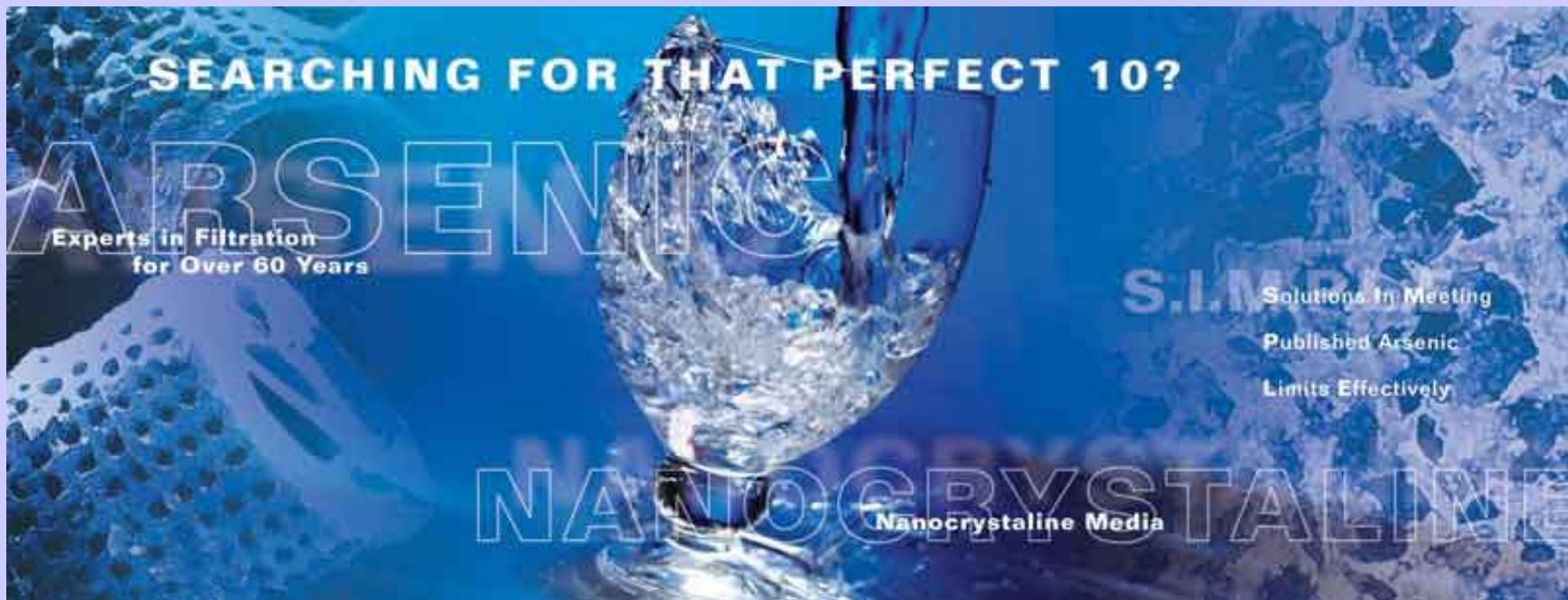


NXT™

Nanocrystalline Arsenic Removal media



11/2/05

Peter Lenz

Agenda

- Who is EP?
- What is **NXT** Media
 - Characteristics
 - Benefits
- Interferants and Competing Ions
- Testing History

Who is EaglePicher?

EaglePicher™
Filtration & Minerals

- ❑ Leading Supplier of Diatomaceous Earth with Over 60 Years of Experience in the Filtration of Food Grade Products
- ❑ Common Applications:
 - Soft drinks
 - Fruit juices
 - Beer and Wine
 - Animal and Vegetable Oils
 - Sweeteners
- ❑ Customers:
 - Cargill
 - Tate & Lyle
 - SAB (Miller)
 - Pepsi Co.
 - Welchs

