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Introduction:

Plant is Mnfouhp of a plants Riyadh of the national water company, was founded in 1967, and swallowed the number of plants, eight ten plant pumps Riyadh drinking water , is located inside Mnfouhp - south of Riyadh - and works within 24 hours, and multiple sources of water that derives from the plant, where it is known that Riyadh had supplied the drinking water of two parts :

- 1) desalinated water by 60%
- 2) groundwater by 40%

But now, rising ratio of groundwater to 55%, and in turn became the desalinated water 45%, and often that is derived from 22 wells away from the plant, a distance of 10-35 km, with three lines[Kharj - Swediy – Haeir].

Characteristics of the water coming from wells:

TDS = 2500 mg / l. And PH = 8.0-8.5 and Hardness - 1600 NTU

Properties outside of the plant:

TDS = 750 mg / l. And PH = 6.8-7.0 and Hardness - zero NTU

When the water reaches to the plant 170 m cubic / h or 28 800 cubic meters / day and the maximum is 36 000 m cubical / day, the high temperature close to 75 degrees, which requires cooled to keep them from evaporation and loss, where he lossed the plant per 4% by evaporation, and thus be the first phase are:

First: Cooling Towers

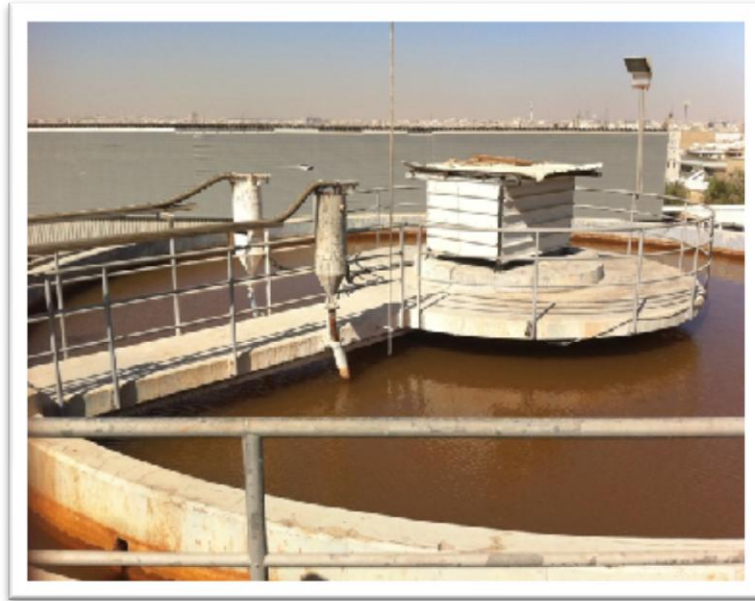


Cooling Towers

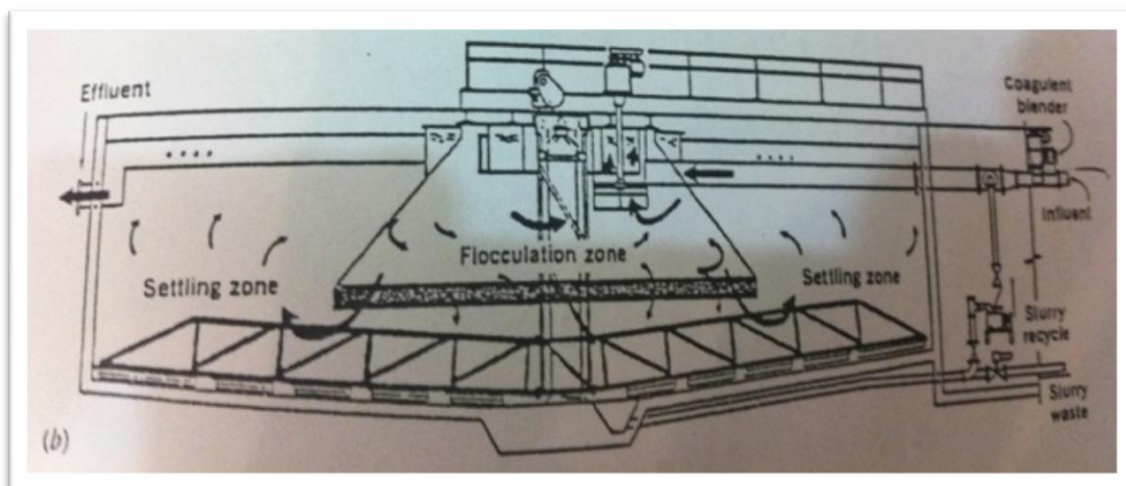
Where the number of refrigerated coolers was station 22, where receiving water on three lines, and reduce the temperature from 75 degrees to 32-34 degrees by the ventilation towers, so as to save them from evaporating as we mentioned earlier, adding that the disposal of elemental iron and magnesium by oxidation and then disposal it .

