CUENCA AGUAS DEL VALLE DE MEXICO INSTITUTION

DRINKING WATER DIRECTION, DRAINAGE AND CLEANSING

WORKS GENERAL RESIDENCE OF CUTZAMALA SYSTEM

"FILTRATION SYSTEM IMPROVEMENT OF THE DRINKING WATER TREATMENT PLANT LOS BERROS, CUTZAMALA SYSTEM, LOW DRAIN LAYING, IN EXISTING MODULES IN THE DRINKING WATER TREATMENT PLANT LOS BERROS, IN MÉXICO"

PRESENTATION OF THE PROJECT'S IMPROVEMENT OF THE FILTERS IN THE DRINKING WATER TREATMENT PLANT "LOS BERROS".

WATER NATIONAL COMMISSION.

PRESENTATION OF THE PROJECT'S IMPROVEMENT OF THE FILTERS IN THE DRINKING WATER TREATMENT PLANT "LOS BERROS"

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INTRODUCTION

The Cutzamala system is a storage hydraulic system of conduction, drinking water treatment and distribution of freshwater for the population and industry of the Federal District and Mexico located in the central areas of the Mexico Basin and the valley of Toluca. Being considered one of the biggest civil engineering works in the world, since the water should be pumped from a height of 1600 M.S.N.M. in its lower point to 2702 M.S.N.M. in its higher point, this system extends to the entities of Michoacán, state of Mexico and the Federal District.

CUTZAMALA SYSTEM CHARACTERISTICS

The main characteristics of the system are:

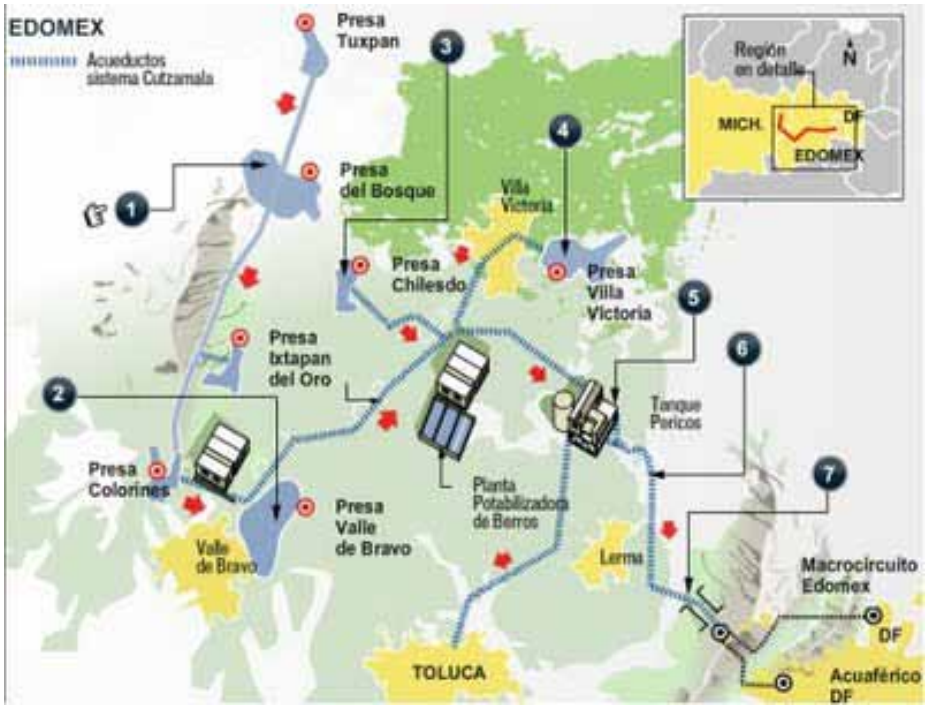
7 Retaining walls.

6 Pumping plants that consume 2280 million kilowatts per hour, the equivalent to the electricity consumption of a city of 1.5 million inhabitants.

334.4 km of primary piping, distributed in 218 km, 43.9 km de tunnels y 72.5 km of pipelines by metal conduit and concrete, 43.9 km of tunnels and 72.5 km of flumes.

