REINHOLD ENVIRONMENTAL Ltd.

2019 REINHOLD Round Table Presentation

June 24 & 25, 2019, in Birmingham, Alabama / Hosted by Southern Company

Steam Electric ELG and CCR Update

Reinhold

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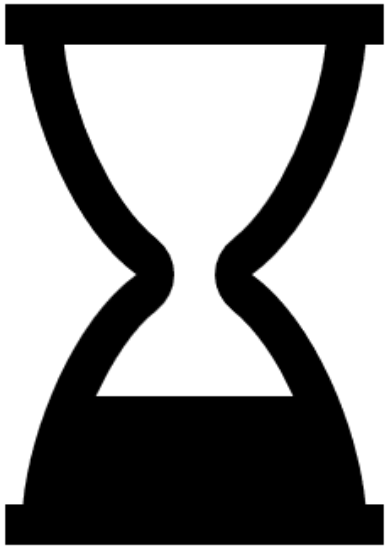
June 24, 2019

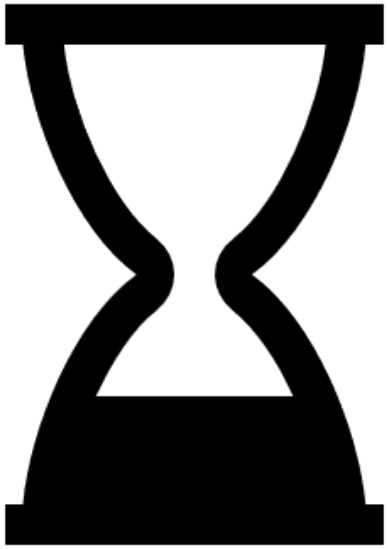
ELG - ON HOLD

- Proposed Rule due Q1 2019……
  - FGD and Bottom Ash rules
  - As of 6/19 – NPRM due June 2019
  - Spring 2019 Regulatory Agenda
  - https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201904&RIN=2040-AF77



ELG - ON HOLD

- Final Rule due before November 2020
  - FGD and Bottom Ash portions
  - Now projected August 2020
- Till then:
  - Deadlines in effect
  - ASAP / November 2020 / December 2023



CHALLENGES - SWEPCO

- April 12, 2019 – 5th Circuit
  - Case 15 - 60821
- Ruled “Arbitrary”
  - Ponds cannot be BAT
- Remanded Leachate & Legacy WW
  - Limits will be required
  - Not part of 2019/2020 reconsideration

CCR Regulatory Update

- Phase 1 Part 1 Edits were published July 30, 2018:
  - Allows alternate performance standards in states with approved CCR programs
  - Added GWPS for 4 constituents without published MCLs
  - **~18 month Extensions for facilities to cease receiving flows and start closure (now 10/31/2020)**
    - Applies to groundwater AND location restrictions
    - Extension being challenged by environmental groups



CCR Regulatory Update

- DC Court opinion issued August 21, 2018:
  - Allowed EPA voluntary remand of:
    - Definition of Coal Residuals piles
    - The 12,400 ton beneficial use threshold
    - Alternative groundwater protection standards
  - Vacated and remanded portions of rule:
    - Unlined ponds should not be allowed to continue operation until leaks are detected, §257.101(a)
    - Composite liners are required, clay-lined ponds should now be considered unlined, §257.71(a)(1)(i)
    - Legacy ponds should be regulated, §257.50(e)
  - EPA to revise liner criteria and legacy standards but schedule for rule revisions unknown
  - **Ponds without composite liners should plan to cease receiving flows and start closure beginning 10/31/2020 (or earlier)**
  - **Closure of legacy ponds could be regulated on a similar timeline**

CCR MOVEMENT

- May 7, 2019 Guidance Issued
- Federal program
- EPA will be reviewing websites for compliance
- Published list of requirements and Deadlines
  - https://www.epa.gov/coalash/compliance-assistance-letter-owners-and-operators-regulated-disposal-units-containing-coal

CCR CONSIDERATONS

- More than ½ of the 299 plants are reporting assessment monitoring into the future
- Groundwater Data is Public
- Citizen suits can move forward
- … and EPA is also looking
- Landfill Leachate disposition challenges:
  - Dissolved solids, Sulfates, Boron, Metals

GROUNDWATER DATA

- There have been court rulings in both directions regarding impacts and the Clean Water Act

NOT JUST ELG / CCR!!

