



Unlined Construction and Demolition Debris Disposal Facilities

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Florida Department of Environmental Protection

Pensacola, FL | June 16, 2023



Presentation Agenda

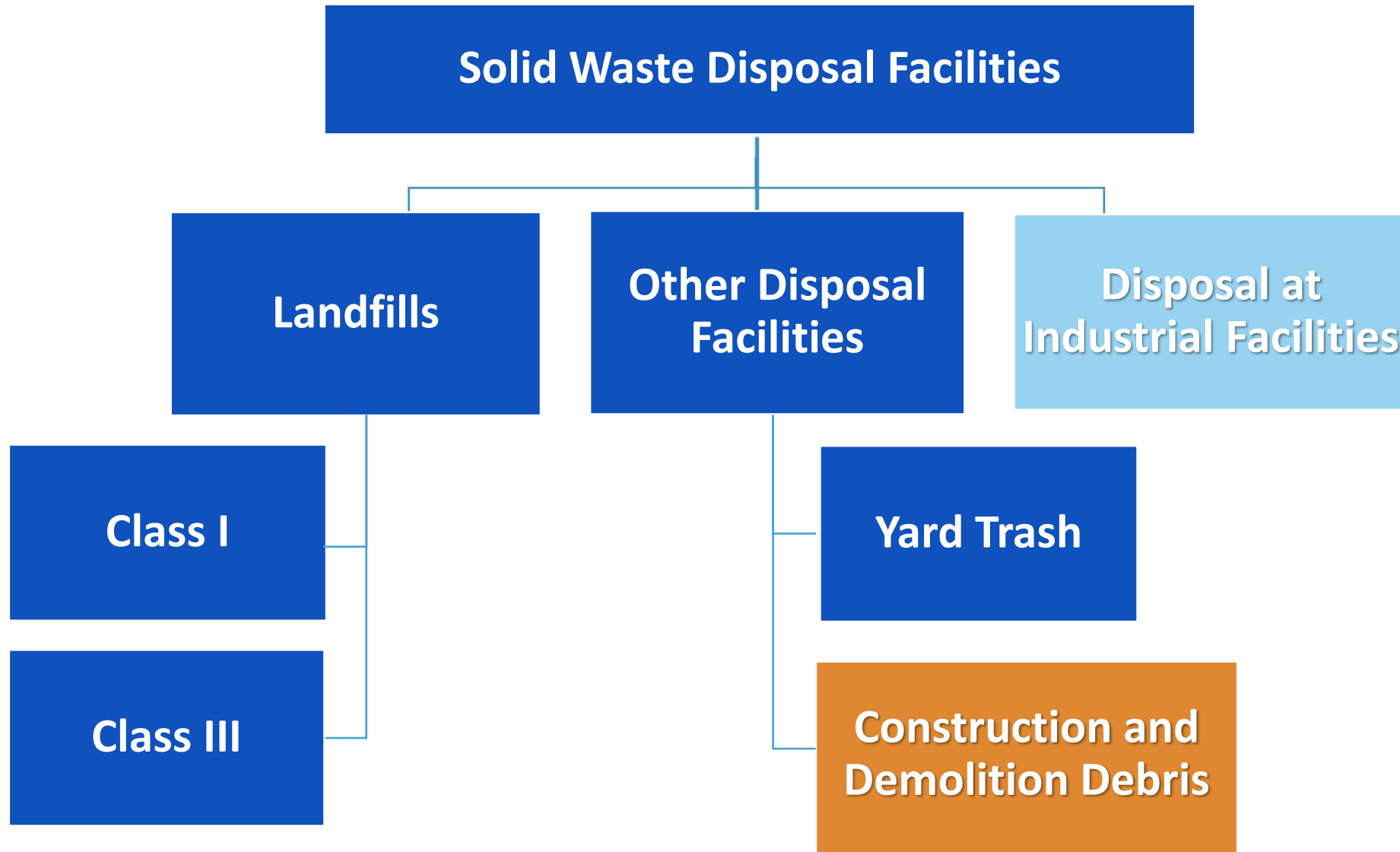


Outline

- History
- Regulations/liner requirements
- Groundwater contamination
- Remediation



Solid Waste Disposal Facilities





History

Construction and Demolition (C&D) Rule established Aug. 2, 1989

- Notify the department (general permit).
- Own or authorized to use property.
- Manage stormwater.
- Storage for waste other than C&D.
- Slope and compact as necessary for closure.
- Control access.
- Consent for department to inspect.
- Close 180 days after final waste receipt.
- Notify department within 30 days after closing.

Amended Jan. 6, 1993

- Same requirements from 1989 but more details required for notification:
 - Site plan, geotechnical investigation, boundary survey, planned life, closure plans and cross-sections.
- Closure requires 3:1 slopes.

Amended Dec. 23, 1996

- Individual permit - time frame to comply.
- **Liner required if department demonstrates one is needed.**
- **Groundwater monitoring required.**
- Operation plan/trained operators.
- Financial assurance.
- Long-term care (LTC).



History

Amended Jan. 6, 2010

- Emergency preparedness and response plan.
- Chromated copper arsenate (CCA) wood management plan.
- **Corrective action required for contamination.**
- **Liner requirements** (same as Class III requirements).
- No waste in 100-year floodplain, 100-foot setback from property boundaries.
- Boundary of waste clearly marked/delineated.
- Stormwater design for above grade units.
- Lift depths 10-feet, 3:1 slope at all times.
- Signage required.
- Declaration to public once closed.
- LTC can be extended.
- Remove waste once discovered outside permitted dimensions.



C&D Liner Requirement Changes

403.707(9)(b) Florida Statute for C&D Liners (pre-2010)

The department shall **not** require liners and leachate collection systems at individual facilities **unless it demonstrates**, based upon the types of waste received, the methods for controlling types of waste disposed of, the proximity of groundwater and surface water, and the results of the hydrogeological and geotechnical investigations, that the facility is reasonably expected to result in violations of groundwater standards and criteria otherwise.

Statute changed in 2010

The department **shall require** liners and leachate collection systems at individual disposal units and lateral expansions of existing disposal units that have not received a department permit authorizing construction or operation prior to July 1, 2010, **unless the owner or operator demonstrates**, based upon the types of waste received, the methods for controlling types of waste disposed of, the proximity of the groundwater and surface water, and the results of the hydrogeological and geotechnical investigations, that the facility is not expected to result in violations of the groundwater standards and criteria if built without a liner.



