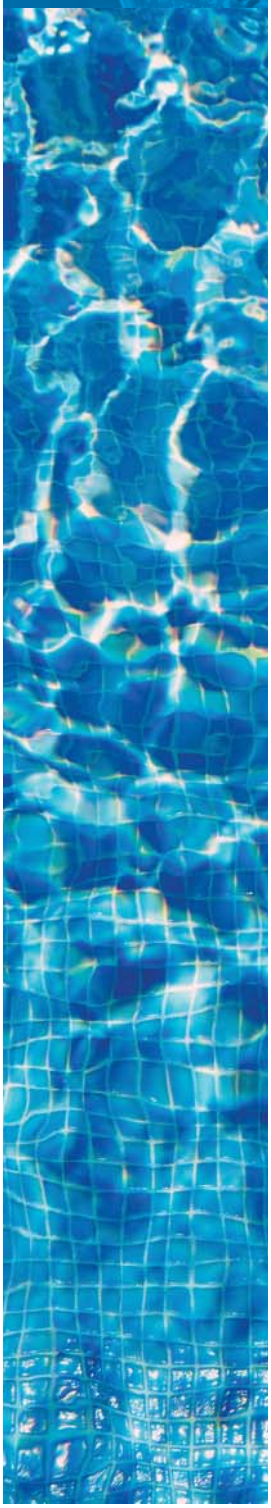

EDMONTON'S CAPITAL REGION – WATER TREATMENT PROCESS

INTAKES

The intake structures for the water treatment plant are located in the deepest part of the North Saskatchewan River, near the lowlift pump station. They are situated below the water surface so that oil and floating debris pass over them. Additionally, the new intake structure at the E.L. Smith water treatment plant is designed with a fish return system to gently deposit fish downstream.

SCREENS

Screens are located just before the lowlift pumps to strain out debris which may enter the intake pipe. The screens are designed with holes about one square centimeter which keep out fish, sticks, and leaves. The screens are rotated and periodically cleaned using back wash water to return debris to the river.

LOWLIFT PUMPS

The lowlift pumps get their name because they pump at a high volume but at "low" pressure. The lowlift pumps are approximately 1,000 horsepower and pump at a rate of 20 – 200 MLD (millions of litres per day).

CHEMICAL INJECTION

Alum and powdered activated carbon are the first chemicals added to the water. These chemicals are added by feed pumps which are adjustable to supply the correct dosages.

RAPID MIX

When the chemicals are added, it is necessary to mix them thoroughly with the water. High intensity mixing is done at the lowlift pump station or mixing chamber.

FLOCCULATION

Following rapid mix, polymer is added and the water is then slowly mixed to encourage the formation of floc. Floc (large jelly-like particles) results from the attraction of dirt particles to the chemicals alum and polymer. The floc later settles out of the water by gravity.

SEDIMENTATION

After the floc is formed, it is then allowed to settle to the bottom of a clarifying basin. This is the process of sedimentation. Once the dirt-laden floc settle to the bottom of the basin, the sludge is removed and the clear water is decanted from the surface.

DISINFECTION

Free chlorine (0.8 % Sodium Hypochlorite) is added after clarification to kill harmful bacteria and other microbes. After filtration, the water passes through ultraviolet (UV) disinfection that inactivates microorganisms. Ammonia is then added and combines with chlorine to form a long-lasting disinfectant called monochloramine.

FILTRATION

The water is filtered by allowing it to slowly flow down through a layer of anthracite coal (about 50 cm) and a layer of sand (about 30 cm). The filters are regularly cleaned by pumping air and water back up through the sand and anthracite coal to dislodge any accumulated particles.

ON-SITE RESERVOIRS

After filtration, the water goes into on-site reservoirs where it is stored until required. The reservoirs provide additional time for disinfection and also allows for the treatment plant to handle variations in the water demand throughout the day.

HIGHLIFT PUMPS

Highlift pumps get their name because they are required to pump water at "high" pressure. These pumps are each 2,000 to 4,000 horsepower and pump 90-200 MLD at a pressure of about 1000 kPa (150 psi).