OTHER RULES

- 316(a) Thermal Discharges
- 316(b) Intake structures
- Nutrient Concerns
- Mercury and Selenium Stream Standards
- Bromine regulation
  - Disinfection byproducts (DBPs)
  - Total trihalomethanes (TTHMs)

TECH APPROACHES FOR …..LANDFILL LEACHATE

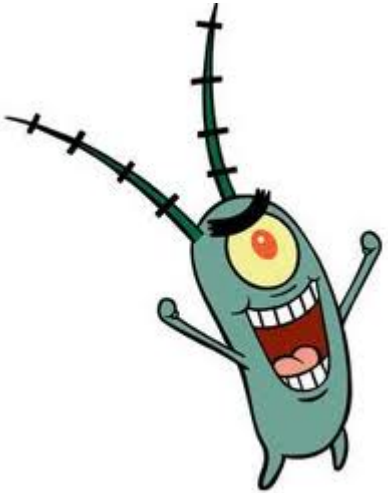
- Studying alternative reuse methods
- Dust control measures
- Fly ash conditioning
  - If landfilling fly ash
- Treating at landfill site
  - Zero discharge may be needed if discharge is to small stream

TECH APPROACHES FOR …..LANDFILL LEACHATE

- Potential to route to larger treatment systems
- Barium sulfate - Sulfate reducing bacteria release Ba
- Arsenic –
  - ORP in the scrubber produces particulate arsenate….
  - TMT may produce arsenic sulfide species with higher solubility

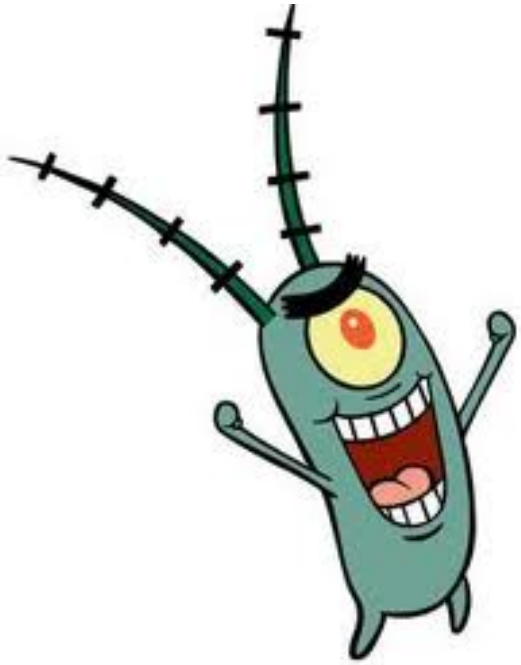
WHAT'S GOING ON IN….
…..NUTRIENTS

- Problems
  - Algae growth in remaining ponds
  - Daily pH swings
  - High effluent TSS
  - Potential nutrient limits on ponds
  - Occasional high phosphorus



WHAT'S GOING ON IN….

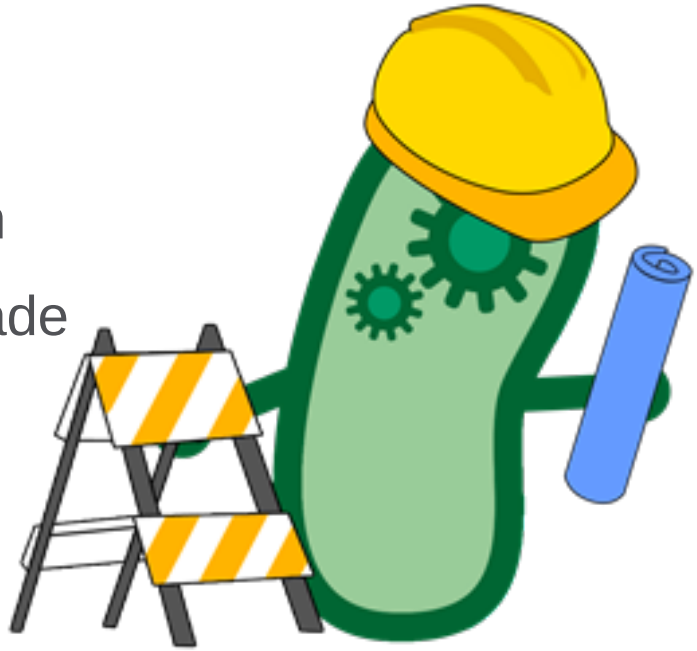
- Sources **…..NUTRIENTS**
  - Antiscalants
    - Cooling Tower
    - Water Treatment System
  - Ammonia – based products
    - SCR/SNCR slip in FGD wastewater
    - Cleaning Products
  - Sanitary wastewater



