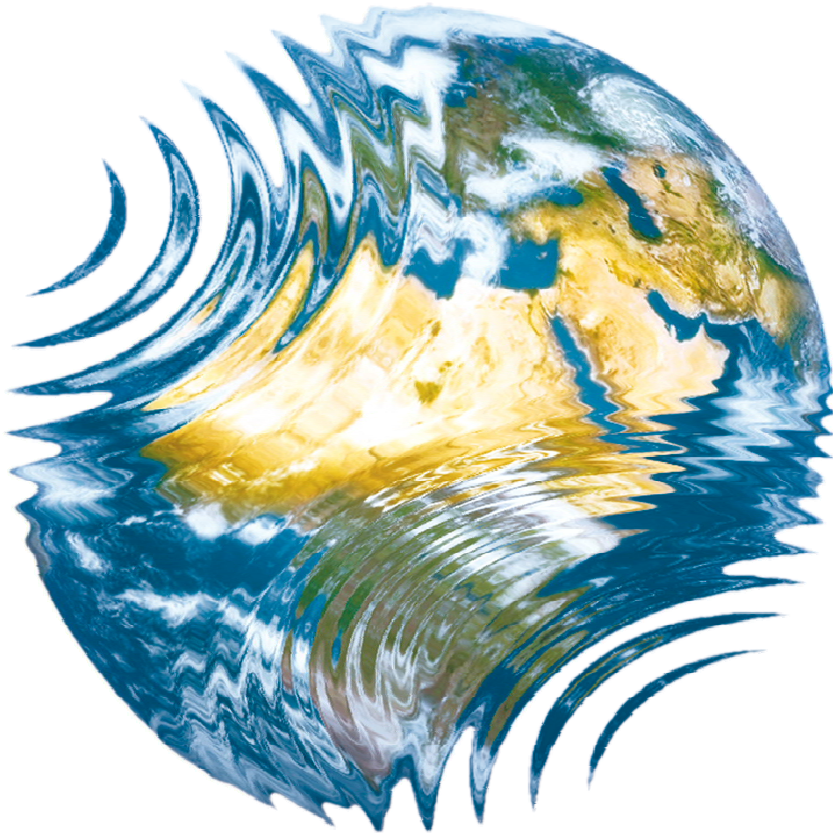


METALSORB™



Heavy Metal Chelating Agents



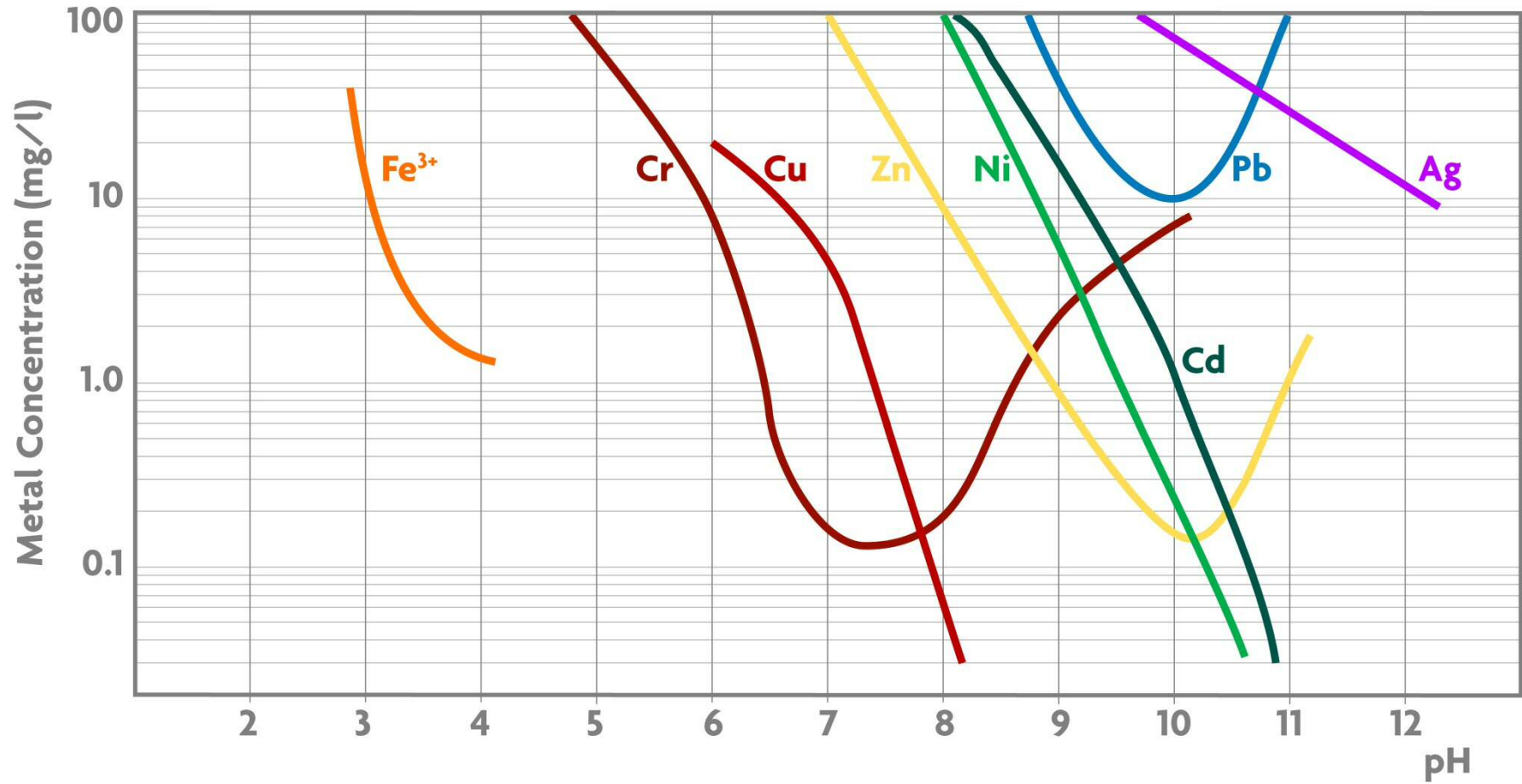
SNF HOLDING COMPANY

Benefits

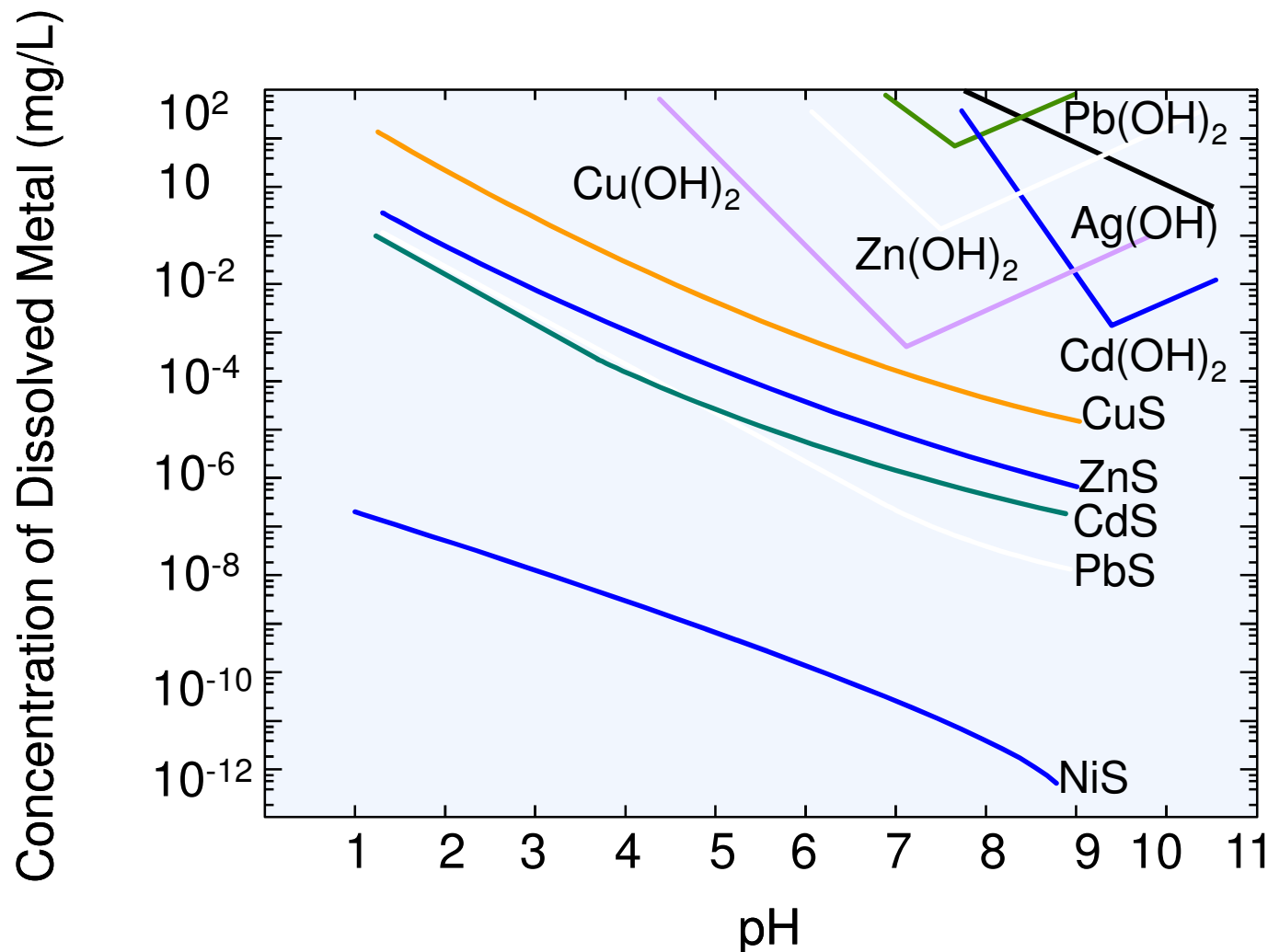
- Sulfide precipitation is the most efficient
- SNF grafted DTC chemistry to core polymer
- DTC precipitates complex /chelated metals
- Water based
- Wide pH range (4-10)
- TMT is most effective on mercury from scrubbers
- TMT is less toxic than DTC