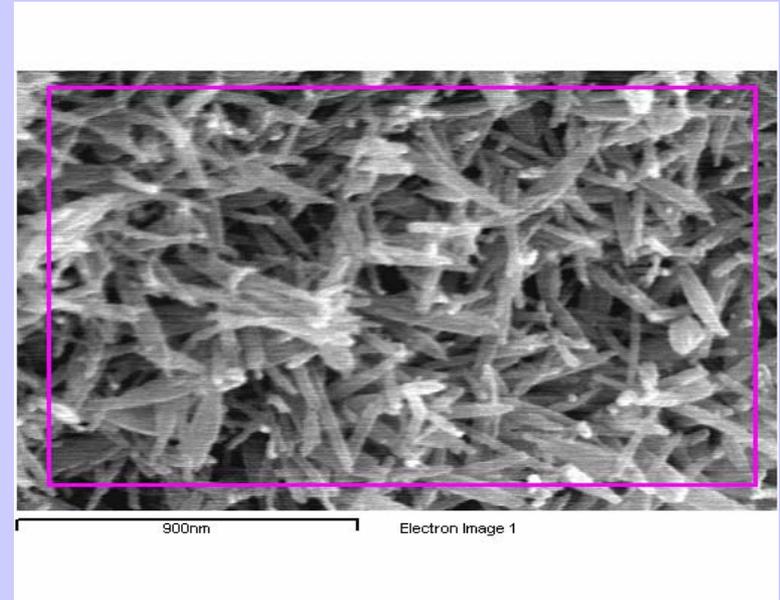


NXT™ Media: What is it?

EaglePicher™
Filtration & Minerals

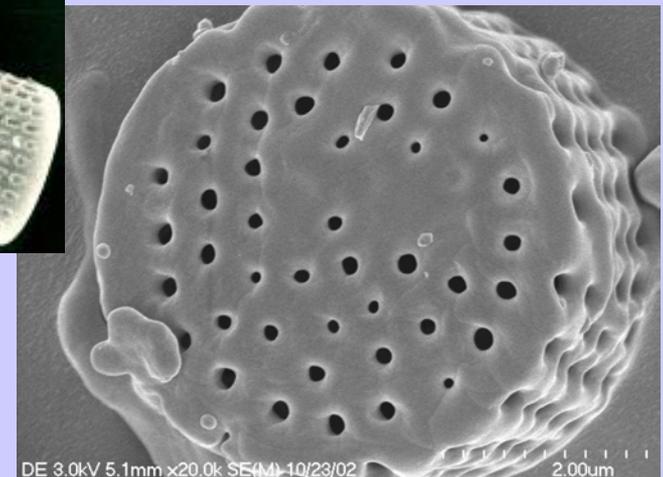
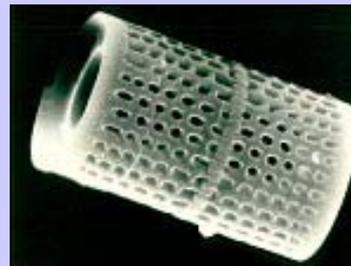
□ NXT-2

- Highly Crystalline (Nano) Adsorbent
- Lanthanum hydroxide enhanced with DE and other constituents