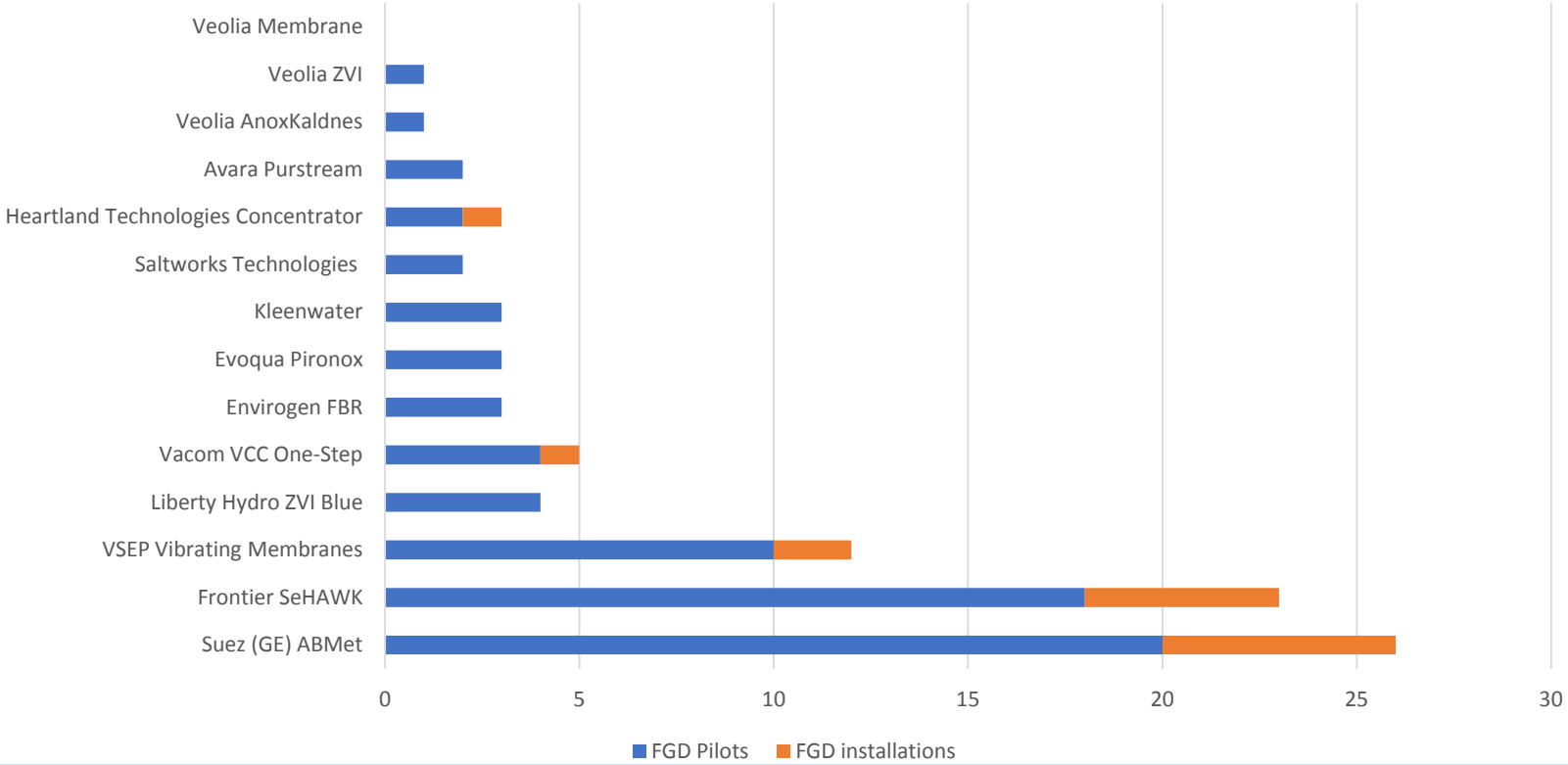
WHAT'S GOING ON IN….

