF) method, developed by Lathrop Pools in Lake Havasu City, Arizona. The first objective used to achieve this goal was to assess the changes in water qualities during the two treatment methods and analyze how these treatment methods impacted the water quality of the pool. The second objective was to create a model that estimated the water, energy, and carbon footprints of each process and compared cost over a ten-year horizon.

To achieve the first objective, water samples were taken at various stages in the treatment methods and transported to Arizona State University's Goldwater Lab under strict protocol. Lab analysis was conducted along twenty-one different parameters and the results graphed. Five parameters were used to determine the Langelier Saturation Index (LSI), which predicts scale formation and corrosion. To achieve the second objective, a conceptual mass balance model was developed to estimate the annual water, energy and carbon footprint of each treatment process.

The results of this study show that the MMF treatment method yields a better water quality, removing a higher concentration of ions and minerals. The MMF method conserves as much as [REDACTED] percent more water and uses almost [REDACTED] less energy than the conventional method. The MMF method proved to be more cost-effective than conventional treatment for all but one scenario. The only area that the conventional method proved more advantageous was they carbon footprint as the MM method uses a diesel generator to run its pumps, which produce more carbon dioxide than the conventional treatment method.

Note: Redacted areas are proprietary production values.