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Well Cleaning and Disinfection New Approach

Osorno Enterprises Inc.

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Common Practice

Expected Results

1. Well Cleaning -

Hydrochloric (“Muriatic”) Acid
(HCl) - technical grade - 33-37%

Dissolving of all precipitated
minerals - screen cleaning

2. Well Disinfection by Shock Chlorination -

Sodium Hypochlorite either as
bleach (nominally 6%), or as
commercial grade (12%)

Destruction of bacteria that have
contaminated the well

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“Side Effects” of Common Practice

1. Well Cleaning -

High aggressivity of the solution can lead to disintegration of the well materials, such as the partial dissolution of the screen (potential of contamination with heavy metals!), partial dissolving of the sediments surrounding the screen area, and - worst case - collapsing of the well

2. Well Disinfection by Shock Chlorination -

The alkalinity of the solution causes the precipitation of calcium carbonate, so that the shock chlorination is often accompanied by a clogging effect. The precipitate also encapsulates bacteria, making this practice less effective.

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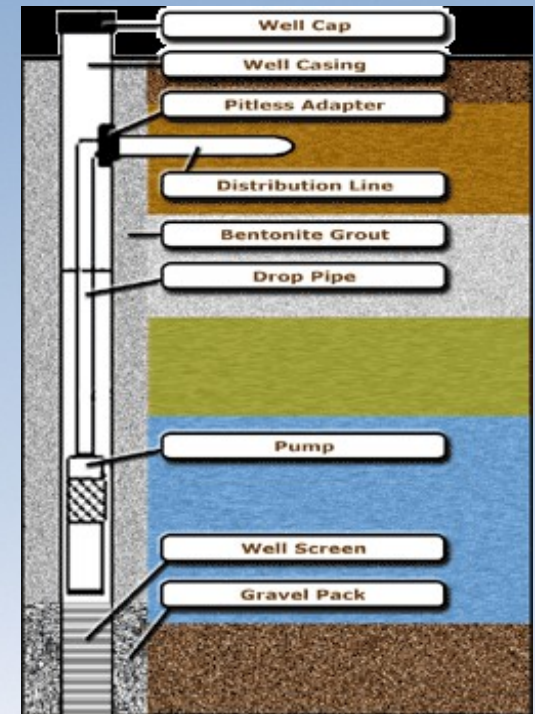
Why “Side Effects” of well cleaning

- Material of the well casing and screen

In cases when materials are stainless steel, carbon still or concrete, concentrated hydrochloric acid will intensely corrode casing and the screen, possibly up to total disintegration.

- Gravel pack around screen area

Gravel or sand that surrounds screen area in part always contain carbonates as a natural binder, which dissolves in concentrated hydrochloric acid.

