Worldwide Pollution Control Association

WPCA-Southern Company

Wastewater Treatment Seminar

April 16 & 17, 2013

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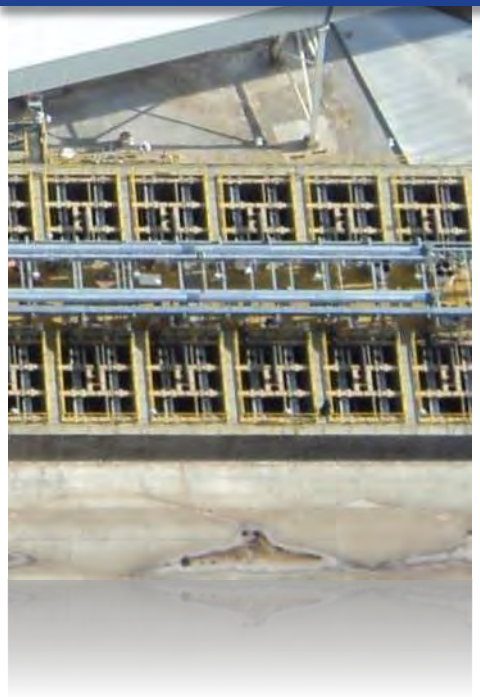
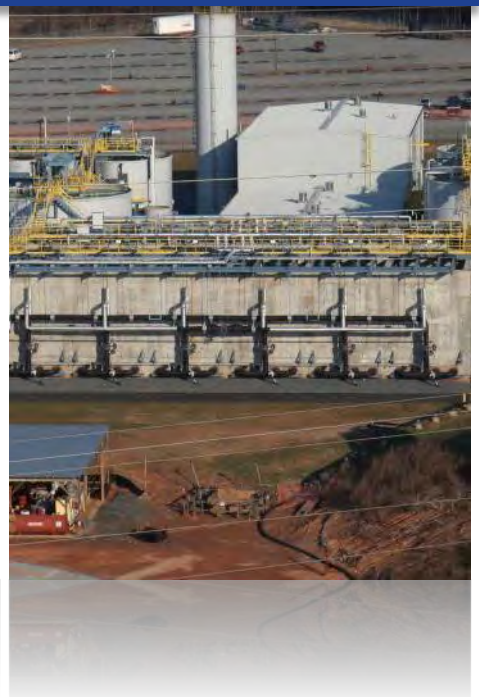
WPCA/Southern Company

Landfill Leachate Handling & Treatment

Mike Wethern | Atlanta, GA | April 17, 2013



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*ABMet is a registered trademark of General Electric Company.

Agenda

- Background
- Non-conventional technology approaches: filtration, reuse and ABMet
- AEP Mountaineer case study
- Mid-West Power Plant case study

Leachate background

- Conversions to dry ash handling and an increase in dry FGD systems creating more landfills with CCR's
- Effluent Limitation Guidelines will address leachate streams and dictate certain requirements for treatment
- Very few existing dedicated treatment systems in the US on leachate in power applications
- Most facilities with leachate collection currently blend with other streams

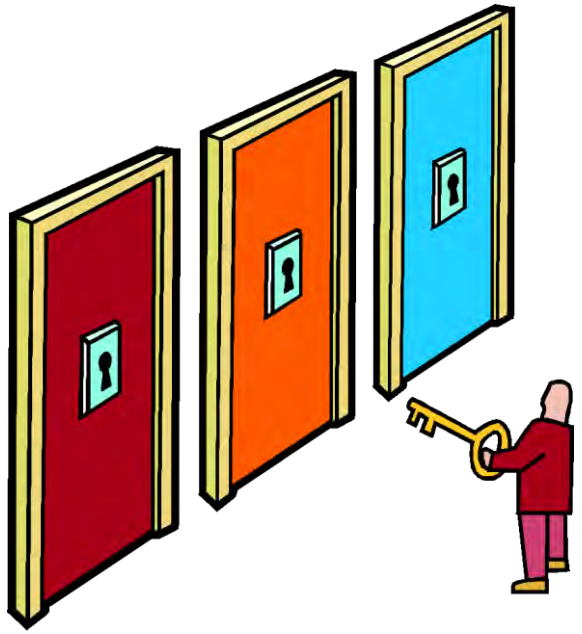
Leachate challenges

- Huge variation in flow rates due to storm events
- Need clear design basis for storm event criteria for treatment both in magnitude and in frequency
- Mitigate as much surface run-off intrusion as possible
- Turn down of any system is a challenge with high flow storm events, average flows and occasional “no-flow” scenarios
- In certain geographies, “no-flow” scenarios could last months
- Concentrations will vary with flow

