

PEAT-BASED SORPTION MEDIA; A NEW APPROACH FOR REMOVING HEAVY METALS FROM STORMWATER

Paul Eger, Global Minerals Engineering
Doug Green, American Peat Technology
John Wagner, Diamond Chrome Plating



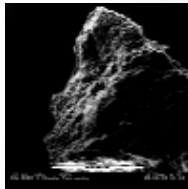
Global Minerals Engineering LLC

Overview

- Peat based sorption media
 - What is it?
 - Characteristics
- Diamond Chrome Plating
 - Problem
 - Approach
- Results
- Conclusions
- Ongoing work

APTSorb™

- Peat based sorption media
- Patented low temperature carbonization
- Hardened granule
- High specific surface area
- High hydraulic conductivity
- High metal affinity



Diamond Chrome Plating

- Industrial hard chrome facility
 - Plates components for aircraft, military, and industrial customers.
- Site ~ 1 ½ acres
- Stormwater
 - Rooftops
 - Storage areas
 - Parking lots.

The Diamond Chrome Plating Facility in Howell, Michigan



Diamond Chrome Plating

- 2007
 - Michigan Department of Environmental Quality (MDEQ) required stormwater monitoring
 - Treatment would be required if metals were elevated
- Monitoring phase
 - Found elevated levels
 - Hexavalent chromium, zinc, cadmium

Monitoring Phase

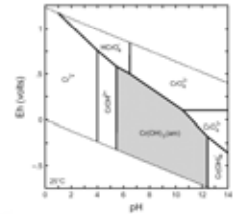
Metal	Pretreatment average, ug/l	Limit ug/l
Total Chromium	526	No limit
Hexavalent Chromium	385	32
Cadmium	219	55
Zinc	565	No limit, monitor only

Approach

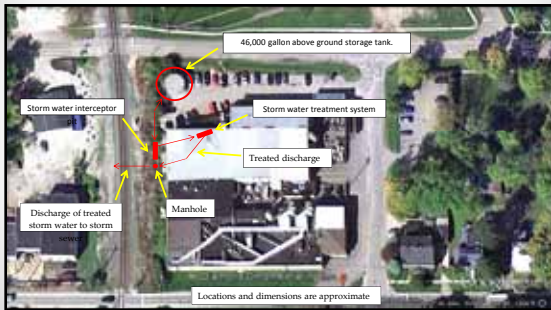
- Use APTSorb to remove metals
- Effective, easy to employ

• Problem!

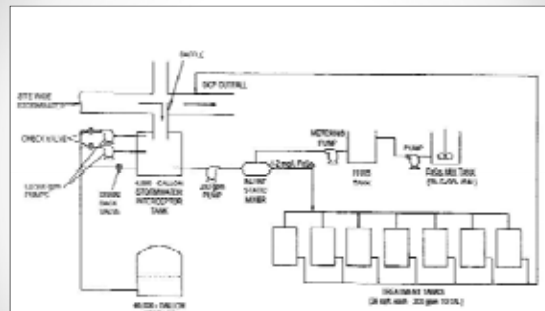
- Hexavalent chromium
 Anion CrO_4^{2-}
 Not readily adsorbed
 Need to reduce Cr^{+6} to Cr^{+3}
 Added ferrous sulfate addition
 Effective
 Quick