Water Quality Impacts

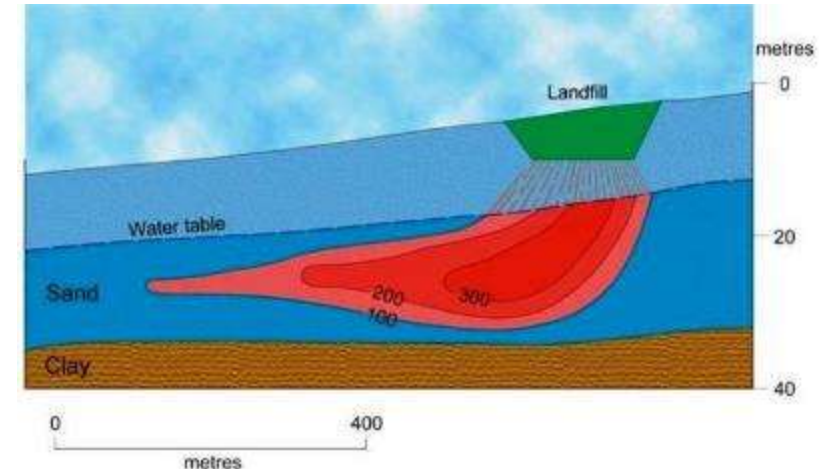
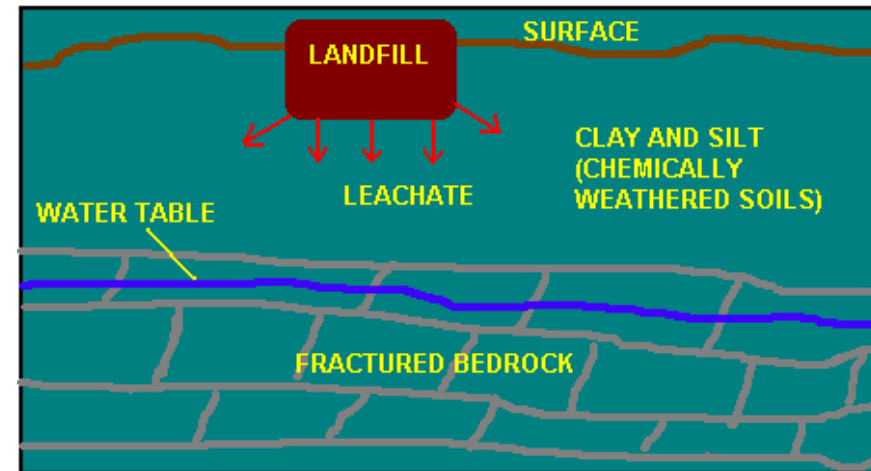




Groundwater Contamination

“Impact of Landfill Leachate on Iron Release from Northwest Florida Iron Rich Soils”

- Hinkley Center August 2006 - July 2007





Surface Water Impacts

Groundwater contamination can cause surface water contamination.