Hydroxides Precipitation vs pH



Hydroxide and Sulfide Precipitation Comparison



Applications

- Surface treatment
 - Electroplating, Solar panel, Printed circuit boards
- Incineration facilities
 - Municipal, Industrial
- Metal manufactures
 - Steel industry, Forging
- Thermal power station and coking plants
 - Treatment of coal impurities
- Refinery/Oil
 - Mercury removal after desalter
 - Deoiler for oil/water separation
- Liquid waste management
- Mines



Metalsorb Overview

- Metalsorb range is specially designed to remove heavy metals in their ionized form from water (mainly industrial wastewater)
- Metalsorb's action is based on its chelating power
 - Metalsorb catches **divalent** metal ions in solution and creates insoluble salts that can be filtered out from water
- The chelating power of Metalsorb comes from a sulfur derivative grafted onto an organic molecule



- Metalsorb works specifically on the following heavy metals
 - Cd, Cu, Hg, Ni, Pb, Zn...



Polymeric Product Range



METALSORB FZ

- Low concentration polyelectrolyte
- Low polydispersity
- Chelating and flocculating properties
- High MW
 - n~10,000-15,000
- Not ecotoxic

METALSORB PCZ

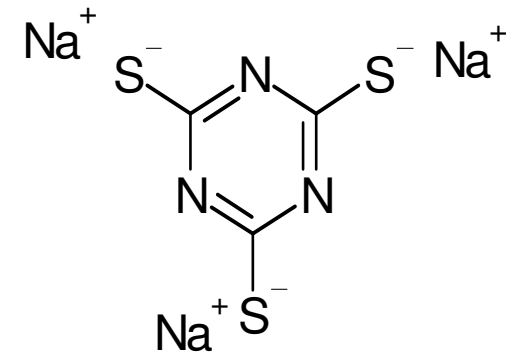
- Low concentration polyelectrolyte
- High polydispersity
- Chelating and flocculating properties
- Medium MW
 - n~5,000-8,000
- Not ecotoxic
- Designed to break EDTA complexes



Organic Product

METALSORB ZM

- Low concentration small molecule
- Highly active
- Chelating but no flocculating properties
- Low MW
- Not ecotoxic



Physical and Chemical Properties

METALSORB	ZM	FZ	PCZ
Molecule	Trimercapto-S-triazine	Polymeric dithio carbamate	Polymeric dithio carbamate
% solids	15%	20%	20%
pH	12.0 - 13.0	10.0 - 11.5	10.0 - 11.5
Polydispersity	Low	Low	High
Molecular Weight	Low	High	Medium
Appearance	Clear green liquid	Red to brownish liquid	Red to brownish liquid
Smell	Slight	Light rotten egg	Light rotten egg
Activity	1.85 meq/g	1.42 meq/g	1.42 meq/g
Equivalent FZ	1.30	1.00	1.00



