

# On-Site Hypochlorite Generators for Zebra Mussel Control

The clogging by Zebra mussels of condensers, heat exchangers and pipework to industrial facilities drawing water from the Great Lakes, can be controlled by the use of on-site hypochlorite generators.

The Zebra mussel spawns when the water temperature is above 12° C. The spawn gets drawn into the water intakes and lodges in the water path where it grows to maturity and spawns again, compounding the problem.

Introducing hypochlorite at the intake point can eliminate mussels which have already formed and prevent the build up of new growth.

Ideally, an on-site hypochlorination system should be installed as part of the original installation. This way no buildup will occur and all the complete water system is kept free from mussel growth. Unfortunately, this is not the case with many operating industrial plants, especially power plants that have an ongoing problem with Zebra mussel.

Chlorination of cooling water systems in power stations has been used since the 1920s with good effect to control marine growth in pipework, condensers and heat exchangers. Using simulated seawater by salting lake water, on-site hypochlorite can be generated in a manner similar to seawater applications.

Zebra mussels, like other marine hard-shelled organisms, rely on the movement of the water over their shells to provide the nutrients for growth. Mussels open their shells to allow the water to pass through, screening out nutrients. Chlorination of the water at around 1 mg/l will kill the mussels in time and control further build up.

Initially, in installations that have Zebra mussel infestation, it can take several months of dosing to kill the mussels. This is because the mussels will close up their shells on contact with chlorinated water. They sample the water from time to time and will remain closed until they get to a stage in which they starve and open up. When they have to open, the chlorine attacks the soft mucous parts of the mussel and it dies. In time the shells will become dislodged and get flushed through the system.

The life cycle of the Zebra mussel allows the operational costs of an on-site hypochlorite generating system to be substantially reduced, once the original mussel population has been eliminated.

The spawn entering the cooling water system lodges in the pipework and starts to grow. Initially, it is not equipped with a shell, which forms shortly after. At this stage the spawn is highly vulnerable to small levels of chlorine in the cooling water. For this reason, during the spawning season when the cooling water temperature is

above 12° C, the hypochlorite generating system only needs to be operating for several days each week and can be shut down entirely during the winter period when the lake water is below 12° C. This generally is from January to June each year.

Electro-chlorination for lake water applications comprises the following:

A single hypochlorite generator sized for each cooling water pump at the intake structure; this means that whenever a pump is started its attendant hypochlorite generator complements it.

An overhead salt hopper complete with salt conveyor or elevator to load the hopper with bulk salt; a screw conveyor at the bottom of the hopper discharges the correct amount of salt.

Salt-water mixer tank; the salt is dropped from the screw conveyor into the intake of the mixer tank, where it is mixed with lake water and then connected directly through an intake manifold to either a single or to multiple chlorinators.

Electrichlor hypochlorite generators will provide 1 mg/l of equivalent chlorine for primary flow rates between 4200 m<sup>3</sup>/hr. to 100,800 m<sup>3</sup>/hr. See Electrichlor Selection Guide.

Electrichlor hypochlorite generators are manufactured from materials selected for a life of 30 years. The precious metal coating (platinum) on the anodes is guaranteed for 5 years at rated output and all equipment is guaranteed for 12 months from placing in service or 18 months from dispatch.