Second : Softeners

After reducing the temperature and disposal partly of Calcium and Magnesium, at this stage to get rid of the material impurity by sedimentated in the basin round ,and number it four basins and time of two hours and capacity of 600 cubic meters for each basin , the addition of a "polymer" helping to sedimentation , as well as at this stage to disposal from Fe and Mn by sediment it and other materials such as imperfection of magnesium and calcium (to remove water hardness) at the bottom of the softness with the material deposited and then get rid of them all. It is noted that 5% of the amount of water coming from the cooling system does not pass through this stage, but proceed immediately to the Sand Filters, and the goal is to maintain the number of simple elements and compounds for water .



Sedimentation Basin



The Details Planned of Sedimentation Basin

Third : Sand Filters

Before it enters the water to this stage, will be add a substance acid to rid it of the rest of the iron .The number of sedimentation basins are twelve basin , and where the ten basins under the work and the remaining are two for washing , and are washed to rid it of sediment , and is the transfer of water from the bottom of soil to top and then the opposite From top to bottom. The major benefits of the basins are:

- 1) Removal of the remaining suspended solids (5% - 10%)
- 2) Removal of about 90% of bacteria
- 3) Removal of iron and manganese
- 4) Removal of color and taste



Sand Filter under work

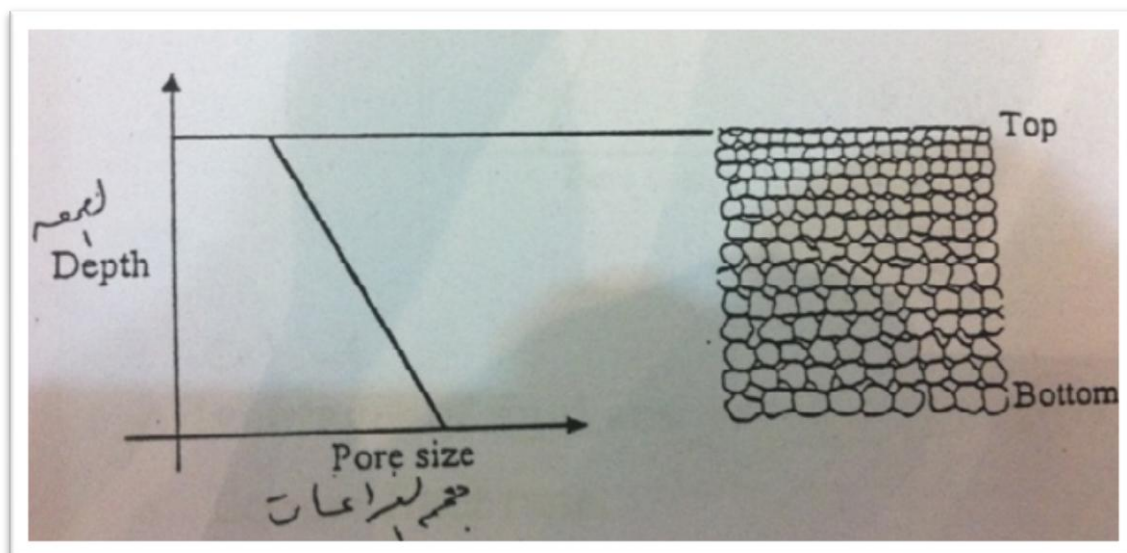


Add Acid before arrival water to Sand Filter

The sand used in filter has several properties and methods at its disposal and organized , and kind it be a Single-Medium Sand Filters-as in the picture Down - and you must change the sand every four years for each filter, and where losing the filter at each washing 4% of the productivity of the plant .



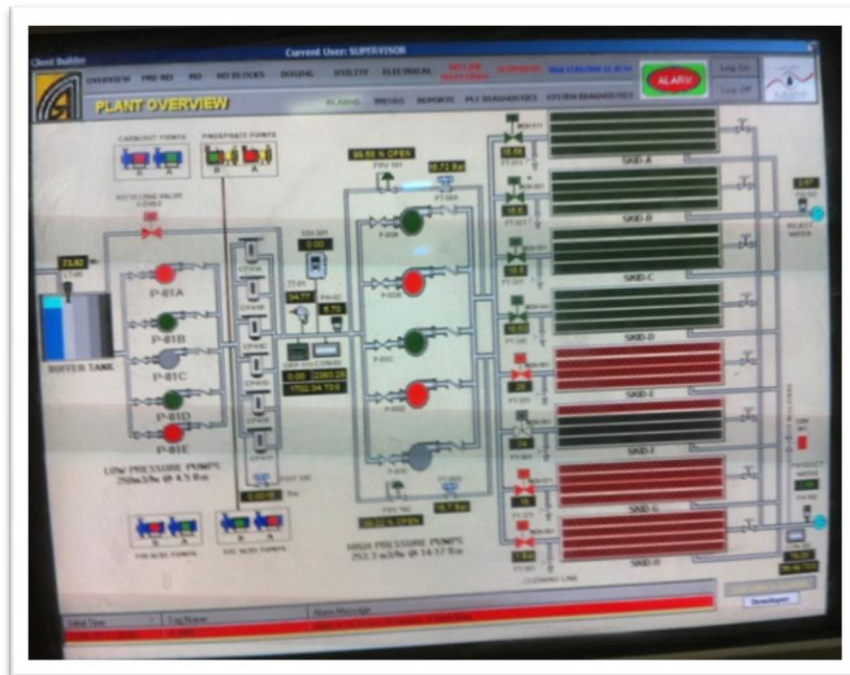
Sand Filter under washing



Single-Medium Sand Filters

Fourth : RO. Plants

Objective at this stage is to remove the dissolved solids in water and its final stage.



Steps of R.O. PLANTS

1) LOW P.PUMP

At this stage, is reducing the pressure so as not to damage the microfiltration [stage after which the]

2) FILTERS: 8 units

To remove the remaining impurities that are trapped in a bitter not disband the former so as not to damage the membrane tubes, and before the pump is added to Article High .P.PUMP anti-deposition (intiscalent) so as not to precipitate the impurities .



Filters

3) HIGH. P.PUMP

Raising the pressure until the pump in the Membrane Tube and then increase the efficiency of the stage after that .



