

# A Brief Outline of Arsenic Removal Adsorption Technology

David P. Boaz HydraTech of New Mexico 505 898 4343

## I. Chemical and Physical Variables Effecting Arsenic Removal Efficacy

- A. Solution pH: Increased pH reduces Arsenate (As V) sorption
- B. Arsenic Speciation: Arsenite (As III)/Arsenate (As V) ratio
- C. Sorption: Concentration of competing ions
- D. Sorption: Concentration of colloidal species that block physical As uptake
- E. Surface area and pore size, distribution of media
- F. Media hydraulic and kinetic properties

## II. Metal Oxide Adsorbents: TiO<sub>2</sub>; ZrO<sub>2</sub>, CuO<sub>2</sub>, mixed oxides (AdEdge GFO [AD33, E33]; Metsorb TiO<sub>2</sub>; Dow Adsorbent GTO TiO<sub>2</sub>)

## III. Coated Synthetic Media: Adsorbent metal oxide coating GAC, SBA, PLE. High selectivity and capacity, easy regeneration.

- A. **SBA:** Strong base anion exchange resins with iron oxide coatings (Purolite) or iron oxide suspended at atomic level (Resintech).
- B. **GAC:** Coated GAC has higher surface area than porous metal oxides. Iron oxide impregnated.
- C. **PLE:** Polymeric ligand exchange with nano particulate metal oxides (Dow 3N-Cu). High selectivity for arsenate (As V) over SBAs in presence of competing anions (sulfate, phosphate, nitrate, fluoride, vanadium).

## IV. Coated Natural Media, Waste Media: Inexpensive but low sorption. Adsorbent media coated with metal oxides (ADA: alumina silicate coated with iron oxide, Virotec: Bauxsol - mixed metal oxides from Bauxite waste; Eagle Picher—lanthanum coated DE).

## V. Other Variables

- A. Performance/Efficacy of Ar Removal
- B. Operation and Maintenance Costs
- C. Waste Disposal