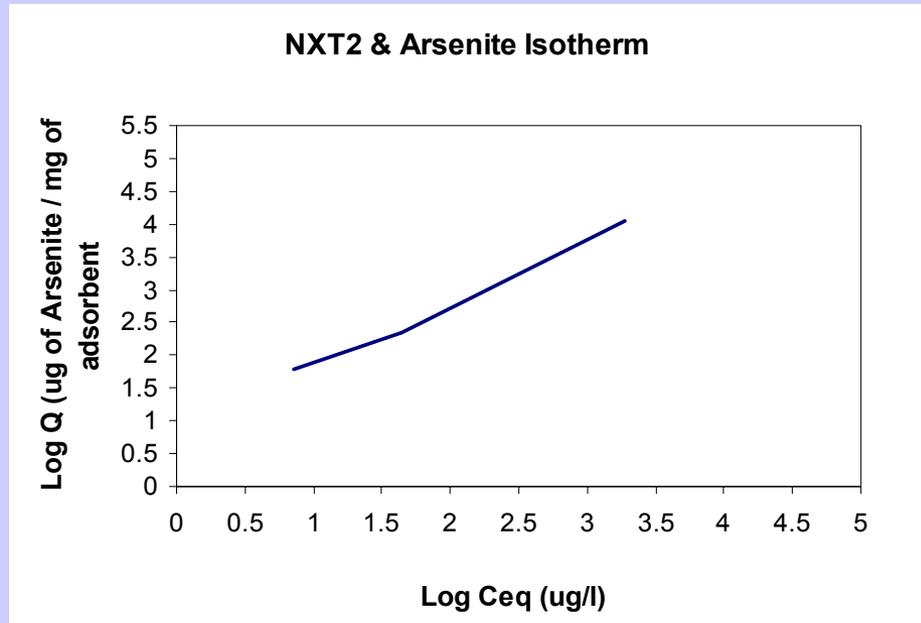
□ NXT-CF

- Specialty Coagulant used with filtration
- DE Coated with La/Fe



NXT-2 Media Characteristics

- ❑ Surface Area: 80-120 m^2/gram
- ❑ Bulk Density: 1.1 g/cm^3
- ❑ Particle Size: 30 x 200 mesh
- ❑ Surface Loading Rate: 7-9 gpm/ft^2
- ❑ EBCT: 3 minutes



- ❑ Cost Efficient
 - Effective over wide pH range
 - Removes both As(III) and As(V), can eliminate the need for a chemical oxidation step