1 Drinking water treatment plant with capacity for 19 m³/s. Drinking water treatment plant Los Berros

6 m³/s of water from Lerma (31.5%), and 13 m³/s comes from Cutzamala (68.5%), a contribution that represents a little more than 30% of the water used in the city of Mexico



THE DRINKING WATER TREATMENT PLANT LOS BERROS

The drinking water treatment plant los Berros is located in Mexico and is part of Cutzamala System.

• Actually it sends to the metropolitan area of Mexico City and State of Mexico, a flow of average 15,500 l/s that is equivalent to 488.808 million liters per year, with the quality that the Mexican Official Norm demands NOM-127-SSA1-1994, modified in November 2000.

• The drinking water treatment plant "Los Berros" with five drinking water modules and installed capacity of 19 m3/s, it is one of the most important facilities in the Cutzamala System.

THE DRINKING WATER TREATMENT PROCESS

The process begins with the rainwater gathering in the Tuxpan retaining walls and El Bosque, located in the state of Michoacán, and those of Ixtapan del Oro, Villa Victoria, Valle de Bravo, Chilesdo y Colorines, as well; each one of them is part of the River Cutzamala basin.

Afterwards takes place the raw water transfer to make it drinkable by means of a chlorination process (disinfection), followed by an application of aluminium sulphate for its clarification since that helps to eliminate soil, mud or clay in the liquid. This whole process is known as flocculation, because the chlorine is added to the water in gassy state that allows the separation of mud and suspended particles made in roughing tanks and filters.

Lastly, five plants pump the liquid to assist the necessities of at least 20 million people in Mexico City.

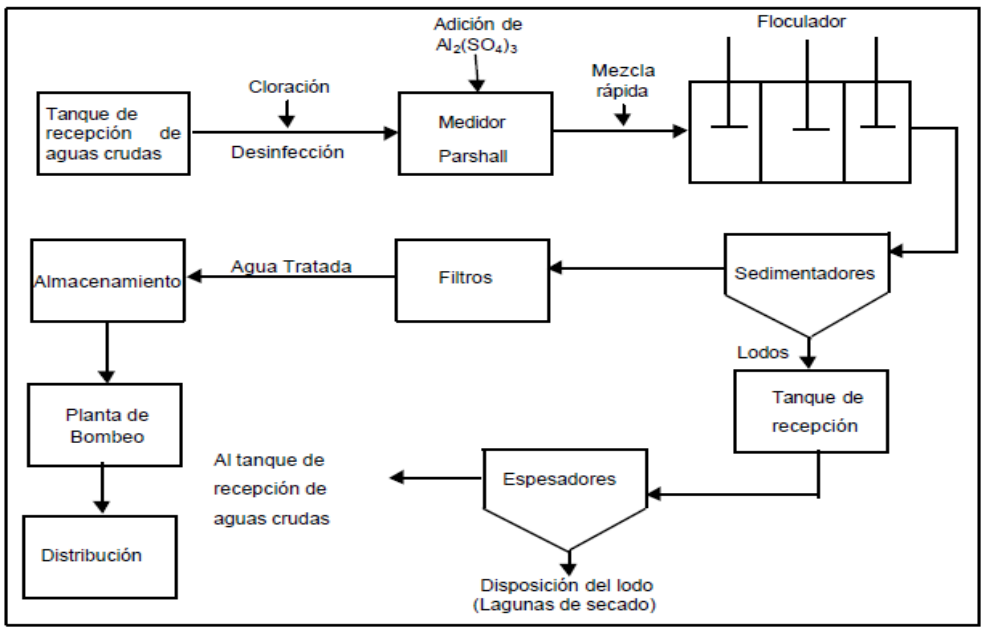


Figura 1. Tren de tratamiento de la planta potabilizadora

FILTRATION SYSTEM OF THE DRINKING WATER TREATMENT PLANT "LOS BERROS"

After 30 years of operation the drinking water treatment plant "los berros" of the Cutzamala system already revealed some deficiencies in the water filtration process, system that was made of false bottom flagstones with grooving drills, that were a frequent problem since they required maintenance whenever they broke because of the pressure and the continuous use, being necessary to carry out periodic stoppages in order to change the damaged pieces. Another problem was that when the drills break there were loss of filter media through these conduits that diminished the efficiency of the pumping causing serious damages to the pumping equipments.

