19. Chlorine Decay Modelling in Derg WSZ

Situation

Chlorine decay modelling is used to simulate and predict chlorine levels across a water network. The rate at which the chlorine decays depends upon the raw water and the network of pipes that the water travels through.

The network supplied by the Derg WTW is prone to water quality problems. The levels of organics in the raw water vary at different times of the year due to temperature, pH and farming activities and this presents a treatment challenge. Chlorination of organic matter results in the formation of THMs (trihalomethanes) in drinking water as a disinfection by-product. THM concentrations increase as the water travels through the network and THMs at high concentrations are hazardous to health. It takes up to 8 days for the treated water to reach the extremity of the Derg zone. The oldest water with low chlorine levels manifest as high concentrations of iron, manganese and turbidity which often result in customer complaints.

Action

We are currently piloting a Chlorine Decay Model of the Derg WSZ. Samples of the Derg treated water will be tested for chlorine to produce a chlorine decay curve. Chlorine monitors will be installed across the network to calibrate the model. This will predict chlorine levels across the network at different times of the year.

Results

It is expected that the chlorine predictions from the model will inform optimum chlorine dosing rates throughout the year which will limit THM formation and provide adequate disinfection at the extremities of the zone. This should improve the quality of the water and reduce customer contacts, which are more prevalent during the summer months. Optimising chlorine dosing may also result in a reduction in chlorine usage and hence OPEX savings. The modelling may also help to inform investment decisions on whether pipes require to be replaced or cleaned.

KEY
DERG SUPPLY AGE OF WATER

	168 to 192 Hours	(94)
	144 to 168 Hours	(106)
	120 to 144 Hours	(325)
	96 to 120 Hours	(1322)
	72 to 96 Hours	(2517)
	48 to 72 Hours	(3232)
	24 to 48 Hours	(3551)

Derg Supply Zone

DERG WTW

Watermains

The Distribution System as Reactor

northern ireland water