Dosage Calculator

	Mw	Concentration ppm	Metalsorb FZ ppm		
Cu	63.55	0.8	16.904575		
Zn	65.39		0.000000		
Hg	200.6		0.000000		
Pb	207.2		0.000000		
Cd	112.4		0.000000		
Ag	107.9		0.000000		
Ni	58.69		0.000000		
Co	58.93		0.000000		
Fe (+2)	55.847		0.000000		
Cr (+3)	51.996		0.000000		
Au	197		0.000000		
Pt	195.1		0.000000		
Sn	118.7		0.000000		
sum			16.904575		

12 "AM"	12 SNF
135.2	136.54
131.4	132.7
42.83	43.25
41.47	41.88
76.43	77.2
146.37	147.84
145.79	147.24
153.85	155.37
247.86	250.32

Comparative analysis for 12 ppm of each ion

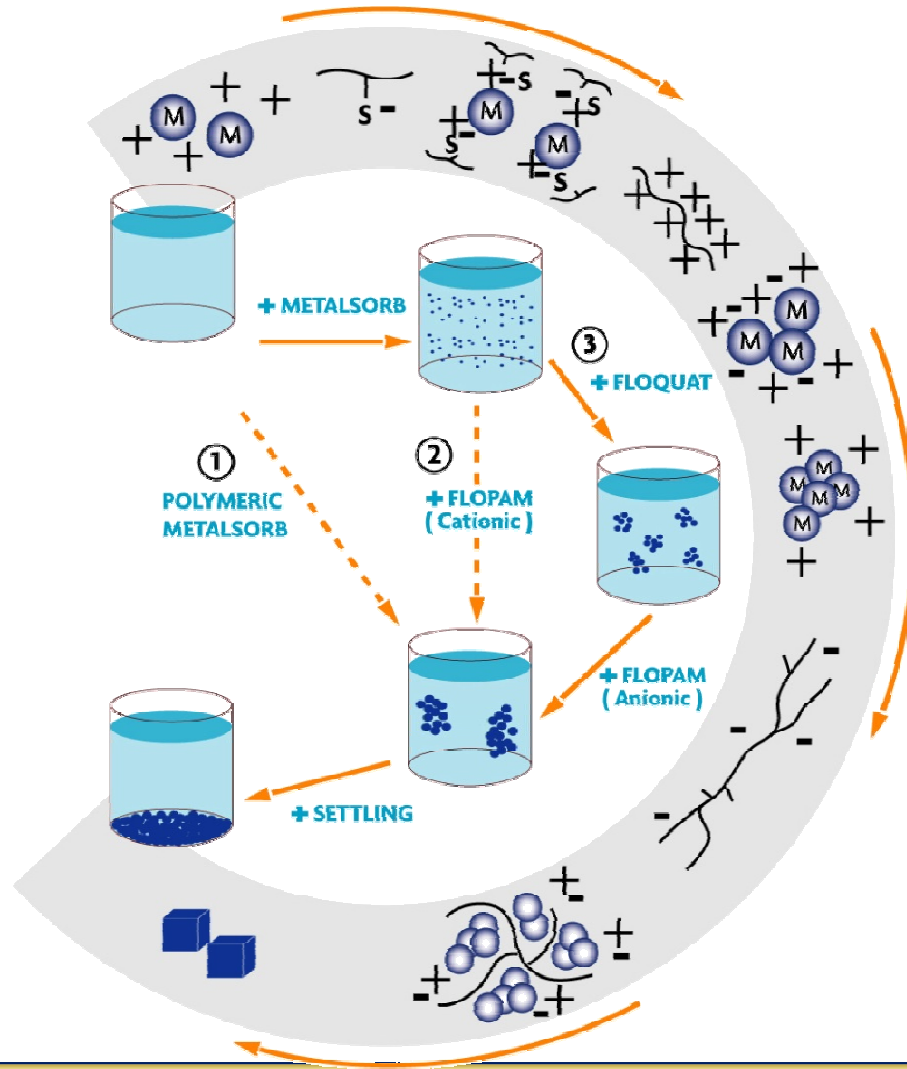
Please enter the residual amount of each heavy metal in Column C
 ⇒ You will get required commercial dosage of Metalsorb

Once you know the dosage is mg/l and you know a system volume in liters or gallons, how many gallons or liters of product are needed?
 If you want to do some jar testing and you know how many ml or liters you want to test, how many microliters of product will be needed given the above mg/l dosage?