INVOLVEMENT OF AQUALIA INFRAESTRUCTURAS OF MÉXICO S.A. DE C.V. *in the* Project: "*Modernization of the filtration system of the drinking water treatment plant "Los Berros", Cutzamala System, setting of the drainage blocks in the drinking water treatment plant "Los Berros" in Mexico"*

Given the previously mentioned problem it was necessary the realization of a project that guarantee the water filtration. That's why Aqualia tender for the project of filters modernization that includes modern patented technologies as the polyethylene drainage blocks of high density free of maintenance. This new project also improves the quality of water thanks to the new draining materials of quartzose gravel, silica and anthracite. A better filtration is obtained compared to the one obtained just with sand, in the same way the conservation of the draining material is guaranteed since the combination of the thick and fine material layers and the loss of draining material is avoided.

General view of the drinking water treatment plant “Los Berros”, Villa de Allende, in Mexico

Front view of a filter’s module, drinking water treatment plant “Los Berros”

Filter's view before the rehabilitation

Extraction of draining Material and existing filtration nozzles

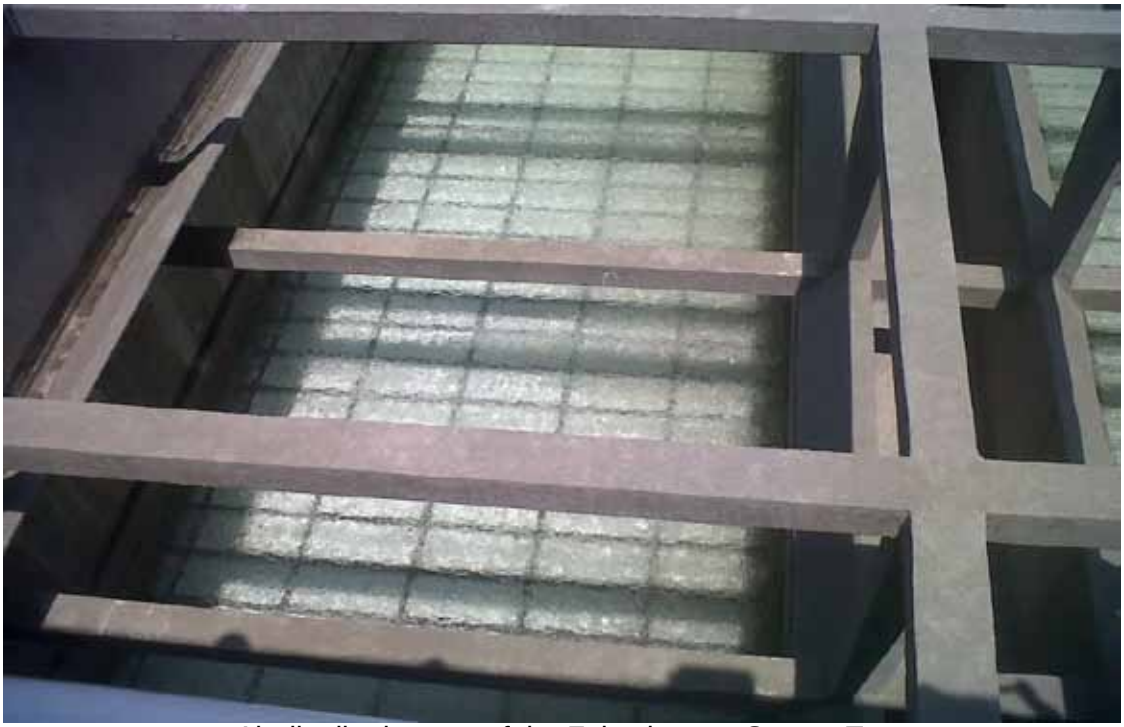
False bottom flags removal

False bottom flags removal

Open-pored wall cleaning

Bottom cleaning and waterproof application Xypex

False bottom setting Severn Trent



Air distribution test of the False bottom Severn Trent

P

Draining material setting Quartzose gravel

Draining material setting Silica

Anthracite setting and draining material wash

Filter backwash and running test