From the Board

Washwater Recirculation Can Create Severe Problems


Shirish Kardile

A conventional surface water treatment plant (80 million liters per day) in a medium-size town in West Maharashtra faces a common problem: source water pollution. The plant's treatment scheme is fairly common, consisting of a cascade aerator, a Parshall flume, a flash mixer, two circular tube settlers, eight high-rate monomedia deep bed filters, washwater recycling, sludge thickeners, and centrifuges. The plant also uses chlorine for disinfection and powder polyaluminium chloride (PAC) as a coagulant.

The plant's source water, the Krishna River, is fairly turbid during the monsoon season (June–September). However, the river is highly polluted in lean-flow season (December–May), laden with algae, water hyacinth, oil, grease, and other organics.

Much of the pollution originates from several sugar factories on the upstream side of the river. During cane-crushing season, the factories discharge their effluent in the river. Although they claim to have effluent treatment plants, they don't work satisfactorily. The problem intensifies when the factories produce byproducts such as molasses and alcohol.

To avoid detection, the factories let out the effluent discharges in the river at night. Typical raw water biochemical and chemical oxygen demand values are 10-15 ppm and 30-40 ppm, respectively, during lean flow. Sometimes dead fish are also reported in the river water.

The plant's operators practice prechlorination to control the algae, as PAC dosing is inadequate to settle light floating algae and oil without polyelectrolyte, which generally isn't allowed to be used in Indian drinking water plants. During the monsoon season, the plant functions efficiently, generating treated water quality less than 0.2 ntu.

However, algae and oil clog the filter beds rapidly during lean-flow season, and these contaminants get washed off during backwash. As a result, the backwash water in the recycle tank has a green color, with floating oil. To save the water, operators return the backwash water to the Parshall flume. However, recycling further complicates the situation, as algae and oil increase in the raw water. This is a common situation in Western Maharashtra's sugar belt.

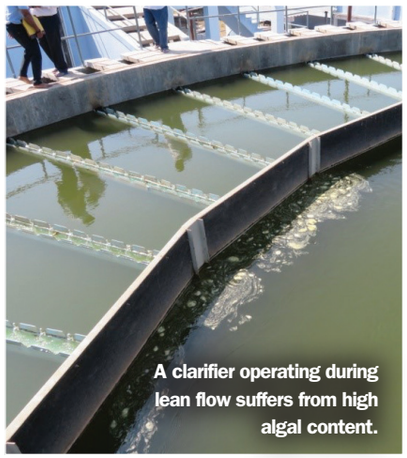
Because source water protection measures are nonexistent and monitoring is lax, the plant's operator can't do anything about raw water quality. The operator's only option is to stop recycling the backwash water.

This predicament leads to two big questions. First, does the authority (whatever it is) certify polyelectrolyte use as coagulation aid? Almost all industrial plants in India and drinking water plants in developed countries follow this practice.

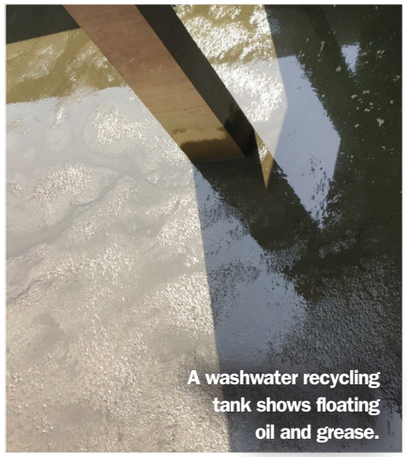
Second, does the recycled water require further treatment for algae and oil removal? Such treatment is complicated and costly. Moreover, the plant doesn't have any space to accommodate any proposed treatment units.

India has started facing the problems associated with polluted rivers. However, much more needs to be done, as industrial effluents and untreated sewage are increasing algae and organic levels in raw water. A similar situation existed in the United States between 1940 and 1960. Indeed, there are many similar wake-up calls. India's authorities need to stop turning a blind eye and develop a comprehensive policy solution.

—Shirish Kardile,
AWWAIndia Past Board Chair


A clarifier operating during lean flow suffers from high algal content.


A filter backwash operation reveals a froth of algae and oil.


A washwater recycling tank shows floating oil and grease.

PHOTOGRAPHS: SHIRISH KARDILE