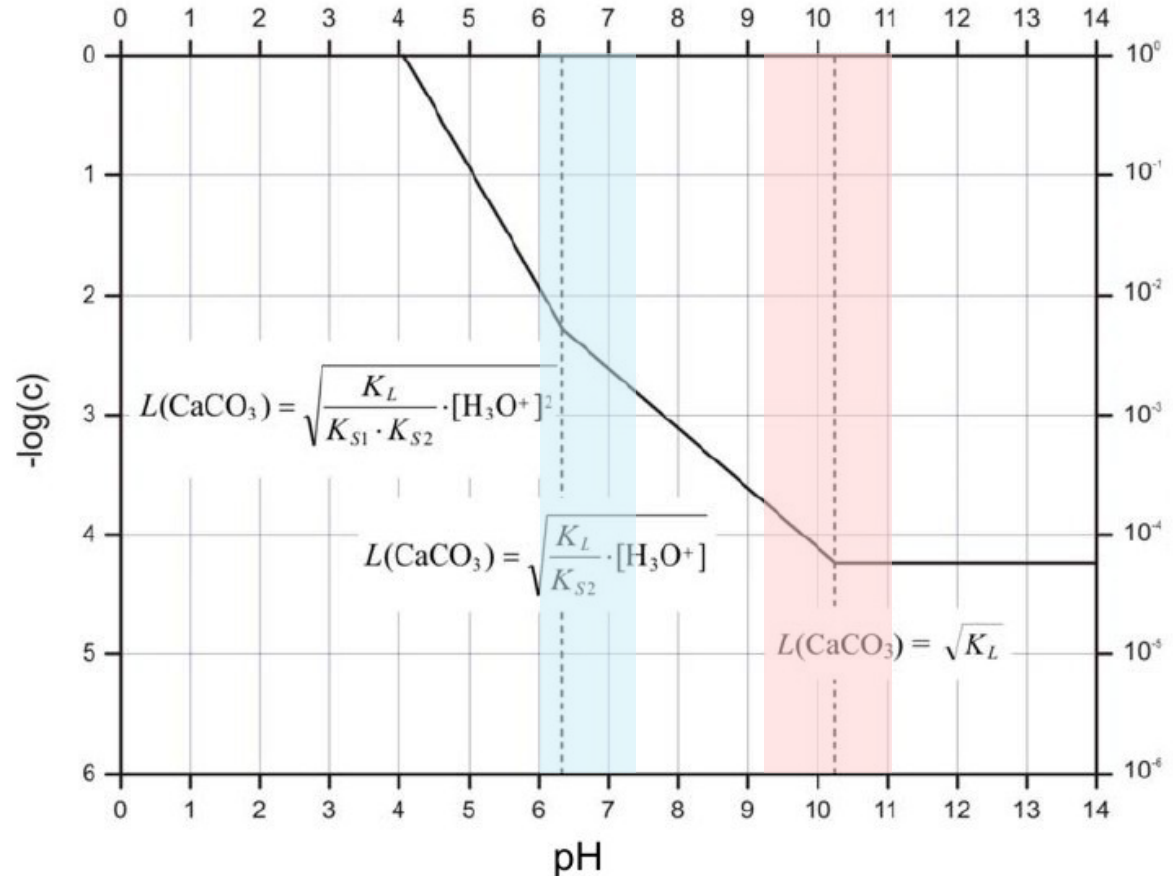


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Why “Side Effects” of shock chlorination

Increased pH of the well water forces precipitation of carbonates which can clog the screen and at the same time encapsulate bacteria in the precipitated particles.



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Why is acidity needed?

- Mineral scaling (carbonates, iron and manganese oxides) are soluble only under acidic condition.
- Hypochlorite **must never be used** under acidic condition, danger of escaping chlorine gas!
- One can occasionally hear that bleach should go into the well first, followed by jars of vinegar. Not only does this violate the safety rules laid out on MSDS for hypochlorite, it also contaminates the well with THMs!

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Well Cleaning and Disinfection the New Approach



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Well Cleaning and Disinfection - the New Approach

On September 2006 we had an opportunity to apply our well Cleaning and Disinfection solution for the first time. It was as successful as we had expected.

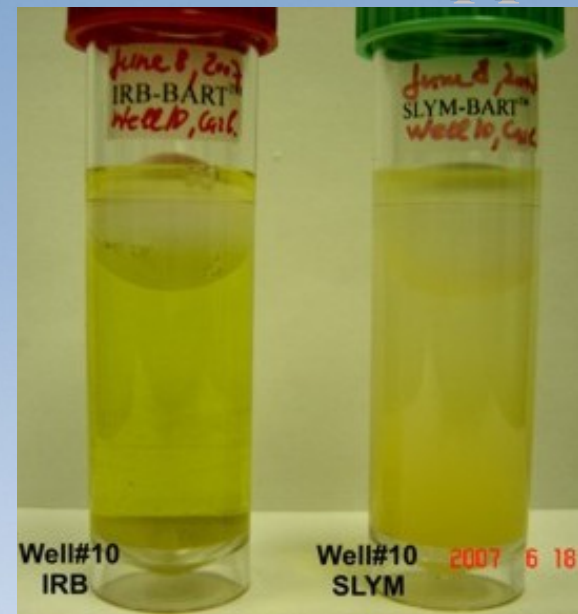
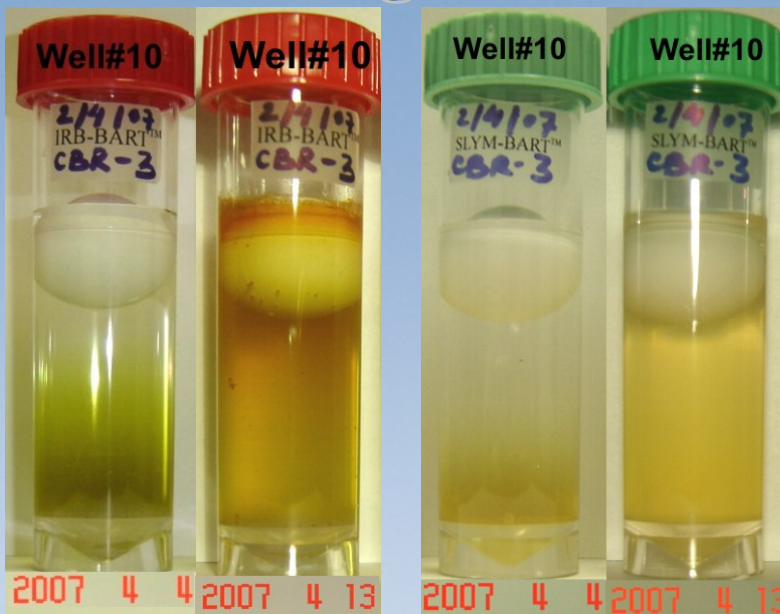


The first application was done at a private well in Miami, RM of Thompson, Manitoba.