- ❑ Safe
 - Will release little arsenic if pH upset occurs in column
 - Better pH stability
 - Spent cake meets TCLP test requirements for non-hazardous material
- ❑ Versatile
 - Removes arsenic, phosphates, chromium, selenium and pathogens*
- ❑ Stability
 - Long Shelf Life

* When used with Precoat Filtration only

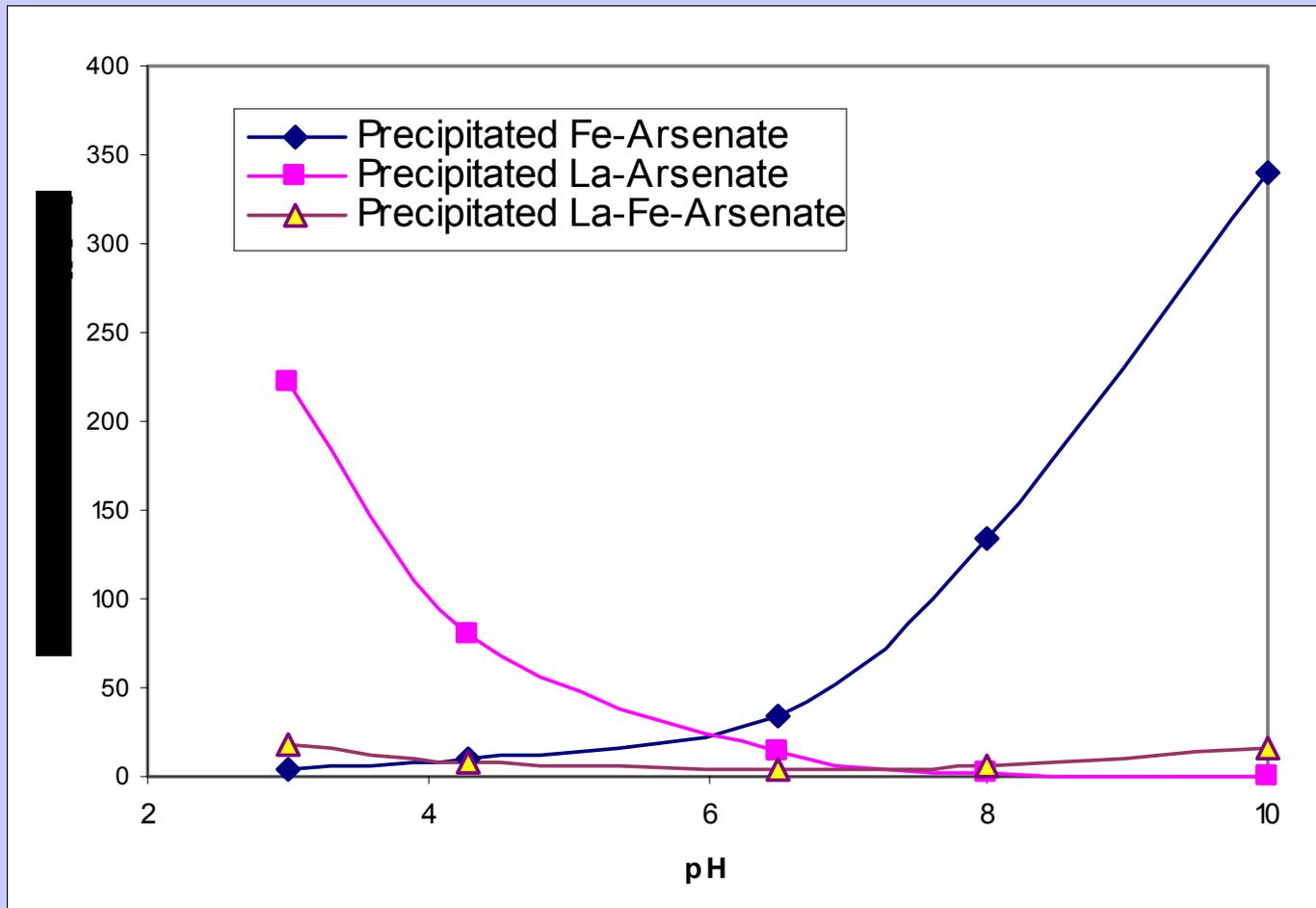
Why La-Fe-Arsenate (**NXT™**) is More Stable with pH?