Upstream



Downstream



Surface Water Impacts

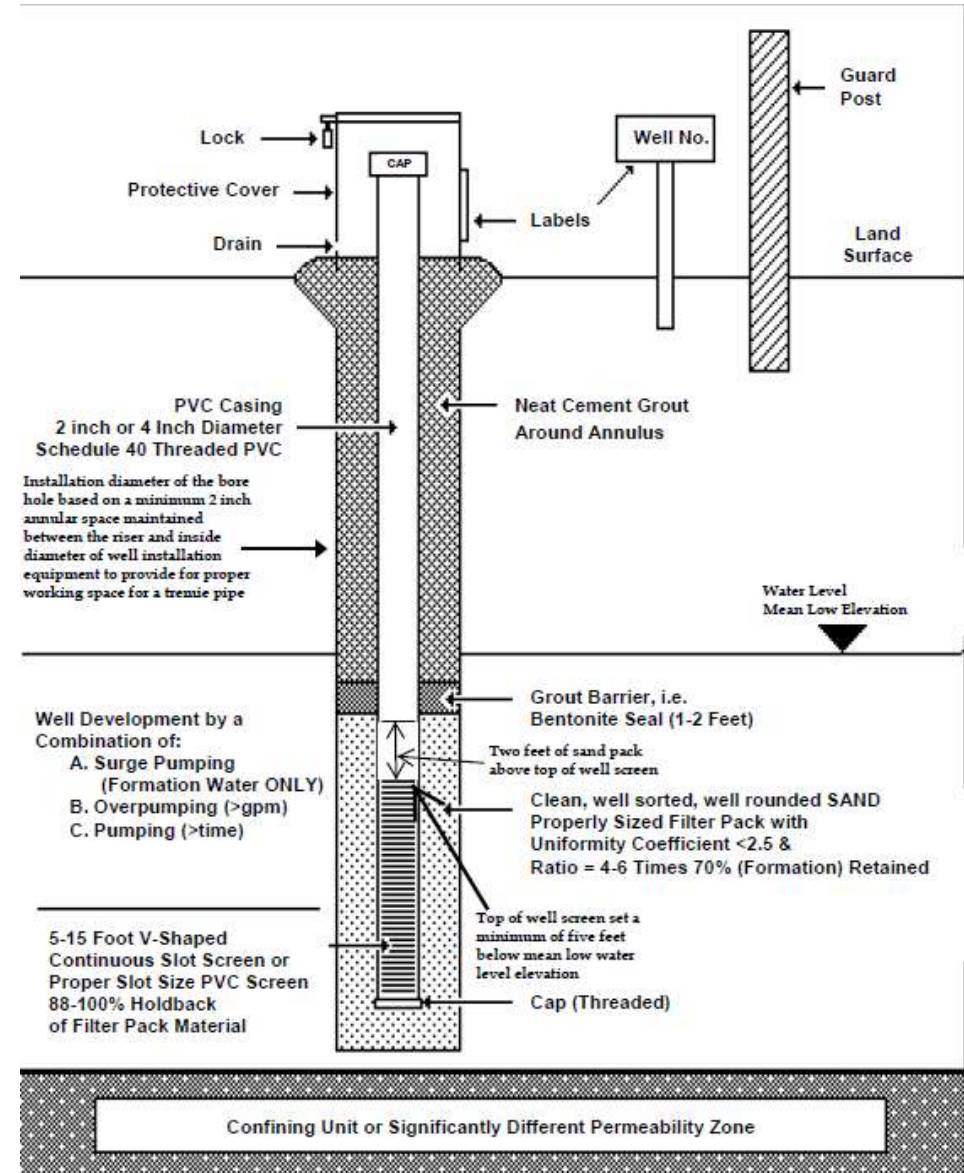




Groundwater Monitoring Wells

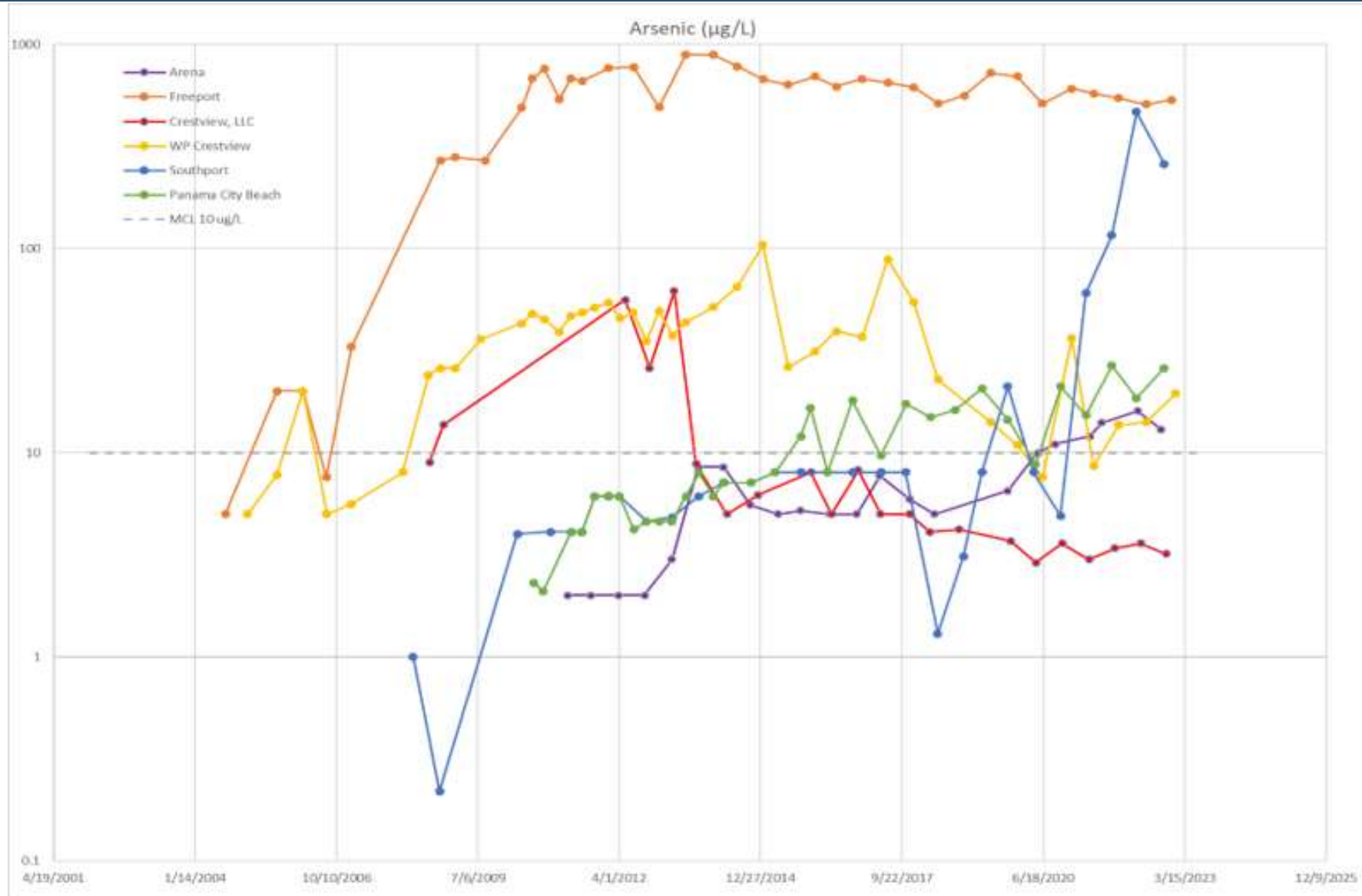
Wells and sampling

- **Construction:**
 - Well screens
 - Location
 - Floridan wells
- **Sampling techniques:**
 - One well volume versus equipment volume