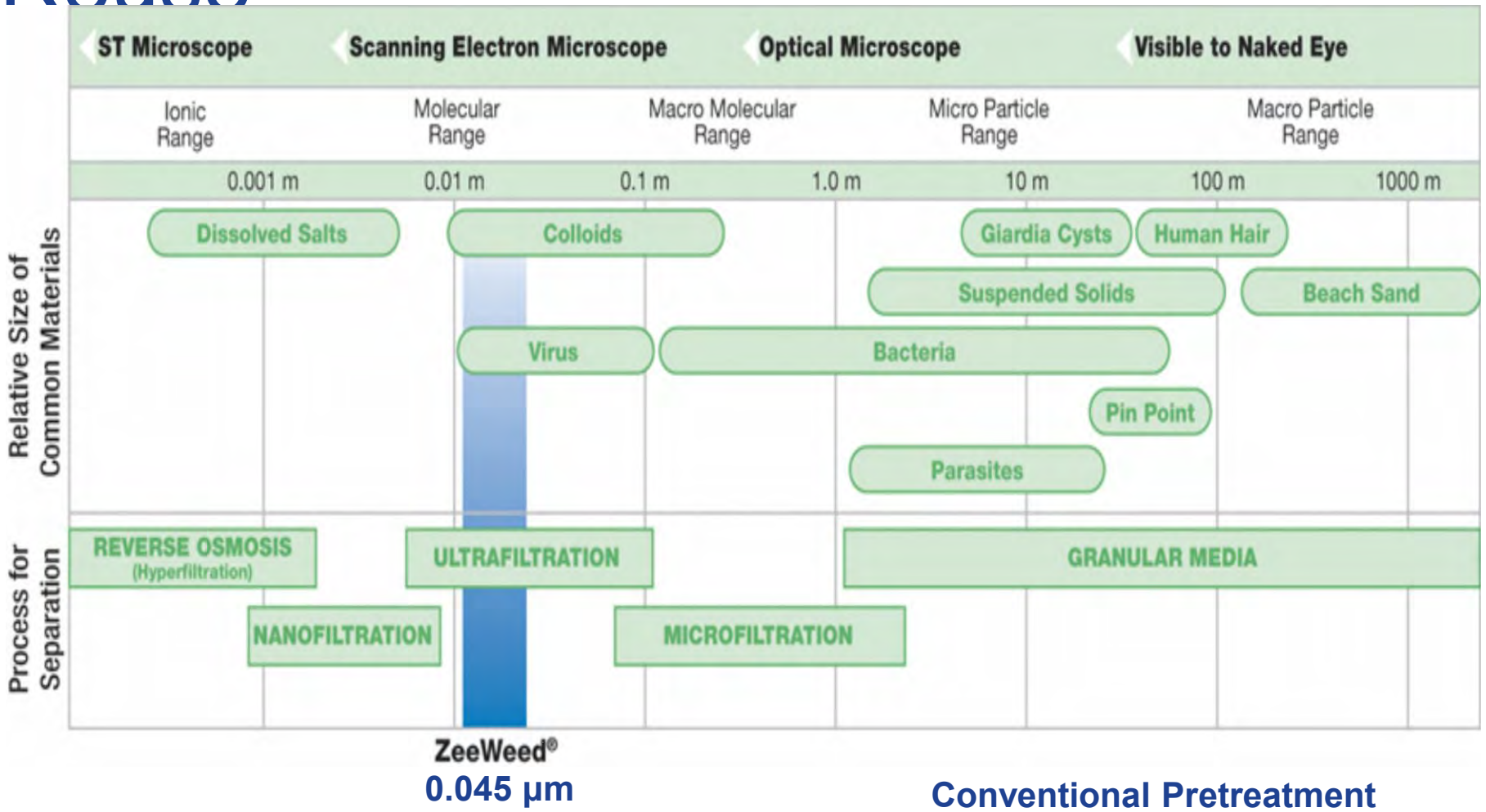
No two leachate streams are the same!