EaglePicher™
Filtration & Minerals

Lanthanum
provides
high pH
stability

Iron
provides
low pH
stability

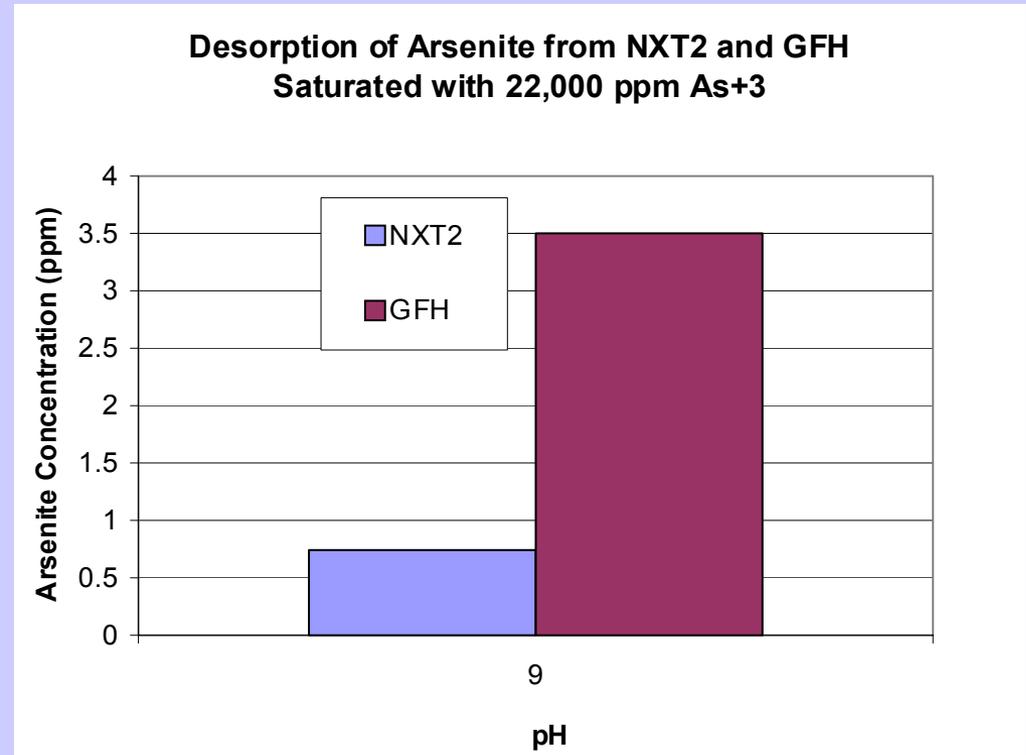
Combined,
NXT is
stable over
full range



**Stability of Precipitated Lanthanum
Arsenate/ Ferric Arsenate as a Function of pH**

Improved pH Stability in the Column...Desorption

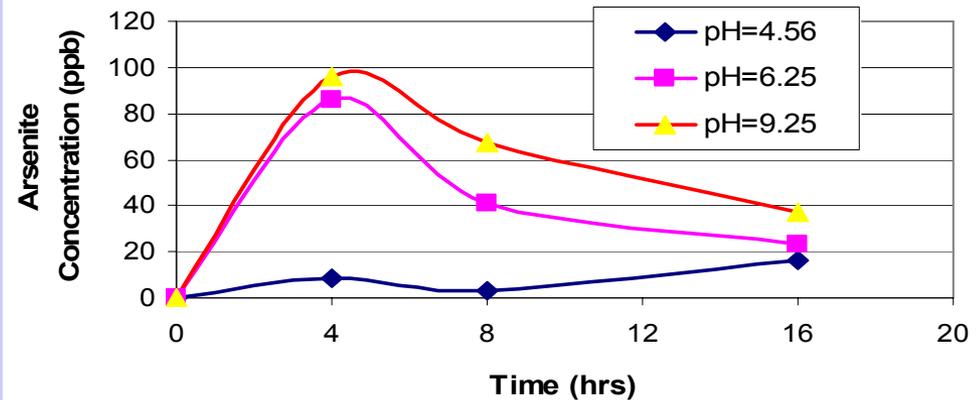
- The NXT-2 / arsenic bond is more stable than the iron-based media bond with arsenic



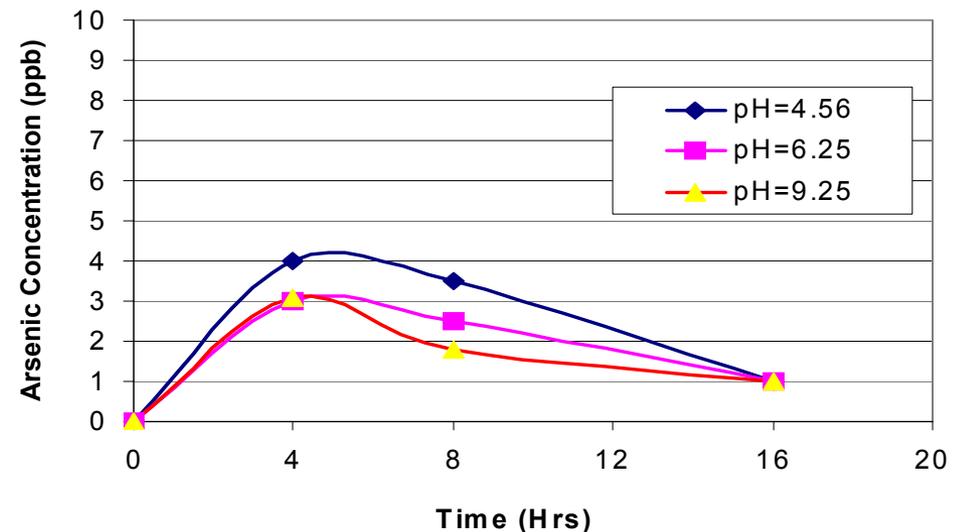
Improved pH Stability in the Column...Desorption

- Less desorption with arsenate
- Arsenite bond is not as strong as the arsenate bond

Arsenite Desorption from NXT2 (2200 ppm Loading)



Arsenate Desorption from NXT2 (2400 ppm)



Versatile

- ❑ Continues to Remove Arsenic (III and V) in the presence of many interfering or competing ion environments
- ❑ Kinetics are very fast
- ❑ Removal preferences:



Table 1: Removal of Arsenate and SO4 at pH 6.5

Anion	Initial Con. (ppm)	Final Con. (ppm)	% Removal
Arsenate	0.060	<0.005	100
Sulfate	60	28	53