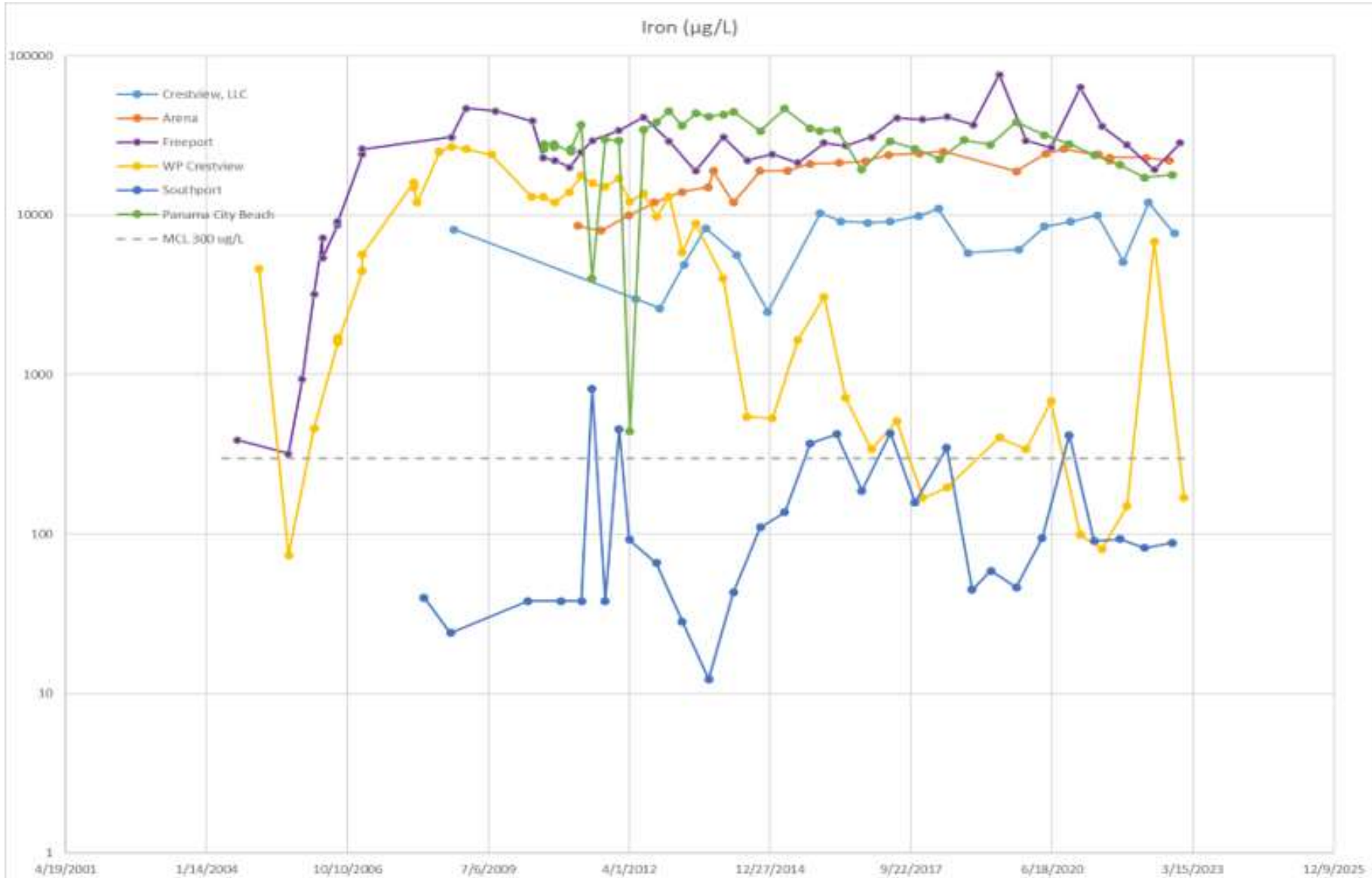


Arsenic at C&Ds



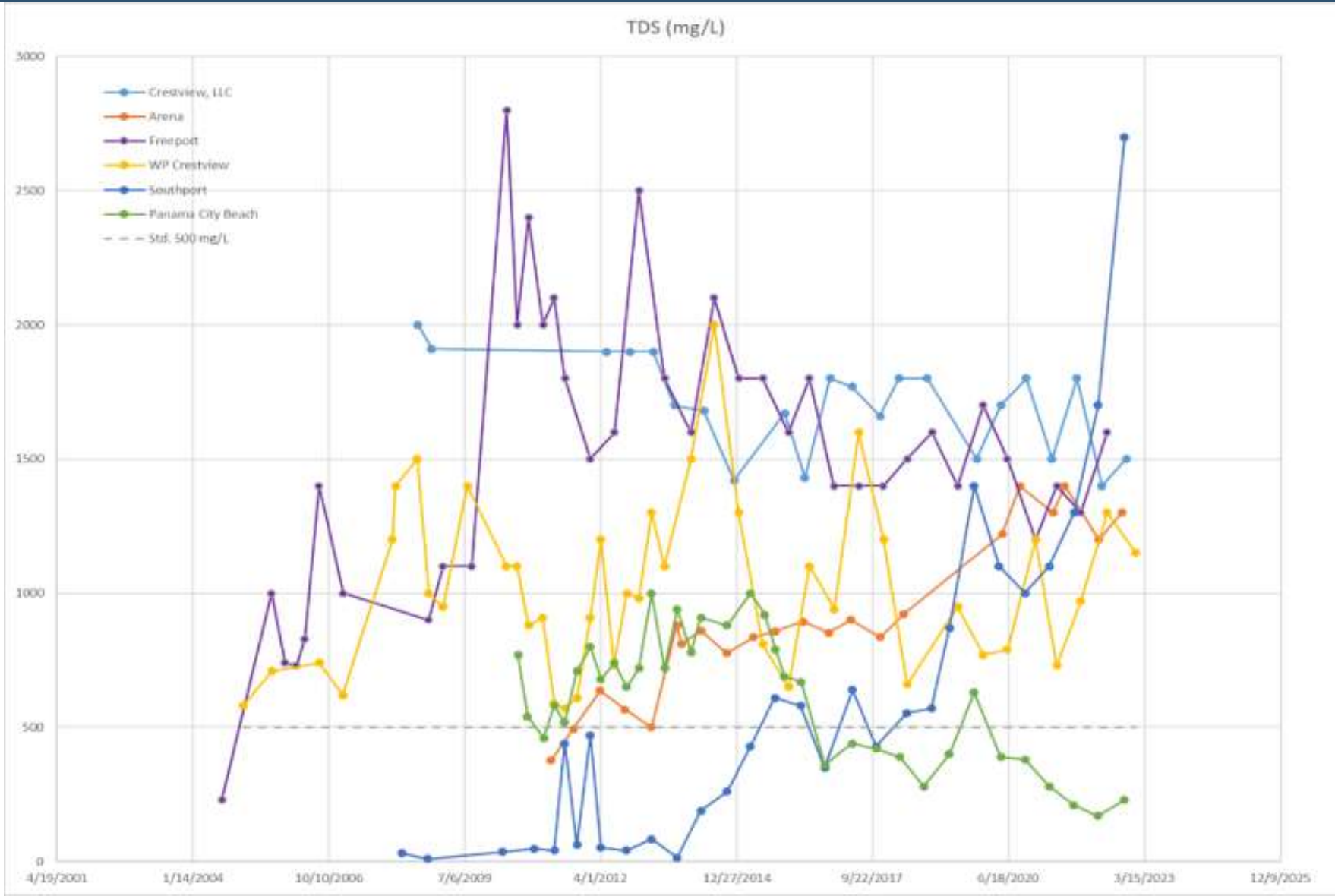


Iron at C&Ds



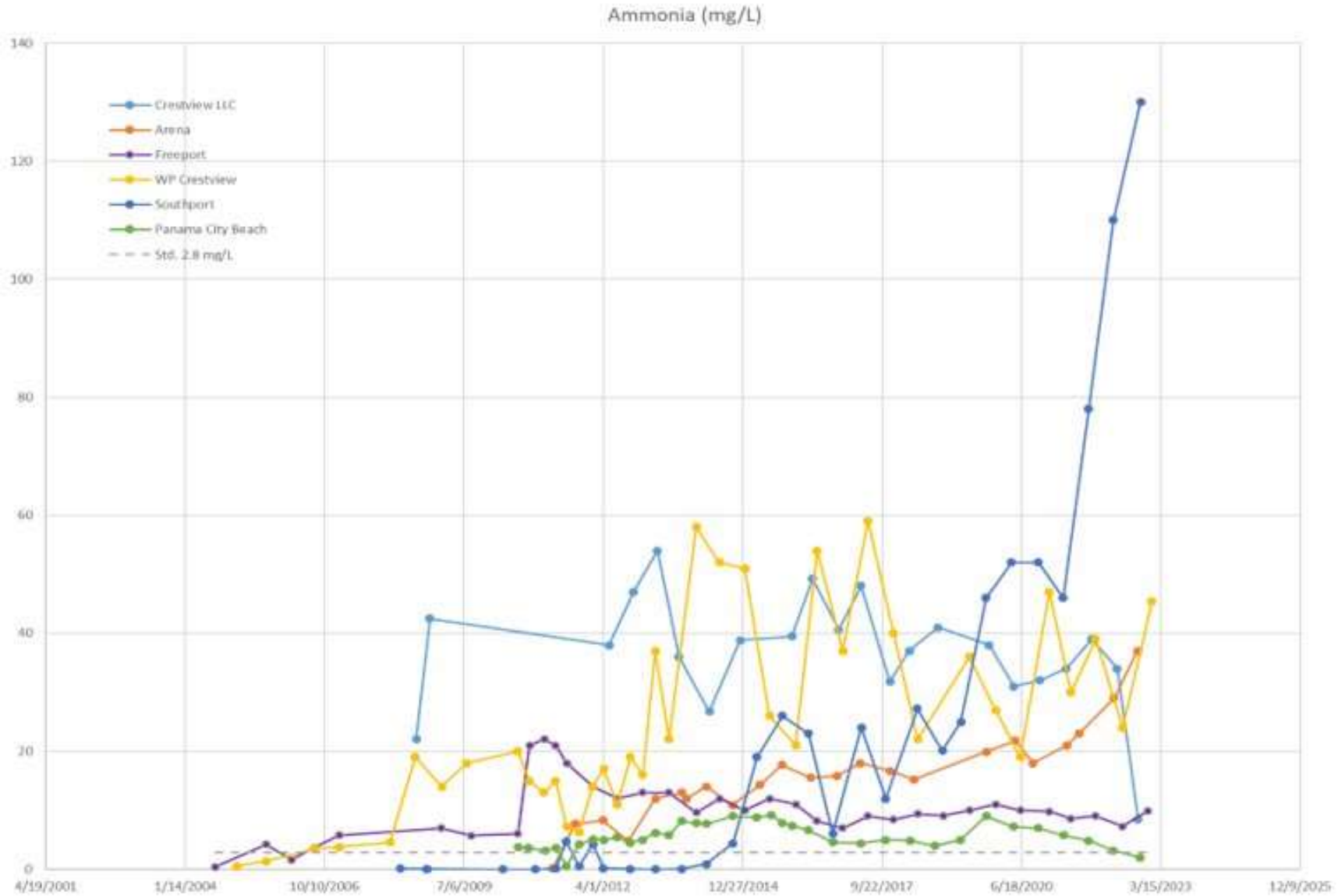


Total Dissolved Solids (TDS) at C&Ds



