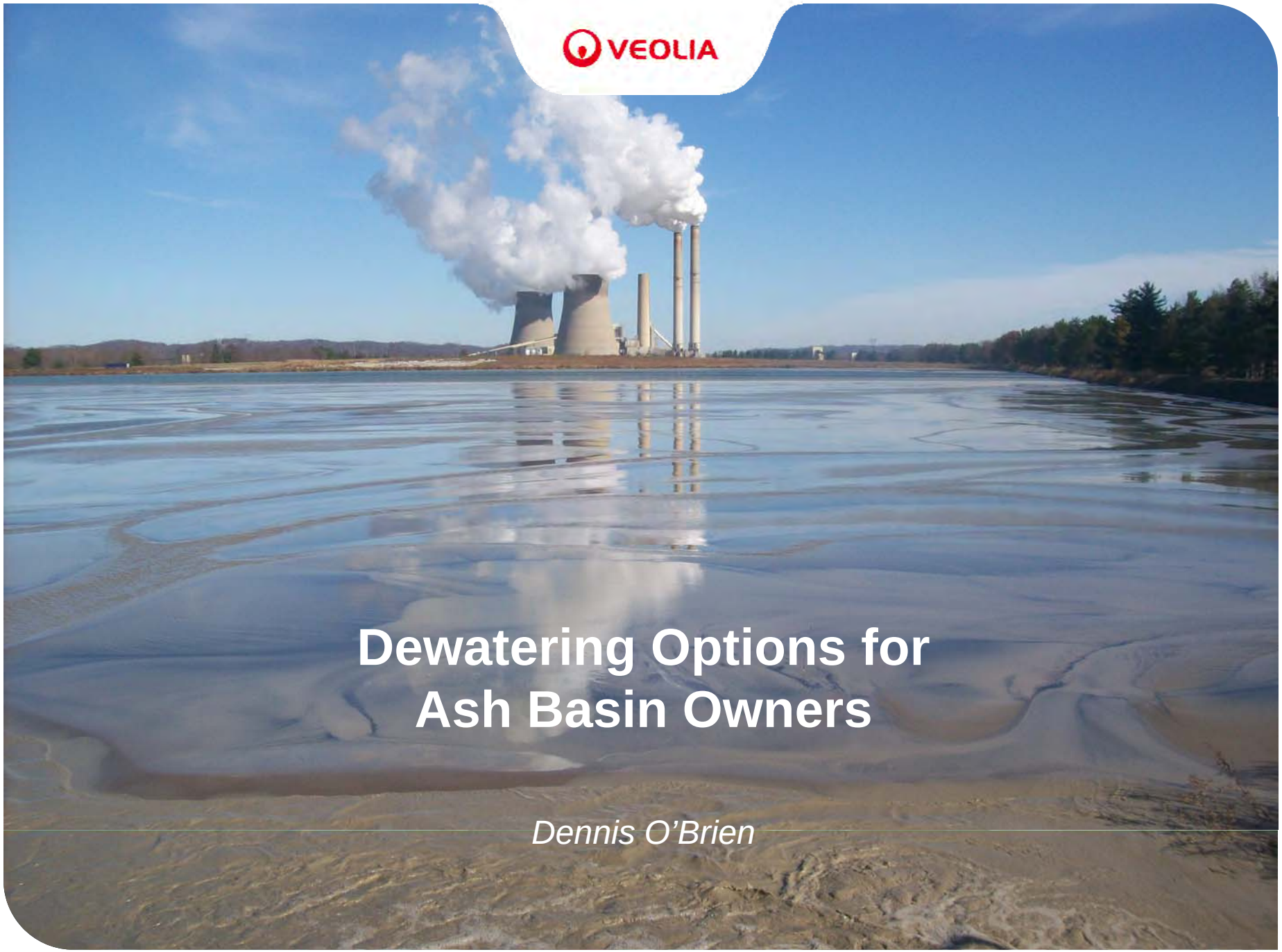
REINHOLD ENVIRONMENTAL Ltd.

