USE CASE CRITICAL INFRASTRUCTURE

BRAIN-IoT
model-Based fRamework for dependable sensing and Actuation in INtelligent decentralized IoT systems

emalcsa

DRINKING WATER TREATMENT STATION

CATCHMENT OF RAW WATER AND ROUGHING

The raw water is taken from the Mero Rivers. As a fisst step of physical treatment, it is passed for a coarse grid, for a fin grid, and a for screen of continous band that prevents the passage of branches, leaves and other solids that are no desirable,since they can cause jams in the different unit of the plant.

1. PUMPING OF RAW WATER

The water is pumped to the plant by means of pumps, previously the Potassium permanganate can be added as pre-oxidation to reduce iron and manganese.

2. MIX CHAMBER

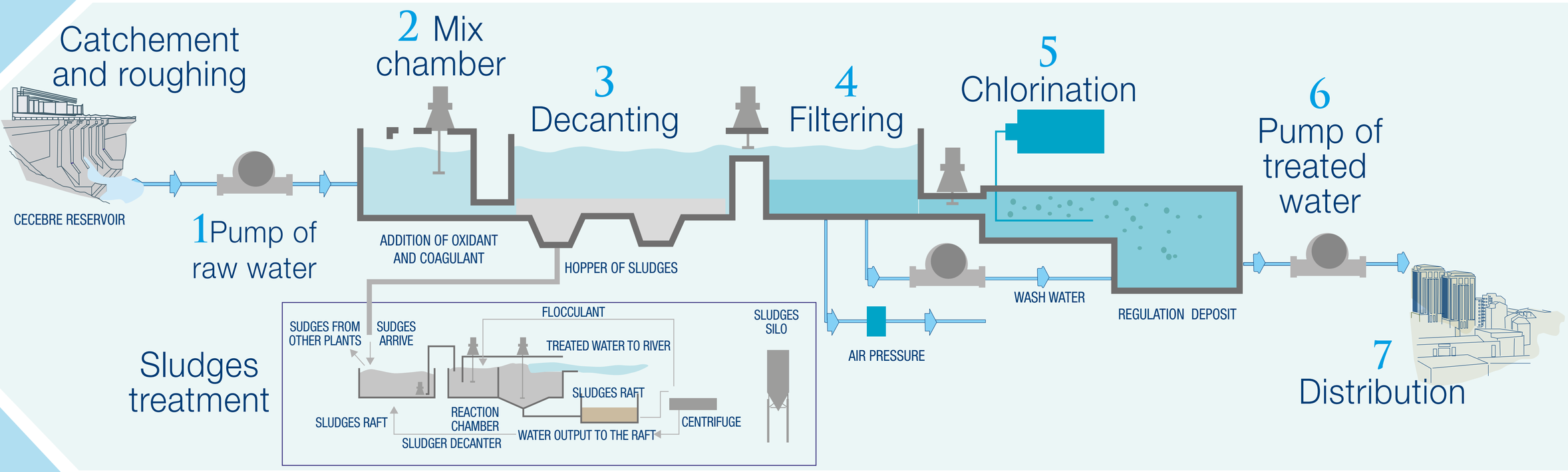
At this point, the necessary reagents are added for:

Pre-oxidation: potassium permanganate and/or chlorine. Their purpose is fundamentally reduce organic matter, iron, manganese and algae.

Coagulation-flocculation: As a coagulant to neutralize, Aluminum salts such as Aluminum Polychloride, and as Flocculant can be used natural type, as starches, or synthetic type.

3. DECANTING

The object of decanting is the elimination of solids present in water by the action of gravity. There are particles that by themselves settle in the decanter, others like colloids are grouped formingflocs with the help of reagents. The coagulant (aluminum polychloride) is used to destabilize the externaload of the colloids, favoring the formation of flocs. The flocculant (starch) captures these flocs forming a more voluminous framework, increasing the speed of sedimentation.



4. FILTERING

One of the main objectives of this phase is to retain partially or totally the solids that due to their size have not been able to decant. The decanted water is distributed among the filters and it is filtered through a bed of sand to finish the clarification process. The filters when saturated are cleaned countercurrent by injection of air and water.

4. CHLORITATION

The objective pursued is the elimination of pathogenic organisms that water can carry, for which chlorine is used in a gaseous state that dissolves in water. In this way, the sanitary consumption is guaranteed, since residual chlorine is maintained throughout the distribution network and at all times.

6. PUMPING OF TREATED WATER

The treated water is pumped to the Alvedro deposit through a group of pumps that allow to choose the flow demanded in each moment. And from this deposit is distributed to the city.

7. QUALITY CONTROL

The entire treatment process is controlled by measuring the physical-chemical parameters at the entrance and exit of the plant and in the intermediate stages as well as throughout the distribution network, guaranteeing water quality to all users.

SLUDGE TREATEMENT

The sludge from the three plants goes to the sludge plant along with the cleaning water from the filters of plants 1 and 2, where they are collected in a well. From this well, they pass to a mixing chamber and reactor (Densadeg), where polyelectrolyte is added for flocculation. The decanted water is returned to the river and the thickest mud passes to another mud pit, where by means of some pumps it is introduced to a centrifuge for the dehydration of the sludge by inertial velocity. The dehydrated sludge is stored in a silo, where it is periodically emptied in a truck to take it to an authorized manager.