



COOLABAH WATER "The Water Professors"

An overview of Iron related bacteria in bores.

The phenomenon that is called IRON BACTERIA is actually bacteria feeding off soluble iron and manganese creating a slime over the inside of pipes. THIS also mixes with CALCIUM which is naturally occurring in most bore supplies.

The calcium turns to a crystal as normal and this combination of CALCIUM – IRON – BACTERIA produces a thick red sediment which causes multi-impeller pump discs to block up with the residue.

This is particularly prone to occur in submersible bore-hole pumps and also the inside walls of delivery pipes and usually seriously affects water delivery performance or stops the flow completely.

Bacteria

The bacteria contamination cannot be killed outright in the bore but needs to be kept under control. The bacteria contamination is a high factor in the overall problem, but the bacteria alone does not cause it.

Iron

The iron that feeds the bacteria cannot be removed from the aquifer but can be controlled in the bore and bacteria just loves feeding off iron.

Calcium

Calcium is also a major part of the issue. Its natural ability to turn to a solid, or to a crystal very quickly is as much of the problem as the other two, bacteria and iron.

Calcium forms a crystal, then mixes with the iron and the bacteria, making a brown sludge which forms inside pump impellers and pipes and the problems start.

If you were to remove this brown sludge from a bore pump or pipe and analyze this you can expect the percentage of calcium in the sludge to be as high as 80% plus.

Removing bacteria only



COOLABAH WATER "The Water Professors"

If the bacteria contamination in bore water is disinfected or removed where iron bacteria is present, then the brown residue would become quite hard and dry scale.

Leave the bacteria active and this same residue that causes so much heartache will remain quite soft and the higher the bacteria contamination, the sloppier the brown sediment.

Iron accelerates bacteria growth

The iron feeds the bacteria and accelerates its growth. The iron cannot be removed from the aquifer but it can be turned to a solid before it feeds the bacteria and the bacteria can be removed by chlorine disinfection, or if the chlorine content is high enough, by poisoning (chlorine can be used as a disinfectant, oxidizer or poison depending on the strength.)

Treatment is needed

We need two systems in place for dealing with bacteria, iron and calcium where it affects bore pumps. Bacteria can only be removed by a poison or disinfectant. Iron cannot be filtered out and can only be removed by oxidation.

This can be treated down the borehole, where the problem starts. The bore water will lose its clarity and become slightly or heavily brown, as it turns to a solid. This cloudy water is quite harmless for such purposes as stock water or irrigation.

Air cannot be introduced into the piping system to oxidize the iron because it will cause cavitation in the pump and damage the impeller(s). The cheapest and most successful method is to chlorinate.

Will chlorine succeed.

Chlorine, fed down to the pump by tube will attack quite a proportion of the iron calcium bacteria sludge and clean up part of the mess in the pump. It can oxidize the iron out if the pH of the water treated is suitable.

Chlorine is not always entirely successful down the bore due to its inability to release as an oxide when the pH of the water supply is low.



COOLABAH WATER "The Water Professors"

Chlorine will not normally or properly activate when the pH of the aqueous solution is outside these parameters, pH 7.5-8.5

Chlorine does not need to be constantly applied, but at short intervals at least once every day or once per week depending in the severity of the problem.

Acid treatment

We have blended a very successful acid powder together to treat this problem. It is mixed with water, handled carefully and fed down a small pipe that needs to be inserted down the borehole.

This is achieved with the pump activated but the output returned straight back down the bore. It is very cost-effective and fast. Treatments can take from 30 seconds to about 1-2 hours to be effective. Pump the residue to waste and re-activate the pump.

The obvious impact results are

Smell (stinks)

Colour (can go from green/brown to quite black)

Improved flow (restored)

Following this treatment you will need to invest in a follow up solution treatment such as the kit that fits the user needs and the budget.

My recommendation is to use the chlorine by dosing pump and re-circulate once or twice per day by time clock and combine a very powerful form of magnetic water treatment which will target calcium without costing large amounts of money.

Alternatively, if the iron content cannot suitably removed by

pumping to a storage tank for aeration or
other tank treatment form,
through a special media in a pressure vessel,
through an iron removal water softener, or
into a dam for aeration



COOLABAH WATER "The Water Professors"

then you may need to dose with the chlorine.

This can be done down or post the bore at whatever level works best for the problem and the chlorine or sodium hypochlorite should be bucket tested on site to find out the effective level first.

Chlorine can be fed down the bore by tube to the submersible pump to be more effective. This also creates very good contact time. Chlorine also gasses off very quickly and will lose its ability to work by dilution in water.

Chlorine is only 12% in volume and it will weaken very quickly as it dilutes and gasses off. This is why it must be tube fed direct by tube to the bore pump.

The chlorine must be turned over regularly as it is unstable and it will lose its potency.

Calcium problem

This needs to be treated also. If you were to remove the iron and bacteria successfully, you could be left with white scale down the pipe-work and other plumbing and this is not desirable.

Magnetic water treatment

We use magnetic water treatment in a very powerful form called the Fluid Reactor. Its task is to break up the calcium build-up after the bore pump. It does this by preventing the calcium from crystallizing out as a solid. This is achieved by inducting a DC voltage charge off the permanent magnetic material that is the heart of the unit.

This forces the calcium to remain fully soluble and not deposit, and it will reverse the existing calcium build-up.

To make this all happen, we make up a kit that suits each problem bore and allows part of the bore water to re-circulate once or twice per day by valve controls or simply by injecting straight down the bore, and a dosing pump applies the chlorine to treat the pump and the bore.

This can become a very necessary and permanent treatment to keep the pump alive as a cost-effective measure.



COOLABAH WATER "The Water Professors"

The Fluid Reactor has ongoing value for bore users and is an excellent investment as it has no ongoing operating or maintenance costs.

This treatment is applied at the bore-head and will treat all the water coming out as well as the re-circulated treated water.