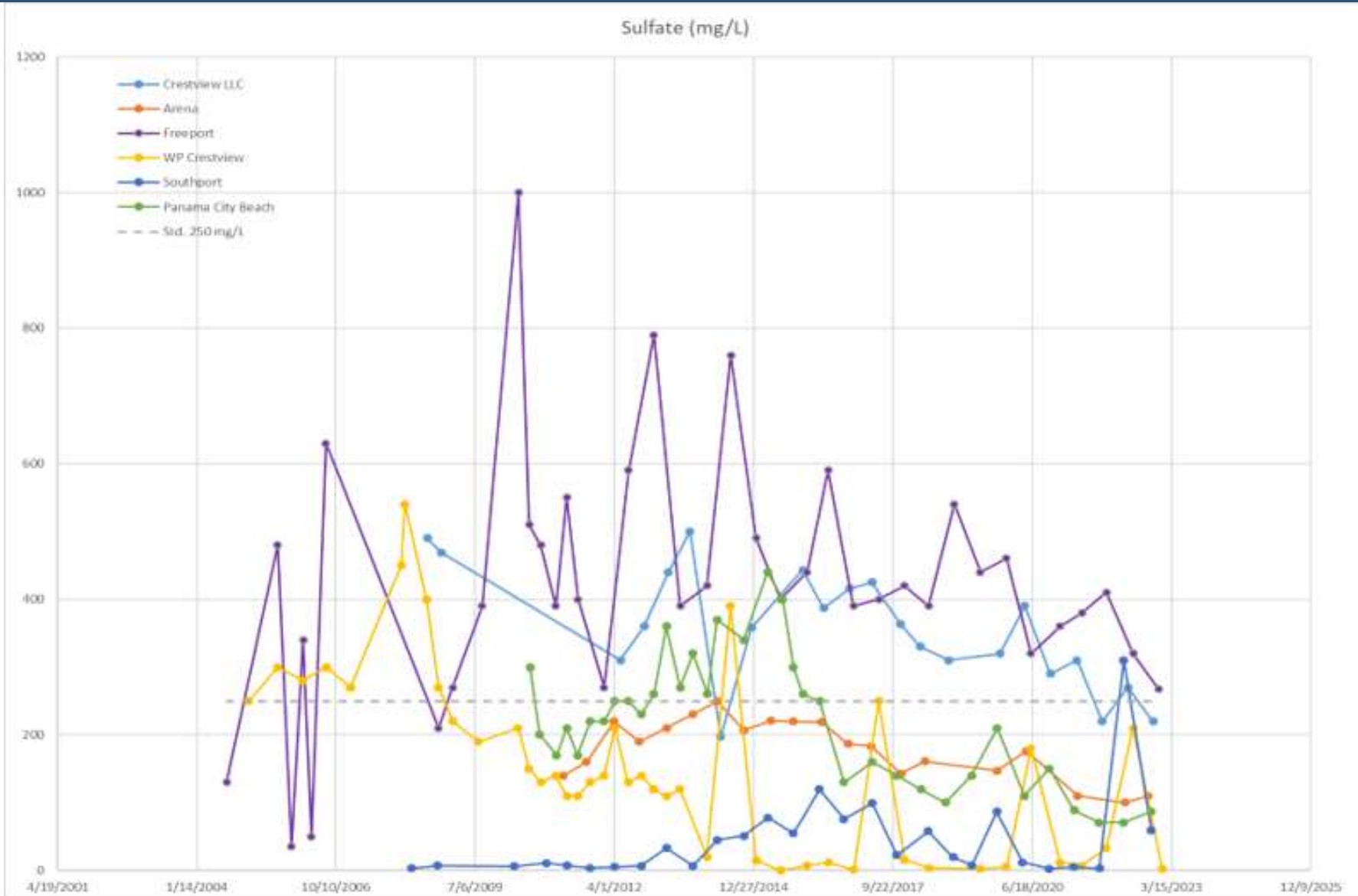


Ammonia at C&Ds





Sulfate at C&Ds





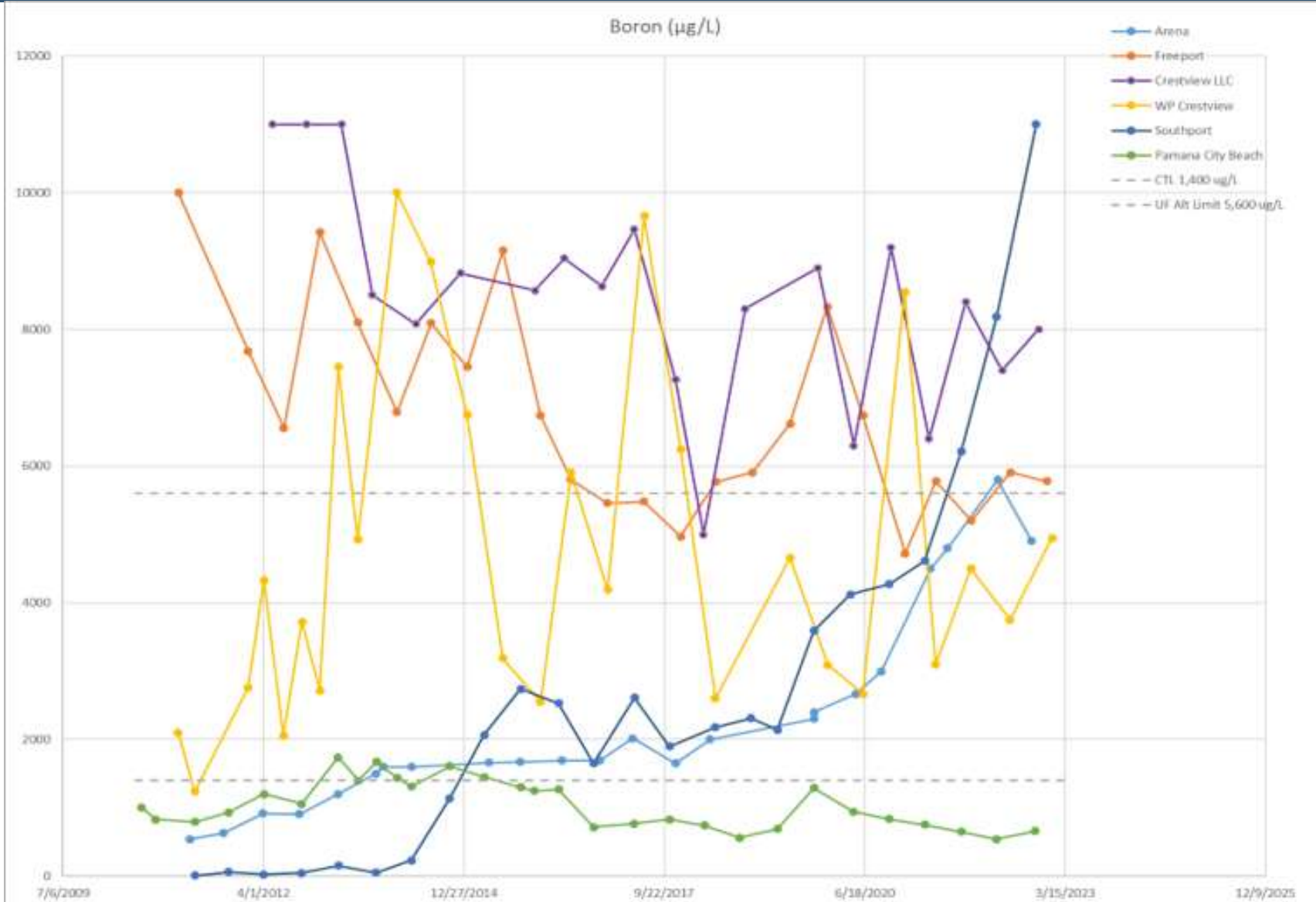
Emerging Contaminants

- Boron/Strontium.
 - “Investigation of Potential Emerging Groundwater Contaminants at Construction and Demolition Debris Disposal Facilities” - *Hinkley Center March 2013*
- Hydrogen sulfide.
- Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS).



