

RED-OXY[®]

Method of Treating Oilfield Water

RED – a Catalyst

OXY – an Oxidizer

Watch Water's Red-Oxy[®] process and system that can be used to treat any kind of water or waste water and remove Hydrogen sulfide in the produced water is the most advanced process in oilfield industry. Used oilfield water contains large amount of hydrogen sulfide is guaranteed using Red-Oxy[®] process. After removing Hydrogen sulfide with Red-Oxy[®] water can be reused because **it isn't toxic, corrosive and flammable**. Big advantage of using the Red-Oxy[®] oxidation process is, absolute **Green Chemical** oxidizer. Red-Oxy[®] does not contain any chlorine, chlorine dioxide as the chlorine have a complex chemistry with H₂S. Example reaction between chlorine and Hydrogen sulfide include,

- $H_2S + ClO_2 \rightarrow HCl + H_2SO_4 + S^0$
- $H_2S + ClO_2 + NaOH \rightarrow H_2SO_4 + NaCl + HCl$
- $H_2S + HClO_2 \rightarrow H_2SO_4 + HCl + H_2O$

Chlorine dioxide oxidize sulfide elemental sulfur that creates precipitation or bulk precipitation. If the water contains a precipitate, it can not be reused as it clog pipes, plug pore throats and damage equipments and formations.

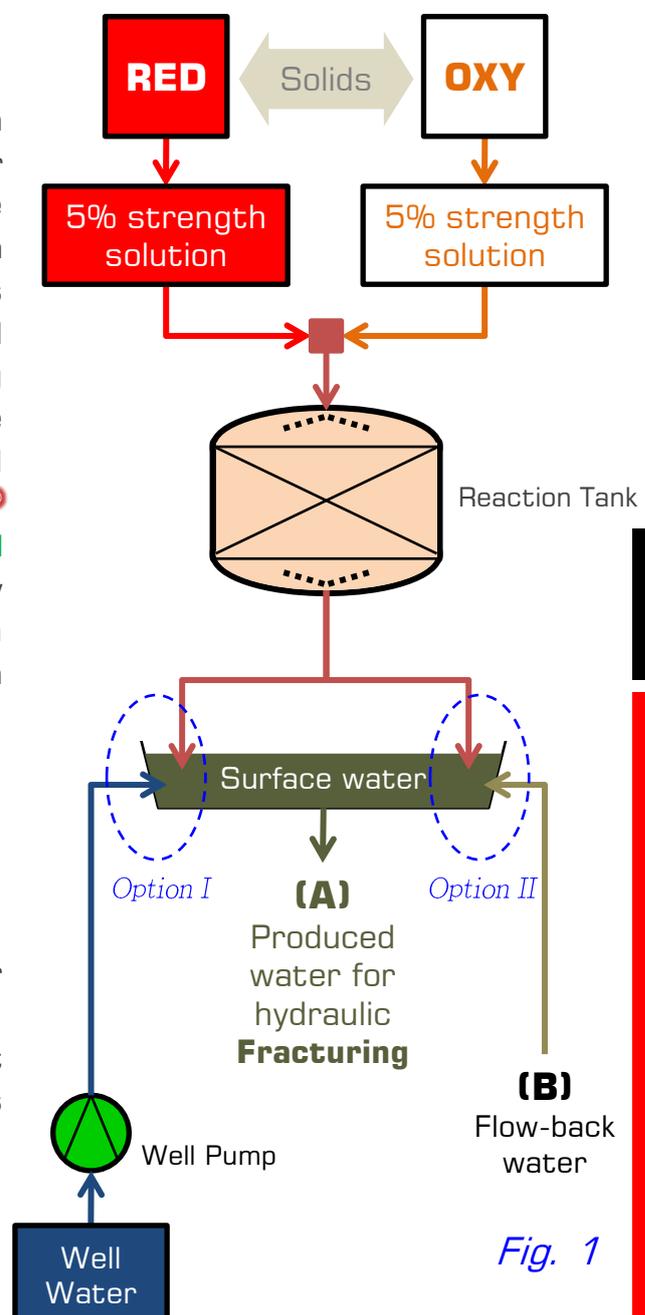


Fig. 1

RED-OXY

Treating Hydrogen Sulfide (H₂S) including Oilfield's water

Watch-Water® explains the process of fracturing and oilfields waste water. Waste water is a product of injecting water downhole or is formation water that flows from the formation to the [surface](#). As on the drawing on the front page (see [fig . 1](#)) oilfield waste water includes produced water, flowback water and the well water or a combination comprising at least one of the foregoing. Produced water typically is water that flows to the [surface](#) during production of oil and gas from a subterranean hydrocarbon source. Flowback water on the other hand, generally is water that flows to the [surface](#) after performing a hydraulic fracturing job. The oilfield waste water **(A) Produced water** and **(B) Flowback water** (see [fig . 1](#)) contains a plurality of neutral and ionic species that include the elements which are causing heavy scale, corrosion and biofouling. Formulation of **RED Granules** contains the iron catalyst with unique combination of ingredients to clarify the oilfield waste water with a flocculent which has the highest capacity to adsorb heavy metals like

- Antimony
- Arsenic
- Copper
- Iron
- Lead
- Manganese
- Phosphorus
- Selenium
- Sulfur
- Uranium

The oilfield waste water also contain high amounts of polyvalent ions these are

divalent alkaline earth metals such as Ca²⁺, Mg²⁺, Sr²⁺, Ba²⁺ these cations present cause sulfate precipitation in an amount that depends on ph, that the sulfate solubility depends on the ph or the solubility product constant of the particular sulfate compound as CaSO₄, MgSO₄. Therefore to control sulfate produced by oxidation of sulfides the **OXY** contains sequesters in the formulation having advantages which avoids the precipitation of cations and form scale. To avoid any corrosion the **OXY** does not contain any oxidizers such as hydrogen peroxide, calcium peroxide or sodium hypochlorite's. **OXY** an exclusive formulation of Watch-Water® to treat waters with high content of sulfides (H₂S) with its very high oxidation power with **RED** changes sulfides to sulfates in forming a [Recycled water](#) that is useful as a hydraulic fracturing water or in enhanced oil production water. The formulation of **OXY** includes,

- (A) strong biocide
- (B) scale stabilizer
- (C) corrosion inhibitor
- (D) friction reducer
- (E) pH-adjusting agent
- (F) scale inhibitor and very important
- (G) a surfactant.

OXY is the best formulation to kill bacteria and reduce the risk of any biofouling, stabilizing water hardness and provide the best corrosion prevention. **OXY** in combination of **RED** reduce all water and fluid tensions.

RED-FERRATE HEXAHYDRATE GRANULES

Preparation

The required concentration is approximately 50 gram ferric per liter of dosing solution. Pour half the required volume of water (clean water) at 25°C into dosing tank and slowly add **RED Granules** of ferrate hydrohexahydrate, stirring until the granules are completely dissolved. Make up the water to the required volume. If the oxidant had to be stronger add sodium chloride (max 0.5 kg) into the tank which will explore the reaction in [Reaction Tank](#).

WARNING: Do not add salt (NaCl) in the **OXY** tank.

[1 liter of solution will treat 2 million mg of total contaminants]

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