Treatment options

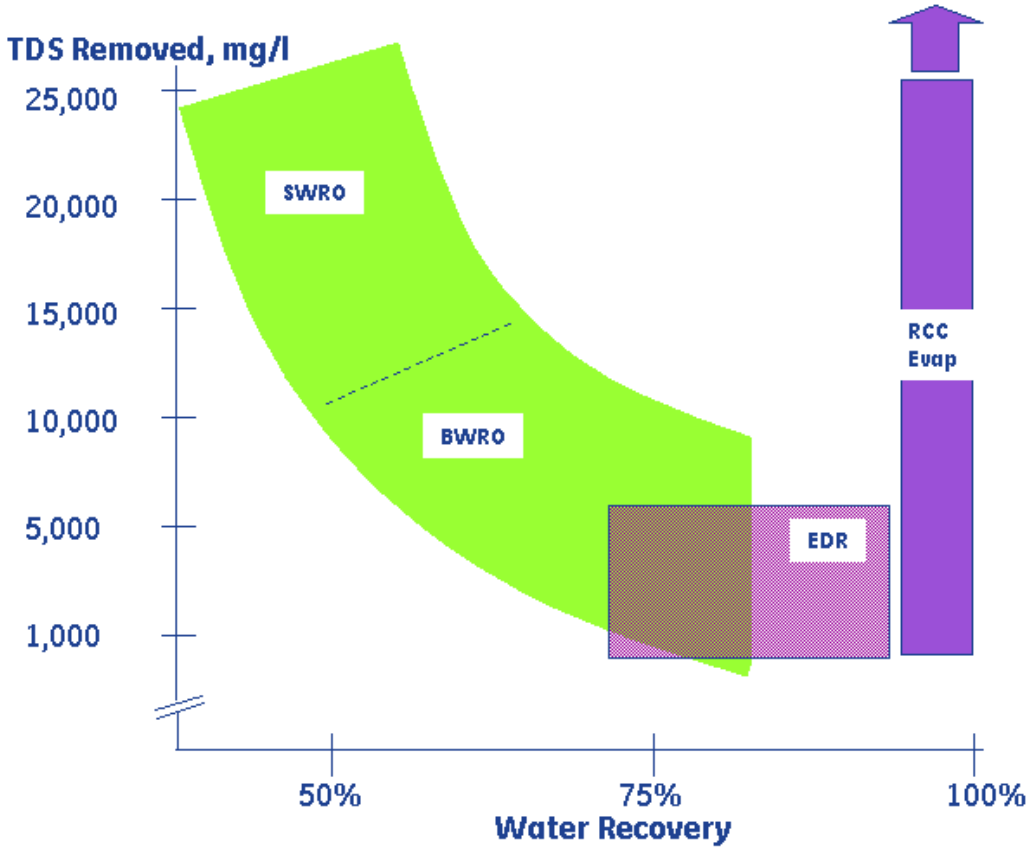
- Conventional treatment
  - Clarifiers, settling ponds, polymers, organo-sulfide)
- Wetlands
- Adsorption
- EDR
- Biological treatment
- Filtration (UF,RO)



Separation Processes for Water Reuse



Technology Positioning:
Dissolved Salt Removal and Recovery



What is ABMet?

Advanced Biological Metals Removal

Utilizes facultative anaerobic bacteria to biologically reduce target constituents

Down-flow, fixed-film, packed-bed biofilter utilizing a biofilm on a granular media

Nitrate and nitrite are reduced to nitrogen gas

Selenium is reduced and retained until backwashed

Other constituents can be reduced or precipitated via sulfide precipitation within system