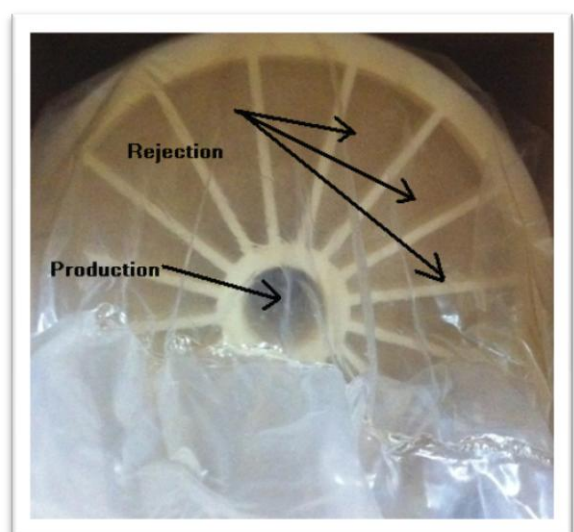
HIGH. P.PUMP

4) RO.PLANTS

It is a separation process of the last remaining impurities in the water, a more accurate stage and consists of three stages, and eventually come to us two products, one pure distilled water and other impurities associated with the water that gets rid of them outside the plant .



Two Blocks of RO. PLANTS

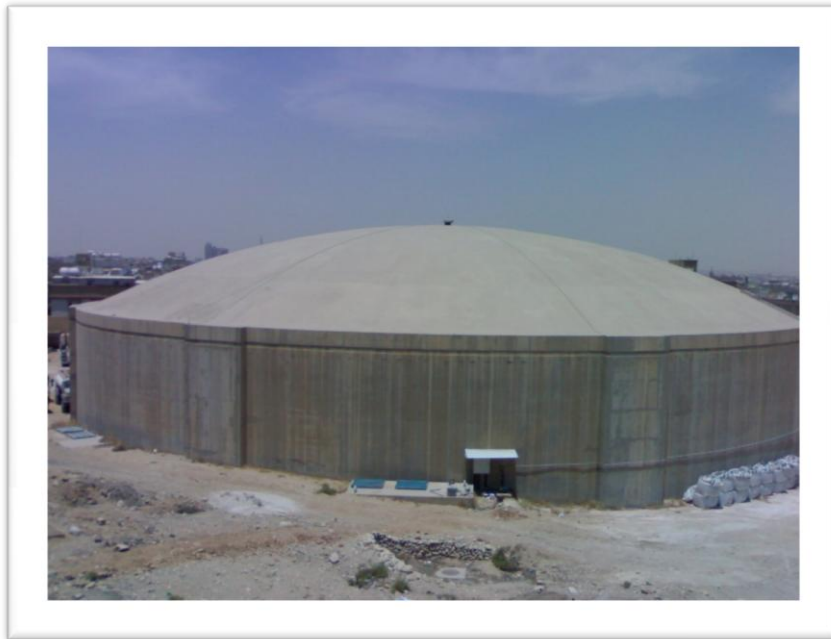


Single of RO.

Fourth : STORAGE TANKS

Here is stored distilled water coming from RO.PLANTS, and we note that the water is distilled and perfectly free from any elements and compounds so we have to mix distilled water with simple partial amount of water coming directly from the Sand Filters, even contains a small amount of the main elements and important of water.

Also added at this stage of chlorine to kill bacteria and the remaining water to maintain in the future than any other viruses.



The goal is to save water and maintain the balance of the pumping .

Then pumped water from the store to the water networks in Riyadh by the amount of 500 meter cubic per hour for this plant only .

But sludge is disposal in sewage and does not return to the plant again.

Laboratory tests made at the plant :

PH meter , TDS meter , DR/2000 , Silica , Ferric

It remains a one question here, what is the difference between the new system and the old system?

1 - to dispense with three materials [ALUM, Lime, Soda Ash] by add only one material [polymer] in the sedimentation basin .

2 - the addition material "intiscalent" before [High. P. PUMP] in the new system

3* - less of the cost because less of materials is adding in water .

4 - increased efficiency and quality in the new system, by reducing the Sludge

5 - less maintenance and breakdowns [less corrosion of materials]

Disadvantages of the new system :

1 – Adding materials of properties unknown, for example: "intiscalent"

2 - Increasing the load on the RO.PLANTS thus reducing the shelf life .

.. The End ..