Tenorio project: a case of sustainable development in Mexico

Lucina Equihua*, Alberto Rojas

Av. Paseo de la Reforma 350. P 15 Mexico City, Mexico
Email: lucina.equihua@degremont.com.mx

Received 14 March 2012; Accepted 18 July 2012

ABSTRACT

The project Tenorio–Villa de Reyes main objective was to increase the coverage of treatment in the metropolitan area of San Luis Potosí and to recycle the treated for agriculture and industry. The project consisted of the construction of one municipal wastewater treatment facility with a total capacity of 90,720 m³/day, five main sewage collectors, one irrigation system with a reservoir called Tenorio that receives most of the treated water, and one distribution system (38-km pipe) that allows reusing the tertiary effluent in the cooling towers of the Power Villa de Reyes. The project has been in operation for almost 5 years, and so far it has reached almost 90% of the plant capacity with significant impact over the restoration of the Tenorio ecosystem due to the improvement of the water quality, and although only 50% of the flow is received in power plant, it has served to the purpose of saving 40 Mm³ of potable water. Before the beginning of the operation, “Tenorio” reservoir had been receiving raw wastewater and wildlife became scarce. Currently, the return of wildlife is very substantial, and the site has become a nesting site for several migratory birds’ species. The Project Tenorio is the first on its type in Mexico that combines industrial water reuse, agricultural reuse, aquifer recovery, and the recovery of and the development of ecosystem that could be considered as an artificial wetland. It is well known that wetlands provide habitat for plants and animals and also absorb excess nutrients, sediments, and other pollutants before they reach rivers, lakes, and other water bodies or in our case before part of the water is used for irrigation of crops. In the case of the Tenorio reservoir, once the artificial internal walls were completed and it was filled with the effluent of the Tenorio Plant, the native plants were restored and the natural depuration process was established to complete the treatment of the water improving significantly its quality. In the spring or 2010, the presence of Daphnia, which are well know for being used as indicator organisms for toxicity test, was definitely consider as indicator of the lack of toxic substances that had been successfully removed by the treatment plant and by the natural depuration process that occurs in the reservoir. During the last 3 years, the number of migrating birds has increased and there are several species of birds that have been observed to rest, feed, and nest during their cross-continental journeys. The quality of the water has been monitored during the last 3 years (BOD, COD, TSS, nitrogen, and coliforms), and it has been found that even though the rate of improvement is low, the effects are notorious over the ecosystem. The power plant management is very satisfied with the use or recycled water since they have proven the reliability of the system in terms of both quality and quantity.

Keywords: Water recycling; Wastewater reuse; Sustainable development; Ecological benefits

*Corresponding author.

Presented at the International Conference on Desalination for the Environment, Clean Water and Energy, European Desalination Society, April 23–26, 2012, Barcelona, Spain