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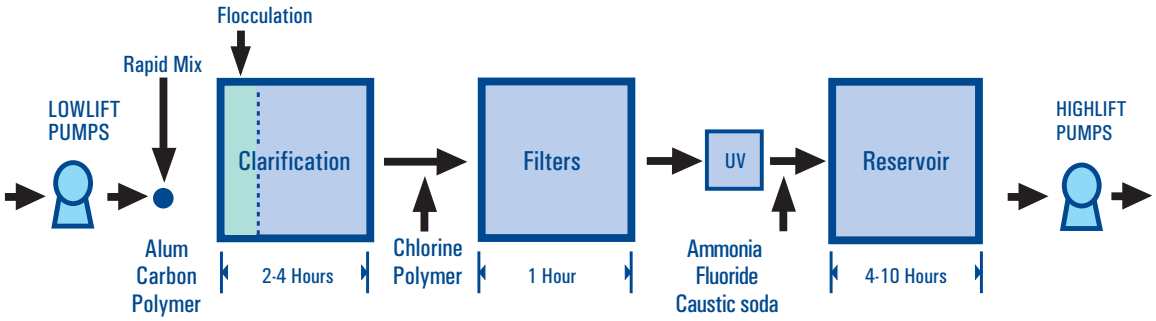
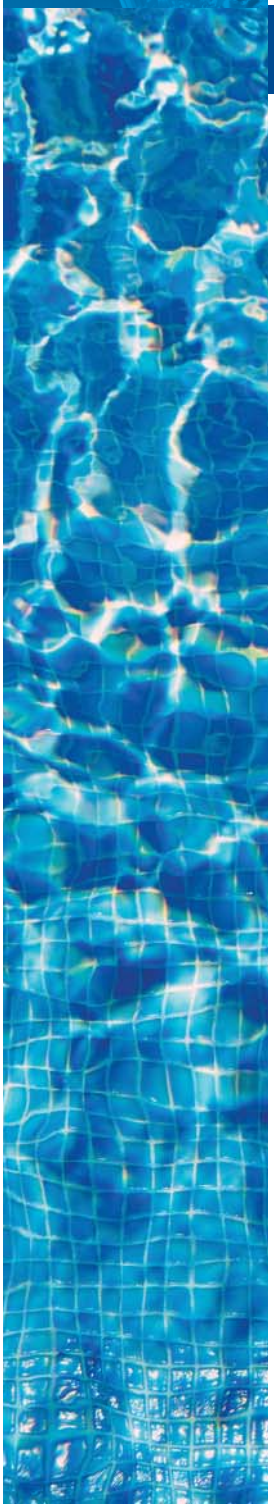
HOW TREATMENT WORKS





CHEMICALS USED IN WATER TREATMENT

POWDERED ACTIVATED CARBON

Powdered activated carbon is added in the first stage of water treatment. Activated carbon is used to adsorb taste, odour and colour causing compounds. The carbon is then removed by sedimentation.

ALUM (ALUMINUM SULPHATE)

Alum is added at the beginning of treatment to remove suspended solids. Alum and dirt combine to form floc, which looks like dirty jelly-like particles. When the floc settles to the bottom of a basin it is called sludge. The sludge is removed by regular draining.

POLYMER

Two types of polymer are added. Primary polymer is used to improve alum floc particle formation. Filter polymer is added to help the filters capture remaining particles.

FLUORIDE

Fluoride is added after filtration to provide up to 0.8 mg/L concentration recommended by Health Canada for dental health. River water has about 0.15 mg/L of fluoride naturally. Fluoride has been added to Edmonton's drinking water since 1967.

CHLORINE AND AMMONIA

Toward the end of the process, chlorine is added to kill harmful bacteria and viruses. After the filters, ammonia combines with chlorine to form monochloramine, a longlasting disinfectant. Monochloramine destroys harmful bacteria in the water distribution system and keeps the water safe up to your tap.

CAUSTIC SODA

Caustic soda is added near the end of the treatment process to raise the pH of the water. The pH is raised to a level that minimizes corrosion problems in the distribution system and customers' home piping. This also helps deter lead, iron, and copper from entering the water from plumbing pipes and fixtures.

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