2014 Wastewater-Ash Round Table & Expo Presentation

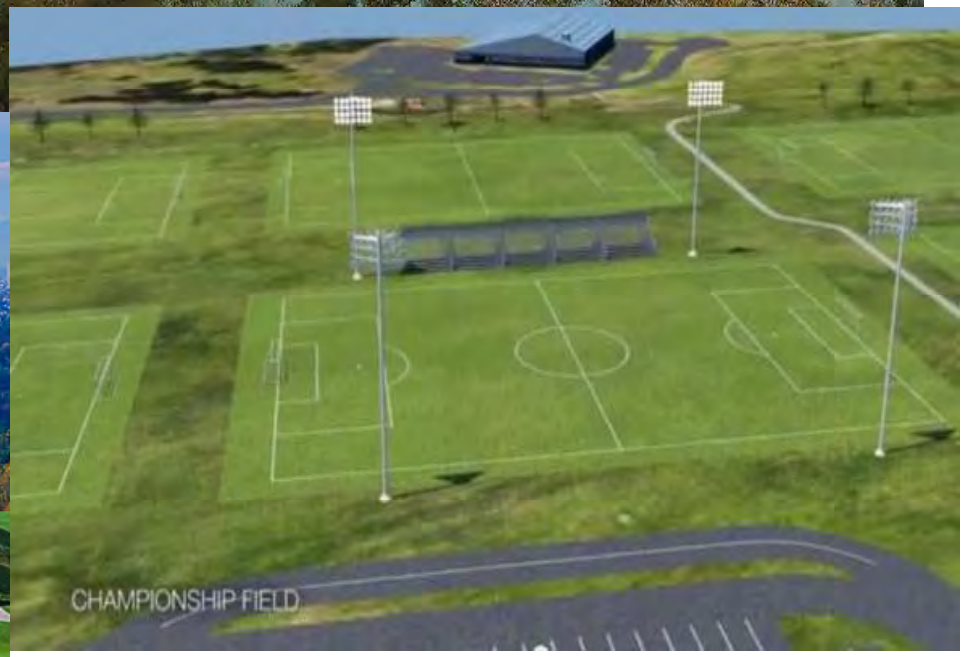
September 22, 2014, in Birmingham, AL / Hosted by Southern Company



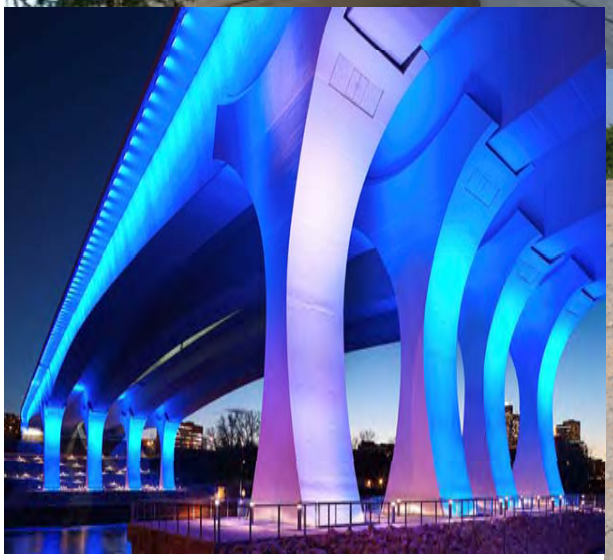
Dewatering Options for Ash Basin Owners

Dennis O'Brien

How do we get potential functional spaces like these …..



Recycled uses like these …



….from ash basins like these ?

U.S. Fly Ash Production

- It's currently estimated that approximately 131,000,000 tons of fly ash are produced annually in the USA

- Where does it go ?
  - *676 ash ponds*
  - *311 dry landfills at power plants*
  - *100 off site dry landfills*
  - *750 inactive dumps*
  - *Hundreds of inactive/abandoned mines*

- It's estimated that 21% of all ash is stored in ash basins, 36% goes in landfills and the remaining 43% is recycled.

Variables

- Coal Types
  - *Lignite / Subbituminous / Bituminous*
- Fly ash w/ various properties
- Landfill (*onsite or offsite*), recycle and production rates
  - *Structural fill & impacts on lifts, daily cover or mixed with other materials*
  - *Paint filter, ASTM etc.*
  - *Transportation & Handling*
  - *Proximity*

Options

- **SOLIDS OPTIONS**
- Mechanical Dewatering
- Yellow Iron
- ISS – In Situ Stabilization & Solidification (*may still have to dewater*)
- Geotextiles

- **WHICH TECHNOLOGY IS BEST ?**
- Each have their pros and cons depending upon what it is you're trying to accomplish, and what your specific conditions are. It may also depend upon the value proposition you're faced with, risk assesment and time frames to name a few.
- The possibility also exists that you may end up utilizing more than one technology to accomplish your specific objectives.
- None of the above technologies removes any environmentally sensitive elements. Each option would require encapsulation (solids) or treatment of the removed filtrate/liquid.

