

1. BIOLOGICAL PROCESSES

- Organic compounds metabolized by micro-organisms
- Micro-organisms stationary - attached to surfaces or agglomerated
- Metabolism as aerobic or anaerobic.

Form of micro-organisms

1. Naturally present -

Effectiveness enhanced by providing nutrients eg. O_2 , nitrates, nitrogen, phosphorus
- eg. Algae growing in ponds due to fertilizer usage.

2. Introduction of Exogenous Cultures -

So far not shown successful.

Injection of genetically engineered organisms prohibited by US law.

Requirements for Success (general)

- Adequate aquifer permeability $K > 10^{-4}$ cm/s
- Prior removal of free product
- Suitable microbial population
- Hydrodynamic control - contain plume
- deliver amendments (nutrients)

- Monitoring system to define progress of the process

Monitor: 1. Changes in nutrients (oxygen, nitrate)

2. Decrease in dissolved compound concentration

3. Increased biomass, in situ.

4. Increased CO_2 or Methane concentration

- essentially circumstantial