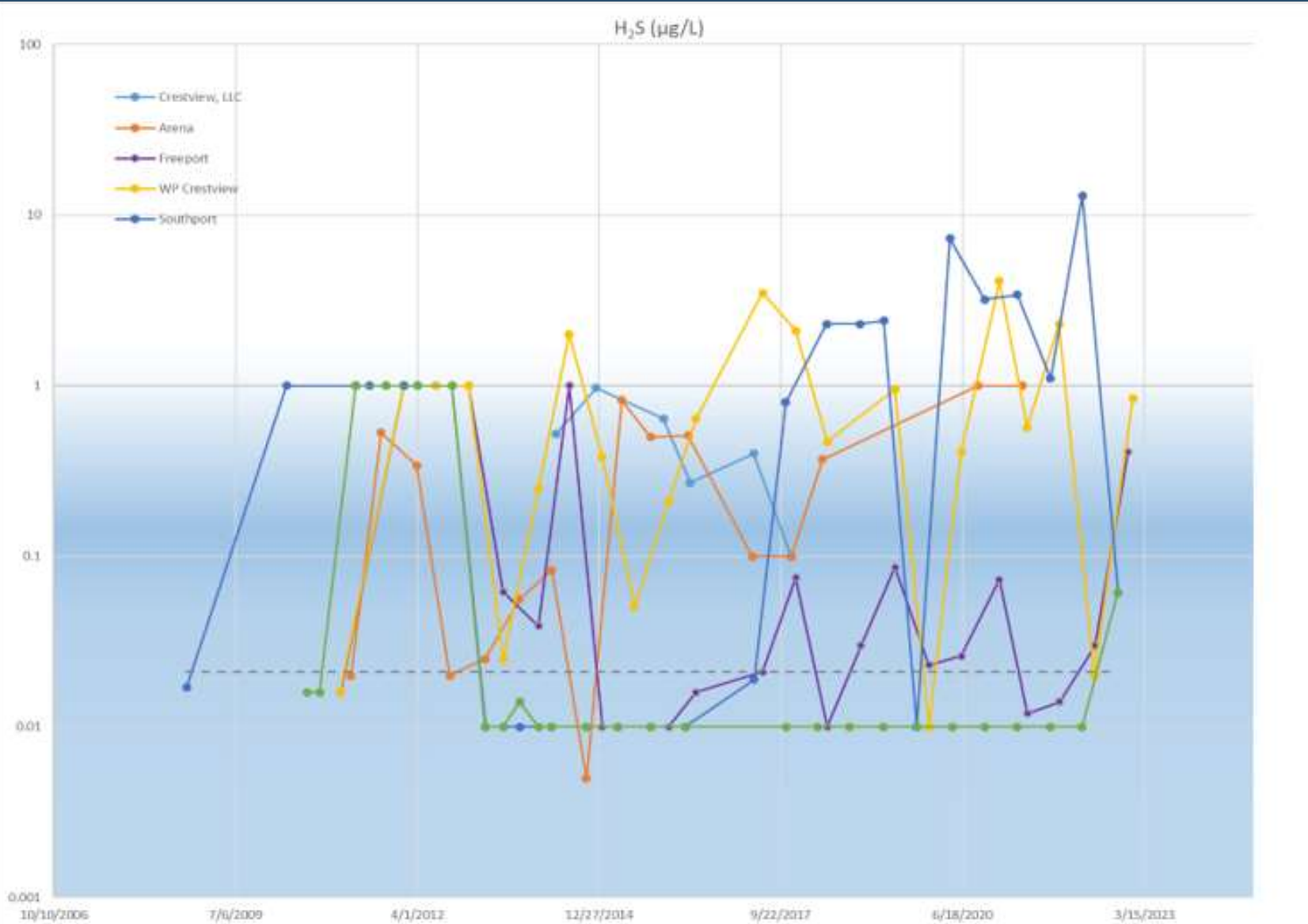


Boron at C&Ds



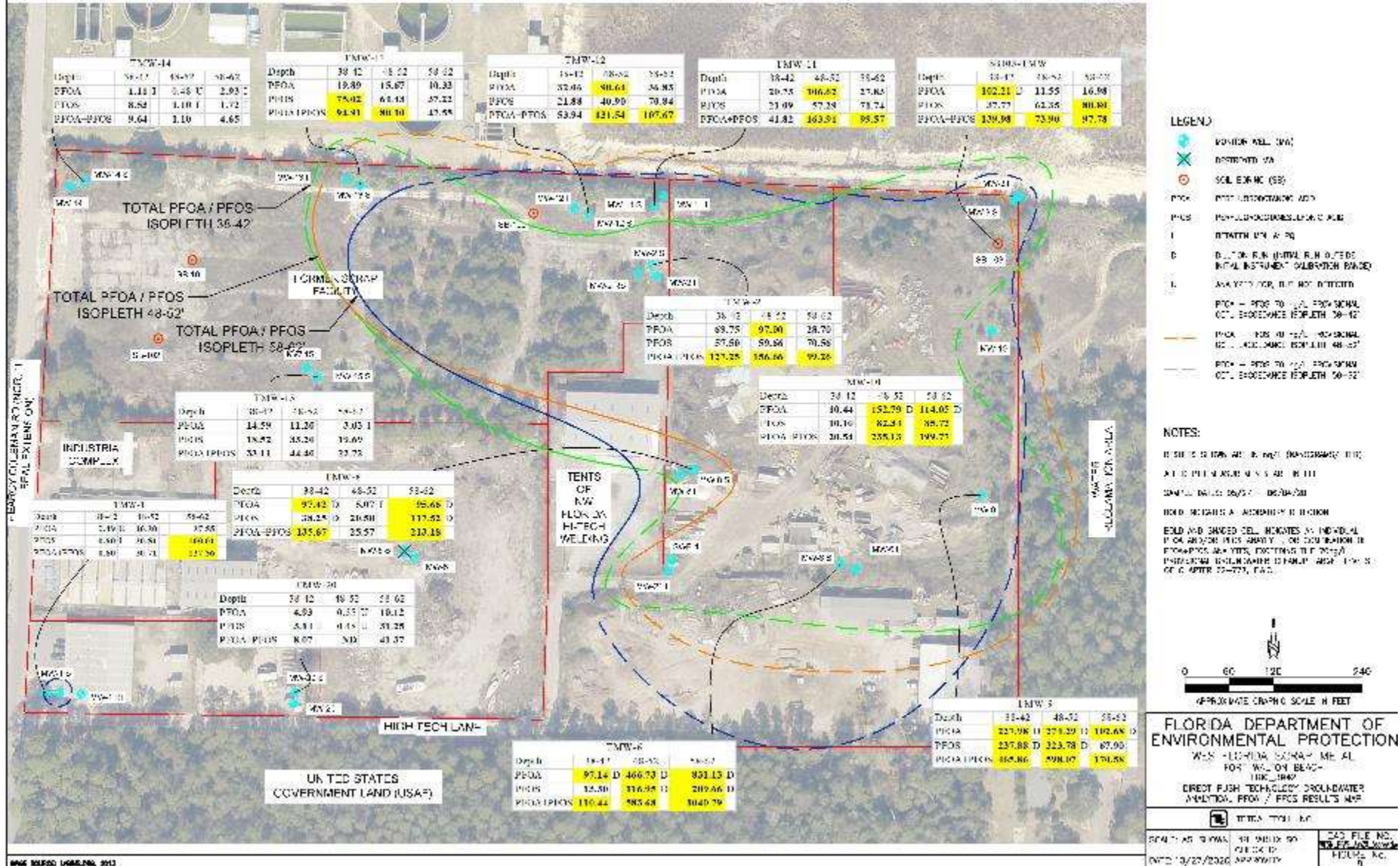


Hydrogen Sulfide at C&Ds





PFOA/PFOS at Unlined C&Ds: West Florida Scrap Metal





Groundwater Remediation



Remediation Systems

- **Technology**
 - Pump and treat.
 - Permeable reactive barrier.
- **Systems in place (landfills)**
 - Santa Rosa County.
 - Escambia County.
 - Okaloosa County.
 - Walton County.
 - Washington County.
 - Bay County.



Majette Landfill Remediation System





Case Studies

A potential solution?

Impermeable caps for unlined C&Ds.



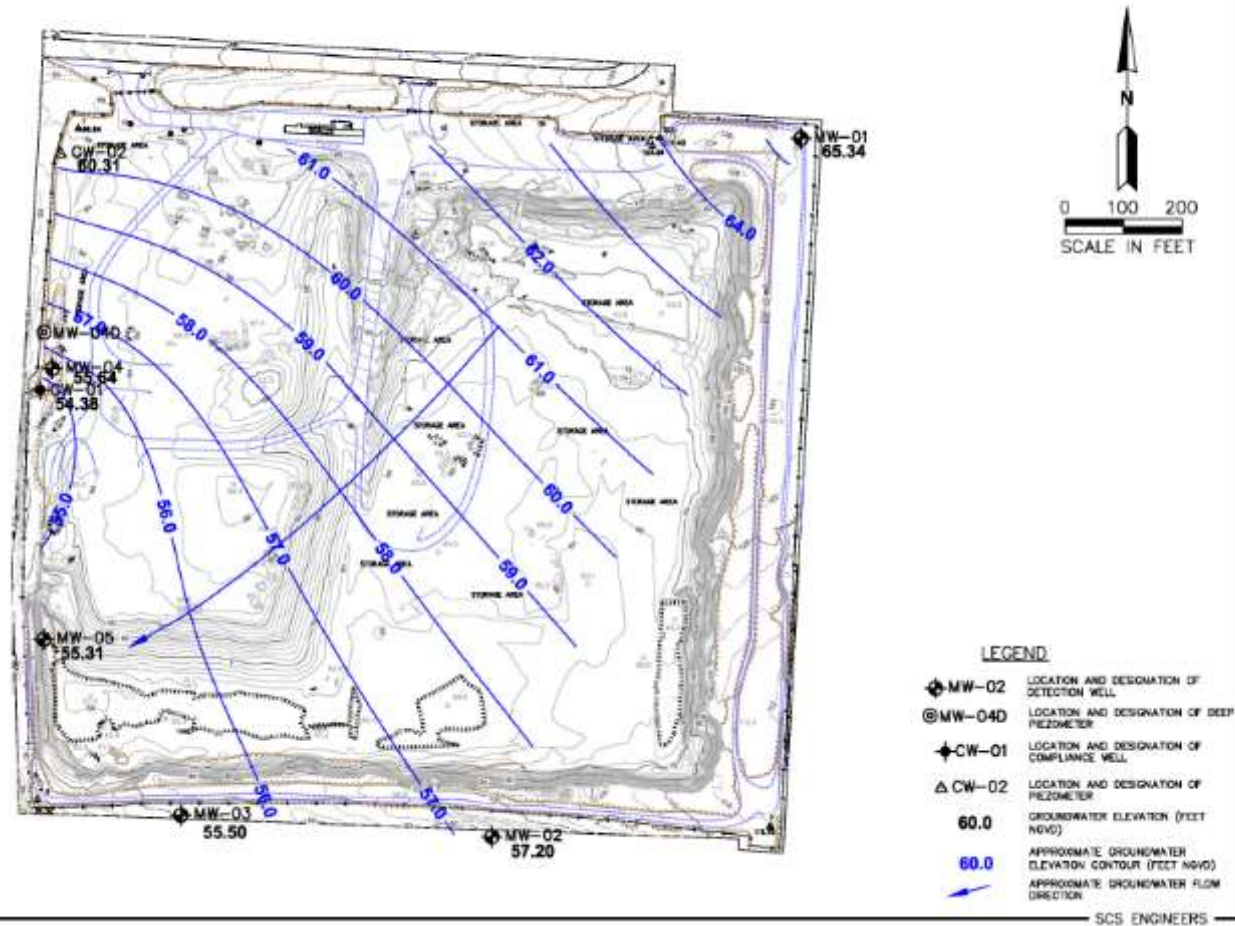


Longleaf C&D

- Longleaf C&D in Escambia County, Florida.
- First permitted in 2006.
- Groundwater contamination noted.
- Pilot study approved to install impermeable cap as part of remedial action plan.
- Cap installation completed February 2014.
- Currently under a monitoring only plan.
- Future cells will be lined.