High Rate Dewatering

Ash Basin
Wastewater Technologies

Ash Basin Wastewater Treatment

- Effluent Waste Water Treatment of the Ash Basin
  - *Fly Ash Transport Water*
  - *Bottom Ash Transport Water*
- Closed Basins – Treatment of Non Ash Transport Waste Water - “Other Wastewater”
  - *Storm Water Run Off*
  - *Coal Pile Run Off*
  - *Plant Wash Down Water*
  - *Water Blasting Wastewater*
  - *Clarifier Sludge*
  - *Filter Backwash*
  - *RO Concentrate*
  - *DEMIN Regenerate Wastewater*
  - *Cooling Tower Blowdown*

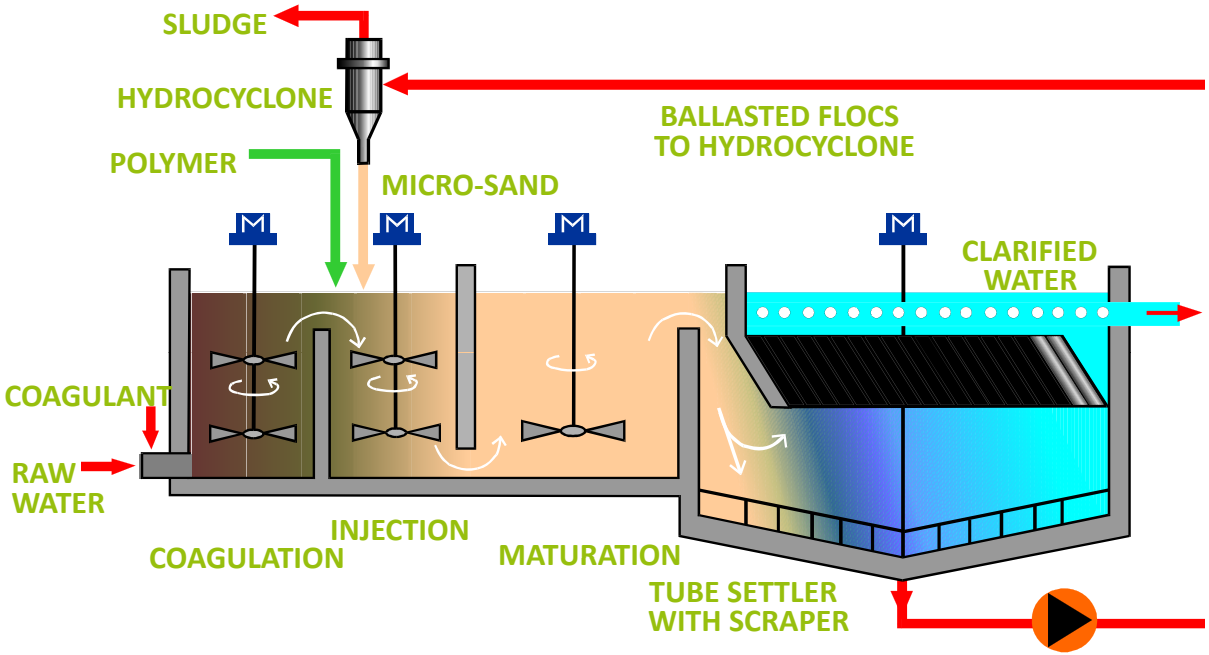
Bottom Ash & Fly Ash Transport Water

- US EPA Guidelines Current*
  - *30/100 mg/l TSS*
  - *6.0 – 9.0 pH*
  - *15/20 mg/l Oil & Grease*
  - *PCBs (Zero Discharge)*
- US EPA ELGs Proposed*
  - *Zero Discharge*
- Current State Guidelines Vary
  - *Metals*
    - Iron/Manganese/Aluminum
    - Heavy metals (Cu, Pb, Zn, Cd, Hg)
    - Oxyanions of metals (As, Se, Mo, Sb)
    - Sulfate, Nitrate

* Electric generating units with total nameplate capacity ≤400 MW or that are oil-fired remain subject to the Existing Limitations

