

## ORC TECHNICAL BULLETIN # 1.3.1

Oxygen Release Compound, ORC<sup>®</sup>**Environmentally Safe**

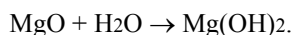
With reference to the safety of contacting ORC with ground water the following review is provided. Regenesis welcomes any further inquiries.

Definition of ORC and its Components:

ORC is a proprietary formulation of magnesium peroxide (MgO<sub>2</sub>), which is the active agent. The product contains both magnesium oxide (magnesia, MgO) and magnesium peroxide. A few percent of food grade potassium phosphate (KH<sub>2</sub>PO<sub>4</sub> or K<sub>2</sub>HPO<sub>4</sub>) is also present.

Behavior of ORC in Contact with Water:

ORC is designed to release oxygen when wet. Essentially ORC is "oxygenated magnesia" and it gives up the oxygen upon contact with water. The spent magnesium peroxide is converted to magnesium hydroxide (Mg(OH)<sub>2</sub>). This also is the fate of the magnesium oxide which simply hydrates to form the hydroxide:



Therefore, the uniform endpoint of ORC, from both directions, is magnesium hydroxide. The safety of this material is easily conveyed by mention of the fact that a suspension of magnesium hydroxide in water is ordinary Milk of Magnesia. The levels of phosphates from the product are low and they are the same materials that are used to support microbial growth for bioremediation.

Other Features:

All of the magnesium products discussed are virtually totally insoluble.

The ORC can be used in pure form or mixed with an inert carrier matrix and contained in a filter sock that is removable from the source well at will.

Magnesium oxide, peroxide and hydroxide are all safe to ingest in small quantities. Magnesium oxide is sold as a magnesium supplement for cattle and is used as a fertilizer material. Magnesium peroxide and magnesium hydroxide are also safe to ingest as they are both used as anti-acids. ORC is used in retail horticultural products, such as Oxygen Plus fertilizer, which is now produced by Ringer Corporation. These products are sold in all fifty states, where they have met Department of Agriculture fertilizer registration requirements and safety criteria for entering the environment and the food chain.

Magnesium peroxide has been used in dentifrices and other dental products.

As with all chemicals safe handling practices should be used to avoid any excess exposure to skin and eyes.

A full MSDS is provided with the product. The following statement is useful as a convenient summary of the key issues covered in the MSDS:

*ORC is the trade name for a form of magnesium peroxide. It is important to avoid contact with skin and eyes and to avoid breathing the dust. The material is not toxic, in fact, it is listed in certain handbooks as an anti-acid for the stomach. It is however, an irritant.*

*Contact with skin should be avoided, but is of less concern - it may cause some dryness and mild irritation. The fine nature of the dust, independent of its chemical makeup, is enough to warrant respiratory protection. Full face protection is recommended to avoid both breathing the material and contacting it with the eyes. Separate goggles and mask are an alternative. Gloves should be worn.*

*These precautions are more important with regard to the use of pure ORC in soil applications than with the ORC filter socks that are almost dust free. Wetting the filter socks down while in the bucket and before removal and insertion into the wells or trenches is a good precaution to take.*

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