Applications



Chemical Precipitation



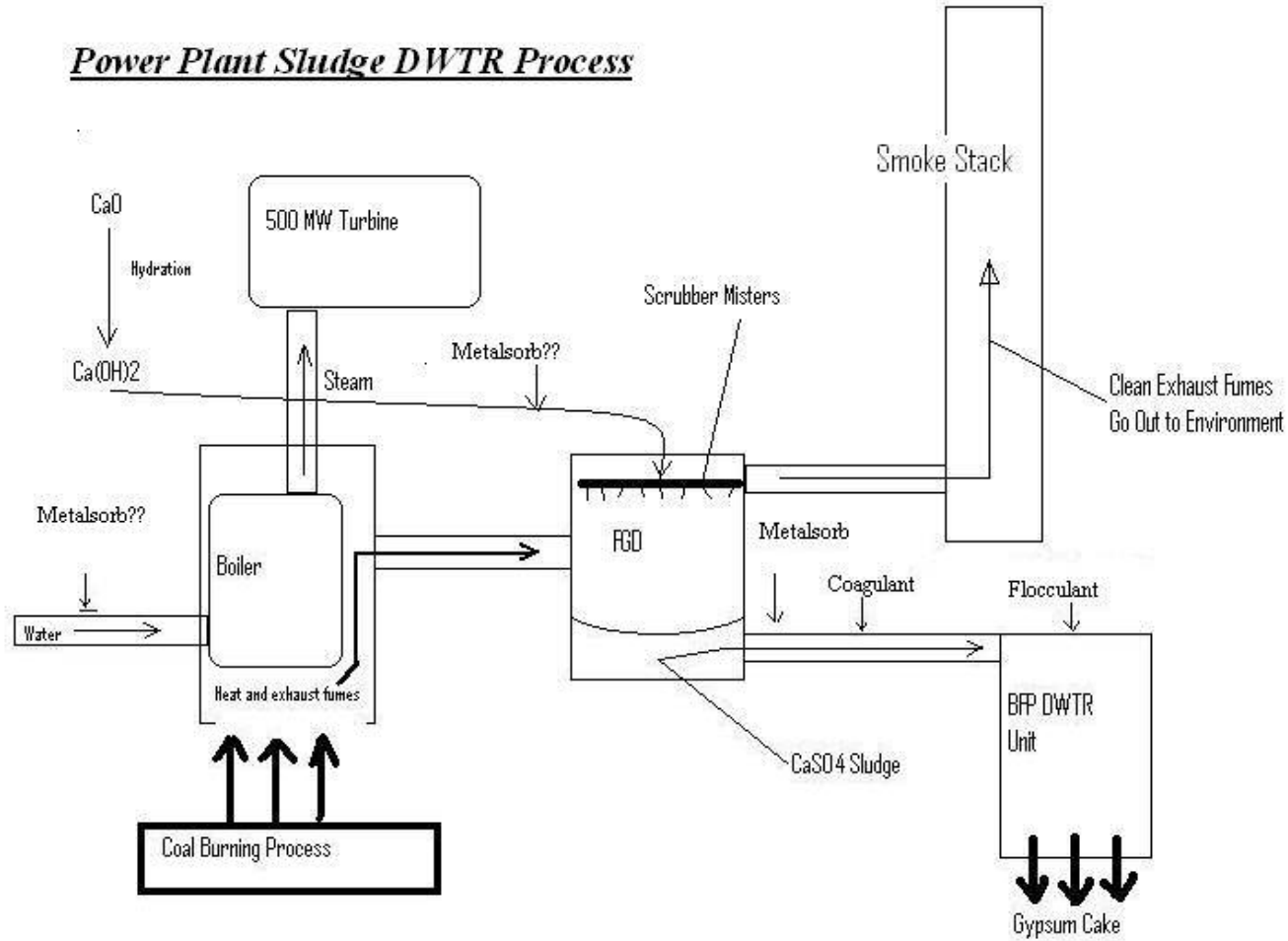
- ① METALSORB alone
- ② METALSORB with Flacculant
- ③ METALSORB with Coagulant and Flocculant

- **Chelant + Coagulant + Anionic Flocculant**
 - Metalsorb ZM
- **Chelant + Cationic Flocculant**
 - Metalsorb ZM
- **Chelant Only**
 - Metalsorb FZ



Power Plant Process

Power Plant Sludge DWTR Process



Limestone Scrubbing - Gypsum Production