Biofilm

upsets

loading changes

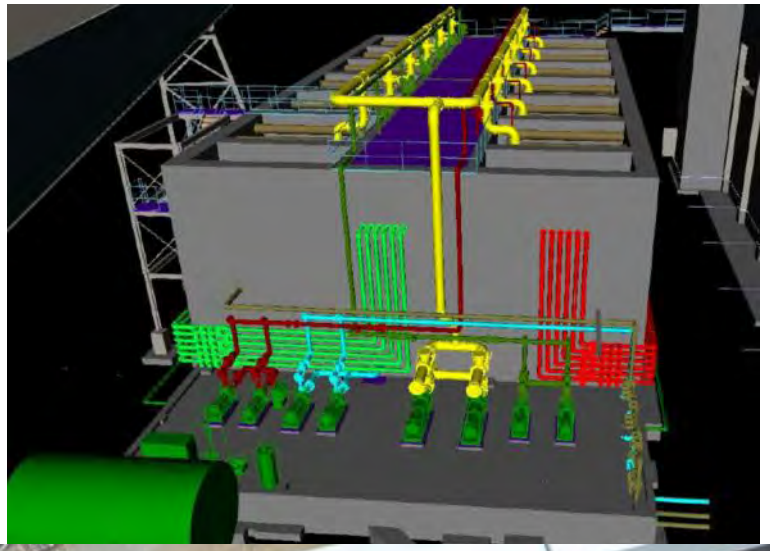
pH swings

foreign constituents

temperature changes

AEP Mountaineer

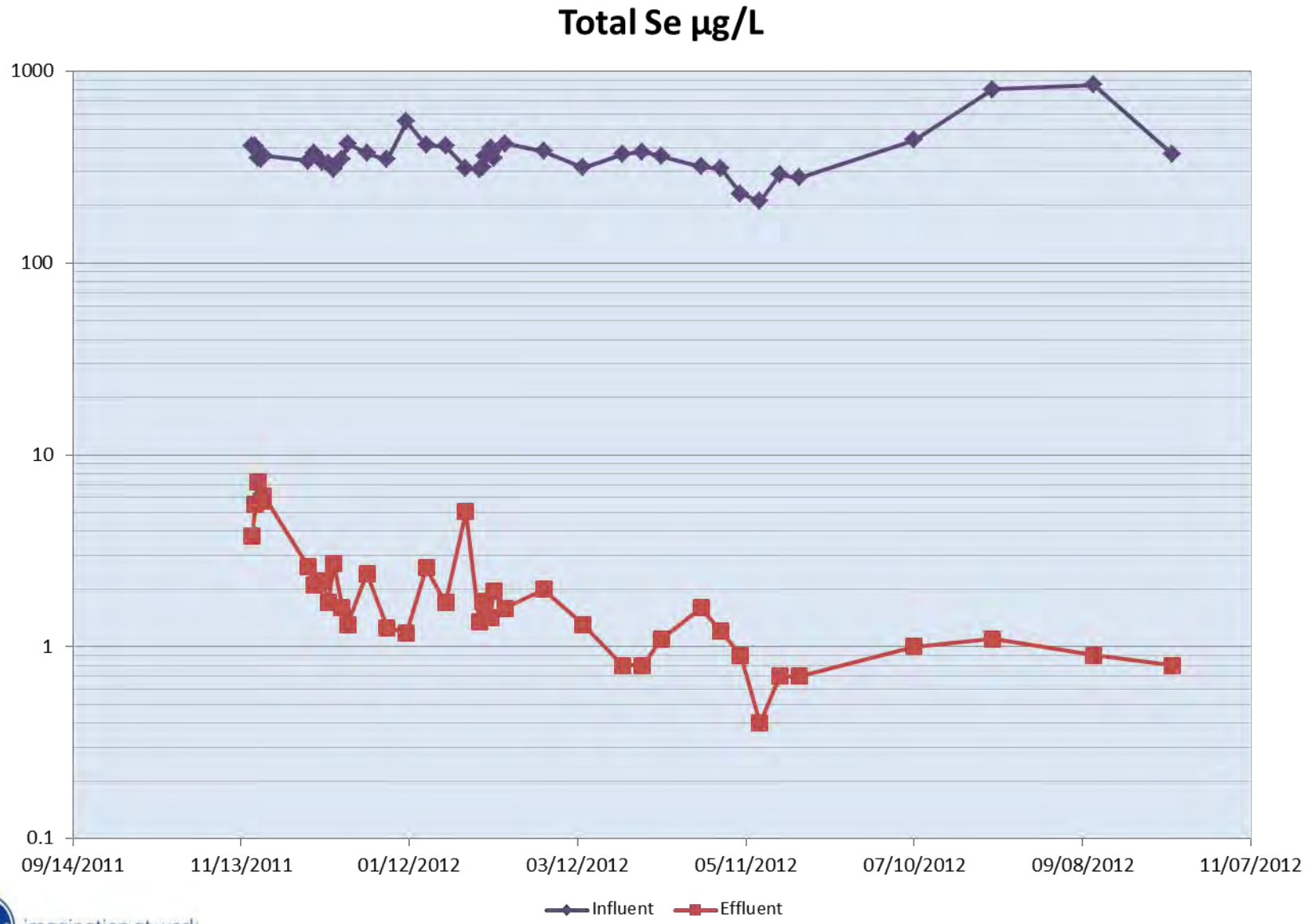
- 600 gpm
- Ohio River
- Blend of FGD blowdown and fly-ash landfill leachate
- Downstream of existing FGD phys/chem
- Operational Nov 2011
- Feed Se: 1,000 – 2,000 ug/L
- Effluent Se: <33 ug/L
- Feed NO3-N: 40-50 mg/L



