

## Customized Metals Treatment Solutions

MetaFix<sup>®</sup> Reagent represents a unique treatment approach for soil, sediment, industrial wastes, and groundwater contaminated with heavy metals. MetaFix is a customized reagent to cost effectively address even the most challenging site conditions.

MetaFix reagents are formulated blends of reducing agents, reactive minerals, mineral activators, catalysts, and pH modifiers. Following placement of MetaFix reagent into the treatment zone, a number of physical and chemical processes combine to create geochemical conditions under which common heavy metals are subjected to reduction, adsorption, precipitation, and conversion to stable sulfide and iron-sulfide precipitates. These heavy metal sulfide precipitates have greater stability than metal hydroxide precipitates which are formed with traditional metals treatment approaches based on pH adjustment.

Moreover, since MetaFix utilizes multiple mechanisms, it allows for robust performance in challenging environments, with high metals concentrations, high concentrations of organic contaminants such as solvents, high salt content, or extreme pH levels.

A custom MetaFix blend is developed based on a site's specific conditions through a low-cost treatability study to address soil and/or groundwater impacts.

### MetaFix Benefits

The MetaFix approach offers a truly one of a kind, proprietary, customized solution for the most challenging metals sites.

- The proven ability to address multiple heavy metals including; Al, As, Cd, Cu, Cr, Hg, Ni, Pb, Se, V, and Zn
- Superior Cr(VI) treatment with the formation of more stable mixed (Cr, Fe) hydroxides
- The capability of treating comingled plumes of heavy metals and chlorinated solvents
- Low overall treatment costs based on lower reagent dosing rates, as low as 0.1%-4% (wt/wt), versus other metals treatment technologies
- The treatment mechanism is not dependent on alkalinity for removal of metals, therefore not susceptible to rebound when the matrix pH returns to ambient levels



### Application Methods

- Direct push injection
- Hydraulic and pneumatic fracturing
- Direct soil mixing
- Permeable Reactive Barriers

*For more information and detailed case studies, please visit our website.*