…..NUTRIENTS

- Solutions
  - Review alternate chemistry
  - Reroute to existing bio system
  - Other – pH correction and shade
- Beware
  - Regulatory obstacles
  - Nutrient free chemistry



INDUSTRY UPDATE

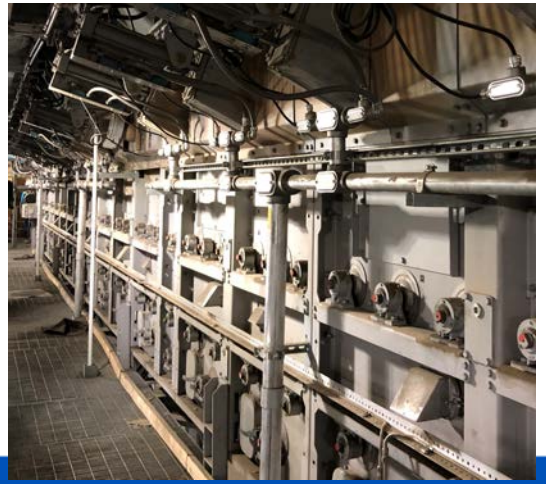


The times, they are a-changing

Technology	2016	2017	2018
Biological	2 vendors	Up to 6 vendors	4 vendors
Thermal	3 vendors	5 vendors	5 vendors
Bypass Evaporation	1 vendor	3 vendors	3 vendors
Zero Valent Iron	1 vendor	3 vendors	2 vendors
Membranes	2 vendors	4 vendors	3 vendors
Selective Resin	1 or 2 vendors	1 or 2 vendors	1 or 2 vendors
Deep Well Injection	?	improving	

What are others doing?

- CCR/ELG compliance path is not one size fits all
- Risk Profiles vary:
  - Proactive planning
  - Wait and see approach
- Significant number of ash handling projects completed
  - Over 50% of plants have compliant bottom ash handling systems (or in progress)
  - ~97% of plants have dry fly ash systems
- Many utilities are evaluating bottom ash technology options with preferences for:
  - Dry solutions (PAX/Magaldi)
  - Eliminating transport water (SCC/SGC)



What are others doing?

What are others doing?

- FGD projects
  - Duke fleet and few others are progressing with FGD treatment projects
  - Regulatory uncertainty causing delays, particularly on FGD side
- Water Redirection projects continuing (required for CCR impoundment closure)
  - Relocating ALL flows away from ash ponds
  - CCR impoundment closures will continue to drive these projects
  - $15-20M + CCR handling + Phys/Chem
  - 3-4 year project
  - Define water balances now – testing to confirm quality and quantity of streams (including outage flows)
  - New ponds vs tank-based solutions

What are others doing?

What is changing?

- Market is driving lower cost solutions and/or retirements
- Outage schedules are not as critical as they once were
- Regulatory requirements will finalize soon:
  - Discharge/blowdown of bottom ash transport water?
  - Bromide limits? Reduced selenium/nitrates limits?
  - What is the compliance date?
- EPA heavily researching membrane technologies
  - Membranes have lower capital costs, but can have significant impacts on landfills and ash sales at some sites
  - Need to determine NPV for remaining life of plant when looking at membrane options
  - Suggest piloting with your FGD wastewater to determine recovery rate
  - Combine brine with your fly ash and test leachate

What do I do now???

- Continue meeting CCR deadlines
  - Groundwater exceedances?
  - Corrective Action assessments?
  - Liner status changed?
  - Ash pond closures?
- Talk with regulators early and often
  - State CCR programs
  - NPDES permit updates
  - ELG compliance schedules/planning
- Ash conversion/FGD treatment/Water redirection Program Plans
  - Ash conversion/FGD treatment/Water redirection programs
  - Water sampling/measurement
  - Dust off technology evaluations and consider pilot studies
  - Business cases
  - Schedules - Lead times may grow significantly

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CREATE AMAZING.