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Well Cleaning and Disinfection - the New Approach



Efficiently removed deposits in the well casing to the extent that the well productivity increased.

Totally eliminated all iron related bacteria (within 1 hour), and the microbial community associated with them.

Completely removed fluorescing Pseudomonadae,

Amount of slime bacteria decreased dramatically (more than 60 times).

Data provided by Avalon Institute of Applied Science

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- This well has never been cleaned before
- Well diameter 0.76 m (30”), depth 22 m (70’), water volume 6,200 L
- Used 160 L of Cleaning solution and 100 L Disinfection solution
- Total application time for both solutions about 6 hours



Analysed samples taken before (1) well treatment and after (2) well cleaning and disinfection

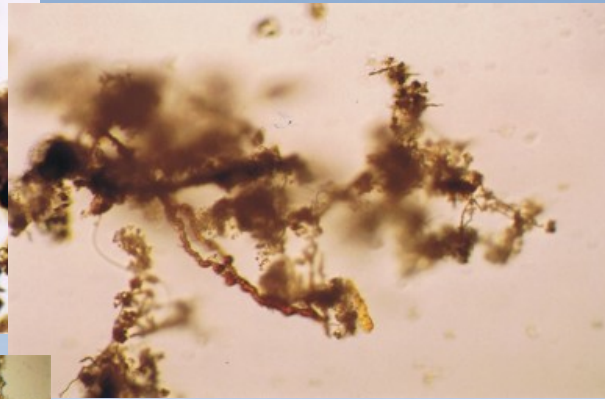
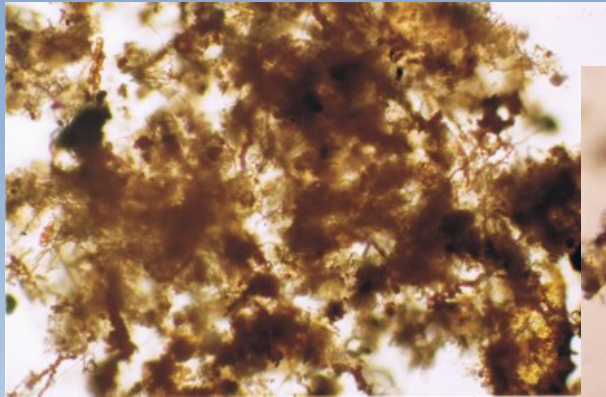
(1) *Amount of slime bacteria >1,800,000 cfu/mL*
Amount of iron bacteria about 35,000 cfu/mL

(2) *Amount of bacteria after well treatment reduced 10 times*

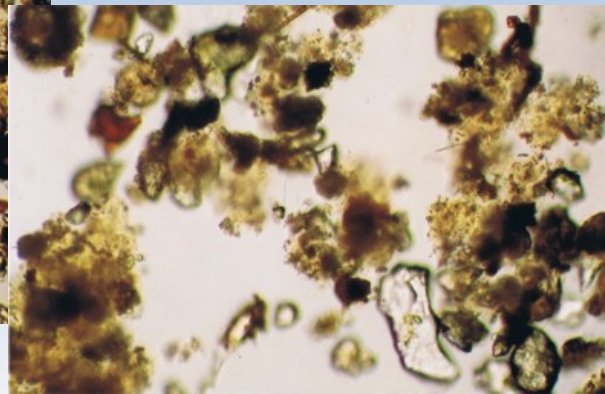
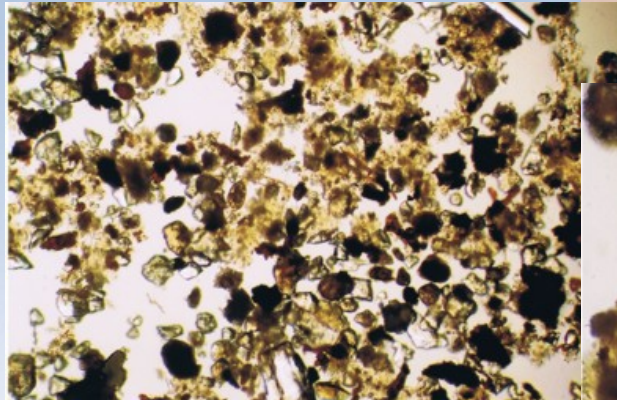
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Mainly bacteria flocs, and iron oxide jells



Dominate mineral debris and some bacteria flocs