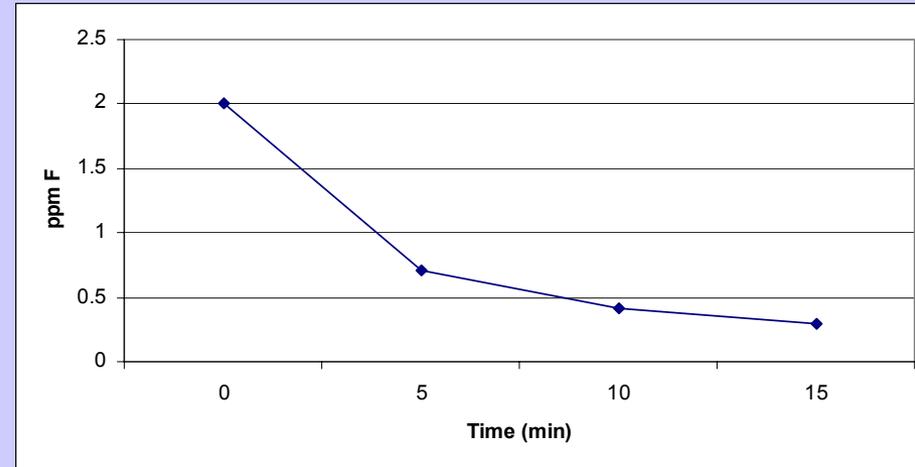
Table 2: Removal of Arsenate and SO4 at pH 8.5

Anion	Initial Con. (ppm)	Final Con. (ppm)	% Removal
Arsenate	0.060	<0.005	100
Sulfate	60	27	53

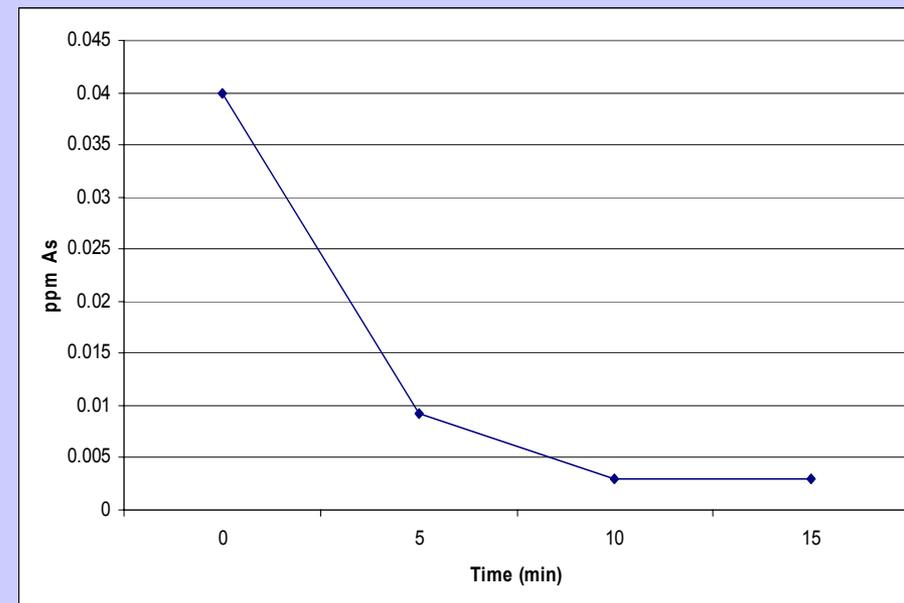
Versatile (Cont'd): Jar Tests

Results with **NXT-2**

Paramter	Result	Unit
Alkalinity, Total & Bicarbonate	190	mg/L CaCO ₃
Alkalinity, Carbonate & Hydroxide	<2	mg/L CaCO ₃
Arsenic –ICP-MS	0.029	mg/L
Barium	0.017	mg/L
Chloride	72	mg/L
Copper	0.006	mg/L
Fluoride	2.2	mg/L
Lead	<0.001	mg/L
Iron	0.24	mg/L
Magnesium	14	mg/L
Manganese	0.01	mg/L
Nitrate	0.65	mg/L N
pH	8.04	pH
Potassium	7.1	mg/L
Sodium	140	mg/L
Sulfate	190	mg/L
TDS	650	mg/L
Turbidity	1.1	NTU



Beatty, NV Water



Making Use of the Best Available Technologies (2 Solutions)

- The Ideal Media is Determined by Water Quality and Treatment Capacity Requirements

1. Adsorption: **NXT-2** Adsorption Media

- Ideal for smaller, remote treatment systems and wells
- Modified Precoat Media
- 8/05 Pilot tested in Desert Sands, NM
- Bench Testing UNR
- Preparing to start pilots in Beatty and Alamo, NV