Mountaineer leachate characteristics

Constituent	Min	Max	Average
Mercury	139 ng/L	1490 ng/L	814 ng/L
Arsenic	9.6 ug/L	15.8 ug/L	12.9 ug/L
Lead	0.36 ug/L	0.36 ug/L	0.36 ug/L
Selenium	339 ug/L	678 ug/L	508.5 ug/L
Thallium	3.9 ug/L	4.6 ug/L	4.25 ug/L
Boron	70.9 mg/L	85.6 mg/L	78.25 mg/L
Chloride	752 mg/L	862 mg/L	807 mg/L
Sodium	1220 mg/L	2630 mg/L	
Magnesium	334 mg/L	648 mg/L	
Bicarbonate Alkalinity	143 mg/L	243 mg/L	
Sulfate	4000 mg/L	8060 mg/L	
pH	7.8	8.4	8.1
Nitrate as N	7.59 mg/L	14.9 mg/L	
Temperature	35 deg F	90 deg F	

Mountaineer station – total selenium



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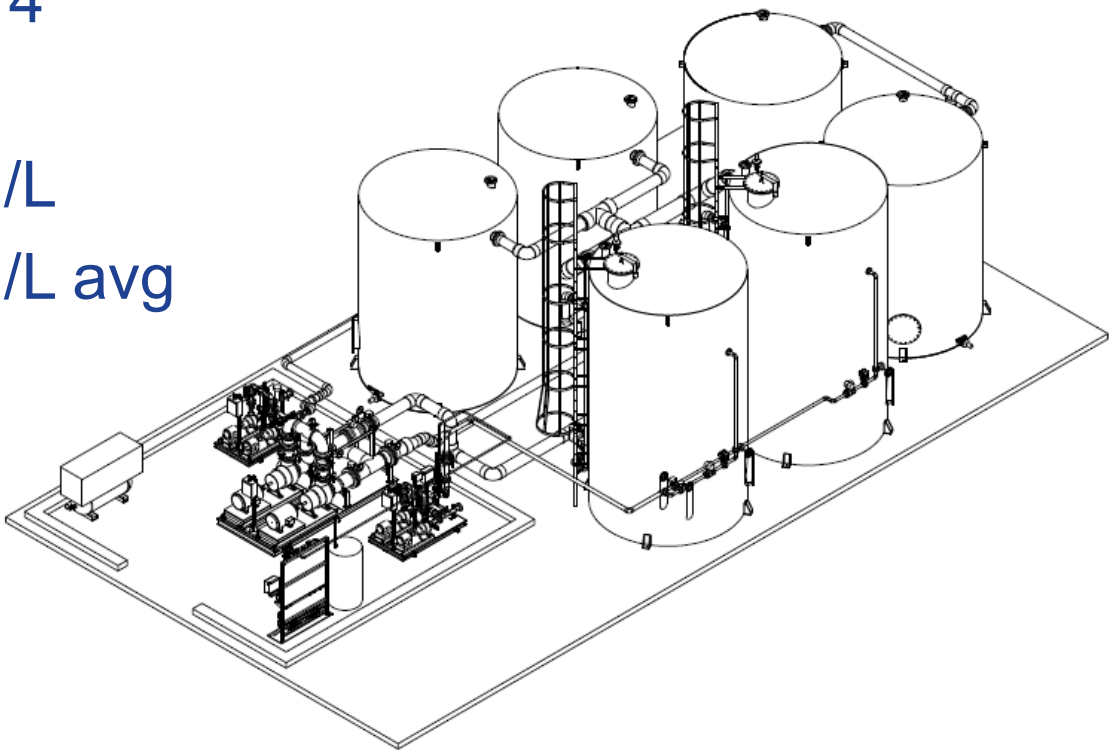
Mid-West Power Plant

- <25 gpm
- Ash + future dry FGD landfill leachate
- Operational early 2014
- Effluent Se: <25 ug/L
- Effluent Cr6+: <30 ug/L
- Effluent TSS: <30 mg/L avg <100 mg/L max



Mid-West power plant leachate

Constituent	Min	Max	Average
Mercury	1.6 ng/L	1.7 ng/L	2 ng/L
Arsenic	13 ug/L	27.3 ug/L	23 ug/L
Lead	0.87 ug/L	3 ug/L	1 ug/L
Selenium	151 ug/L	420 ug/L	307 ug/L
Boron	3.86 mg/L	6.65 mg/L	5.79 mg/L
Chloride	2.61 mg/L	19.5 mg/L	8.2 mg/L
Chromium*	57 ug/L	336 ug/L	140 ug/L
Iron	0.01 mg/L	3.16 mg/L	0.729 mg/L
Sulfate	1230 mg/L	2270 mg/L	1831 mg/L
pH	11.22	11.74	11.48
Nitrate as N			<10 mg/L
Temperature	51 deg F	102 deg F	

Thank You

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