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:** TiO2; ZrO2, CuO2, mixed oxides (AdEdge GFO [AD33, E33]; Metsorb TiO2; Dow Adsorbtia GTO TiO2)

III. **Coated Synthetic Media:** Adsorbent metal oxide coating GAC, SBA, PLE. High selectivit;y 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 exhange with nano particulate metal oxides (Dow 3N-Cu). High selectivity for arsenate (As V) over SBAs in presence of competing anions (sulfate, phosphate, nitrate, floride, vanadium).

IV. **Coated Natural Media, Waste Media:** Inexpensive but low sorption. Absorbent 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