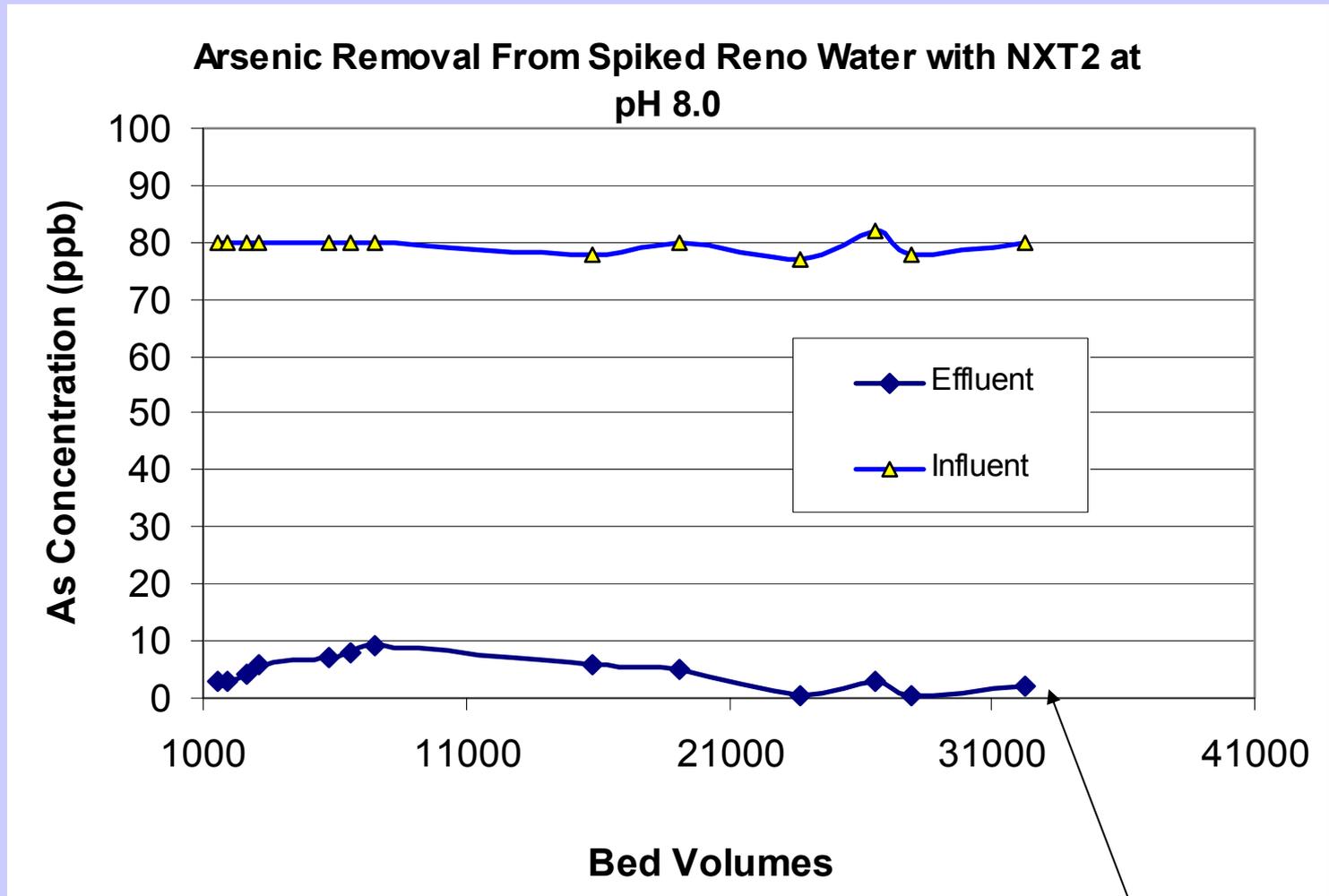
2. Coagulation / Filtration: **NXT-CF** Precoat Media

- Ideal for large centralized systems (typically more than 10K people)
- Pilot tested in Fernley, Nevada with precoat filtration
- Pilot testing ongoing in Indiana with sand filter



Pilot Column Testing Results

UNR



Test Still Going

Thank You

SEARCHING FOR THAT PERFECT 10?

ARSENIC

Experts in Filtration
for Over 60 Years

S.I.M.P.L.E. Solutions In Meeting
Published Arsenic
Limits Effectively

NANOCRYSTALLINE
Nanocrystalline Media