The Diamond Chrome Plating Facility in Howell, Michigan

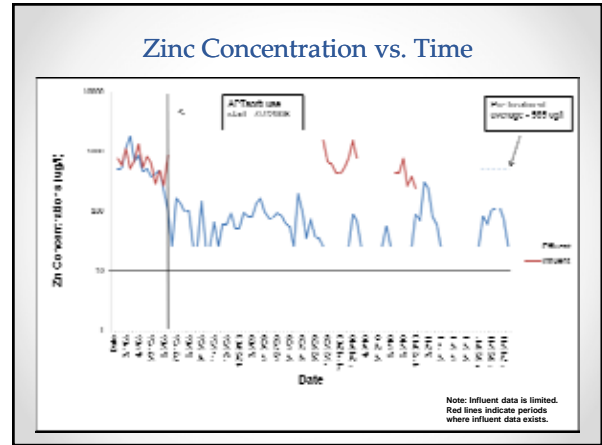
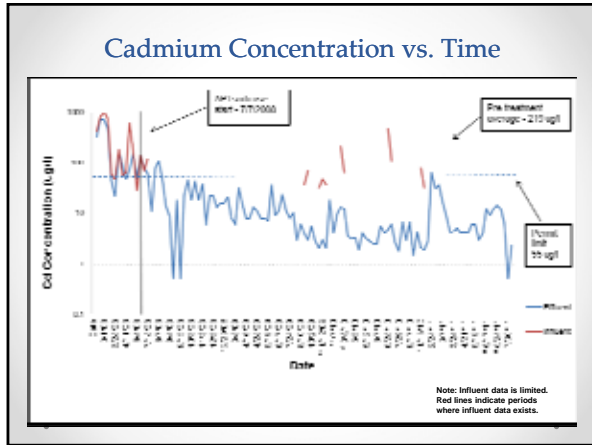
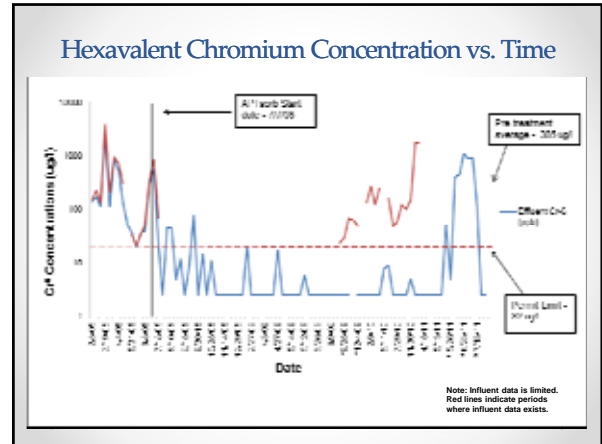
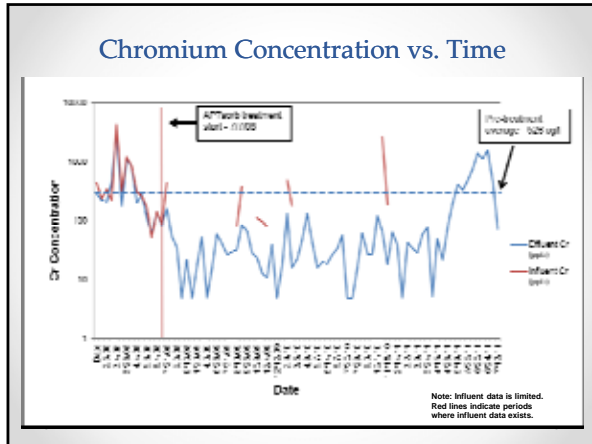


Water treatment diagram



Results

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Removal

Parameter	Influent (estimate) average concentration ug/L	Treated effluent average concentration ug/L	% Removal	Permit limit, ug/L
Total Chromium	526	40	98.7	No limit
Hexavalent Chromium	385	5	92.4	32
Cadmium	219	15	93.2	55
Zinc	565	83	85.3	No limit, monitor only

Over 3 years, APTSorb treated over 3 million gallons with no maintenance

Capacity

Parameter	Influent (ug/L)	Effluent (ug/L)	Mass (gm)	Loading capacity (mg/kg)
Total Chromium	526	40	6609	1346
Cadmium	219	15	2780	>566
Zinc	565	83	6568	>1338

Good News:
water meets discharge limits,
but.....



What do we do with the exchange media?

TCLP

EPA Hazardous Waste code	Contaminant	Regulated Level (mg/L)	TCLP results (mg/L)	% adsorbed metal released
D004	Arsenic (As)	5	ND	
D005	Barium (Ba)	100	1	
D018	Benzene	0.5	0.26	
D006	Cadmium (Cd)	1	0.1	0.4
D007	Chromium (Cr)	5	ND	< 0.01
D008	Lead (Pb)	5	ND	
D009	Mercury (Hg)	0.2	ND	
D010	Selenium (Se)	1	ND	
D011	Silver (Ag)	5	ND	
Not listed	Zinc	Not TCLP regulated	2.8	4.6

Disposal

- Material removed with vacuum truck
- Taken to sanitary landfill



Costs

- System Construction \$85,000
- APTSorb \$15,000
- Disposal \$ 5,000

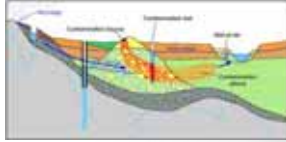


Paul's Top 10 List Why you should use APTSorb

- It's effective
- It has a high hydraulic conductivity
- It can be used in tanks or as stormwater filter
- It's low maintenance
- It's easy to load/unload
- It has high metal affinities
- Metals are tightly bound
- It passes TCLP
- We provide a free evaluation
- We're fun to work with!

Ongoing work

- Stormwater evaluations in California and Washington
- Metal plating plume, New York
- Mine drainage, Minnesota



Questions?

For further technical information, performance data or to request samples go to www.americanpeattech.com/ or call (218) 927-1888

Paul Eger, Global Minerals Engineering
paul.eger@globalmineralseng.com
Doug Green, American Peat Technology
dgreen@americanpeattech.com
John Wagner, Diamond Chrome Plating
env@diamondchromeplating.com



Global Minerals Engineering LLC