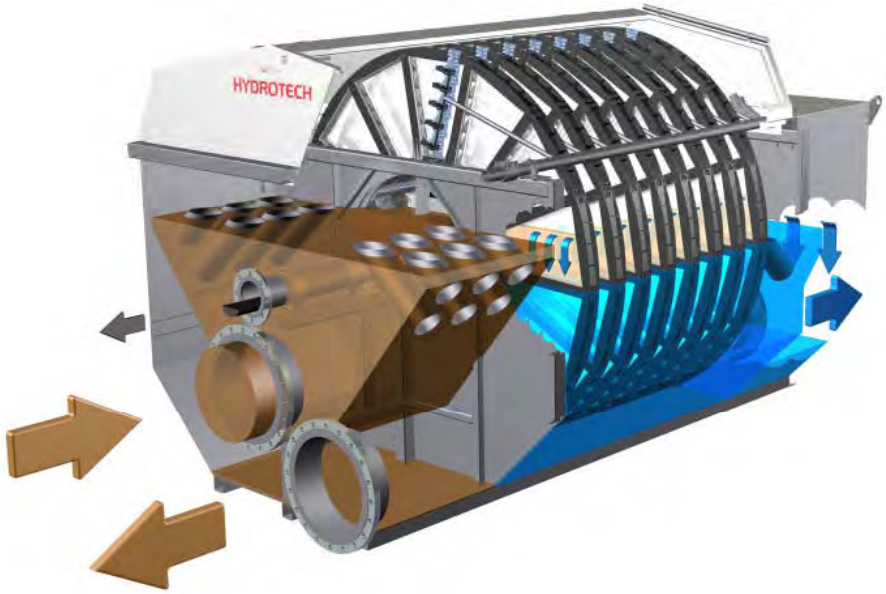
Clarification Technologies

- Gross TSS, NTU, & Metals Removal
- Ballasted Technologies
  - *Package Units to 5000 GPM*
  - *1200 GPM Mobile Flows*
- Solids Contact
  - *Package Units to 1000 GPM*
- Package Units
  - *No welding*
  - *No erection*
  - *Flat Pads*



Polishing Filtration (Macro)

- TSS, NTU, & Metals Polishing
- Media Filters
  - *Multi / Mix Media*
  - *Sand*
  - *Carbon*
  - *Adsorption*
- Low Backwash Volumes – Disc Filters
- CAPEX
- Well Automated

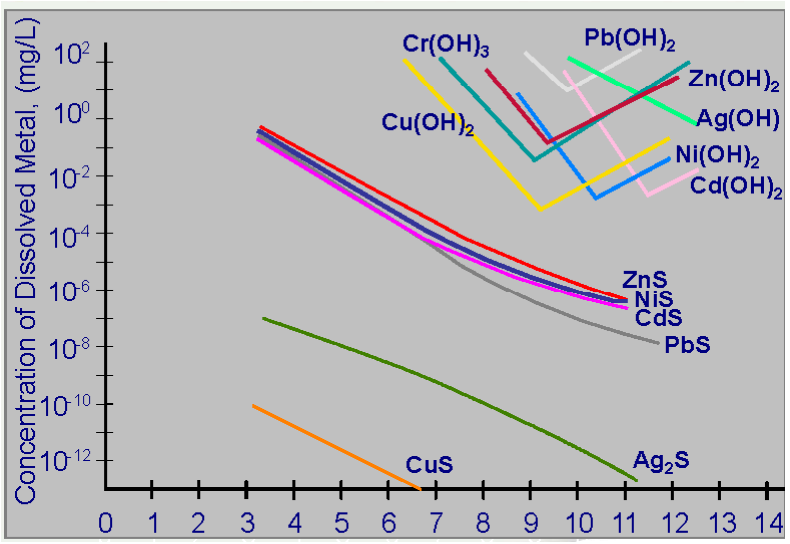


Filtration (Micro)

- Lowest TSS & Metals values
- Well Automated
- Flexible Inlet TSS (tubular, cross flow)
- Complete Pre-treatment Step

Metals Removal

- Current State of the Art Metal Treatment Technologies
  - *Hydroxide/Carbonate/Sulfide Precipitation*
  - *Coprecipitation/Adsorption With Aluminum or Iron Salts*
  - *Ballasted Flocculation*
  - *Ion Exchange*
- Emerging Technologies
  - *Membrane Systems*
  - *Biological Reactors*
  - *Zero Valent Iron*
  - *Sulfur Modified Iron*
  - *Fixed Bed Adsorption Process: Iron or Aluminum based media; Iron-Aluminum composite media*



Conclusion

- Pump and treat solutions may be needed to drain and close ash basins
- Treatment may be needed to divert water from entering the ash basins
- Treatment equipment may be ready to go in a mobile rental platform
- Customized solutions may be required for unique applications
- Start / continue compiling water analysis
- Bench and / or pilot test
- Plan ahead for customized solutions
- Plan ahead for potential low supply and high demand in the market place

Thank you!

Questions?