Site Layout





Cap Placement



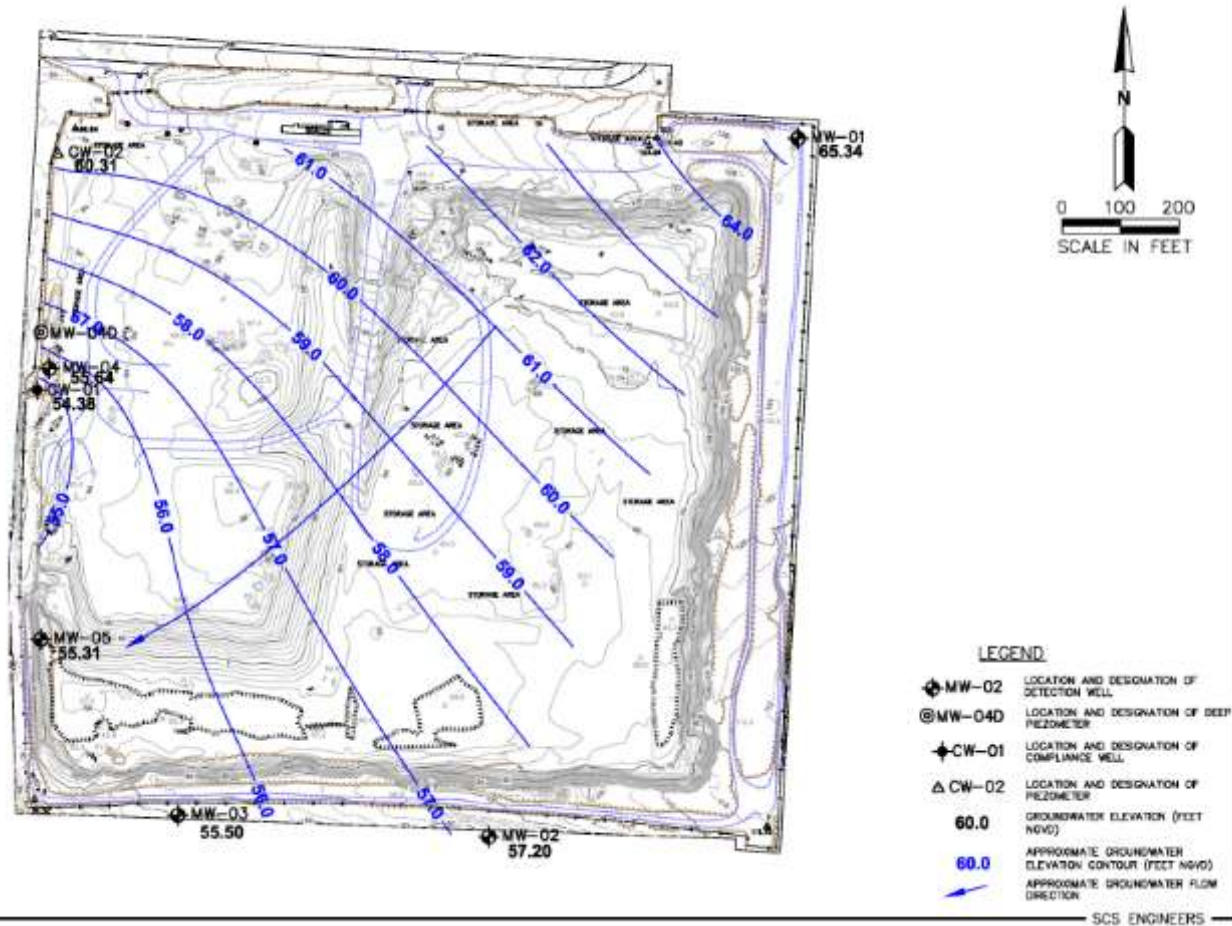


Completed Cap



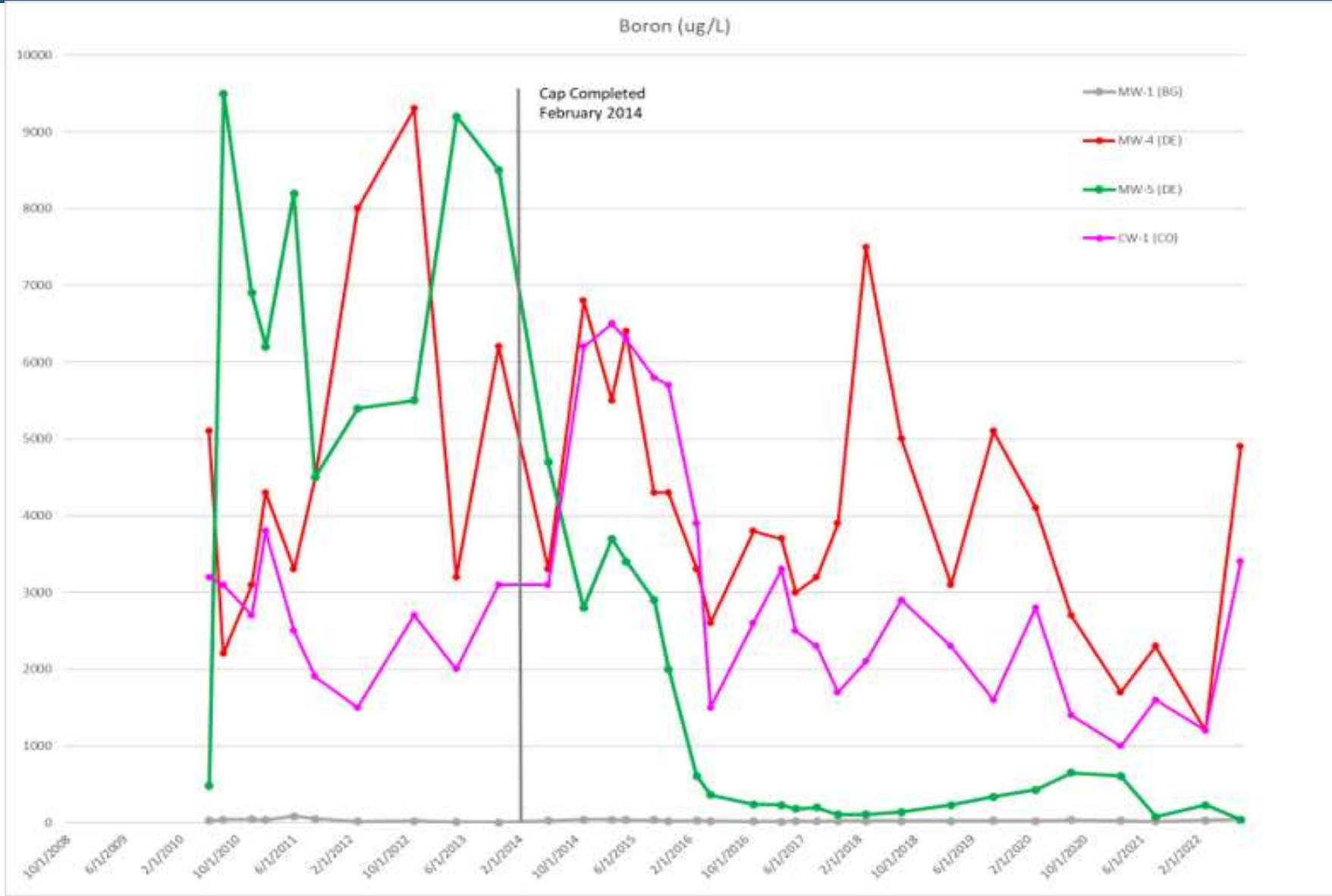


Site Layout: Second look



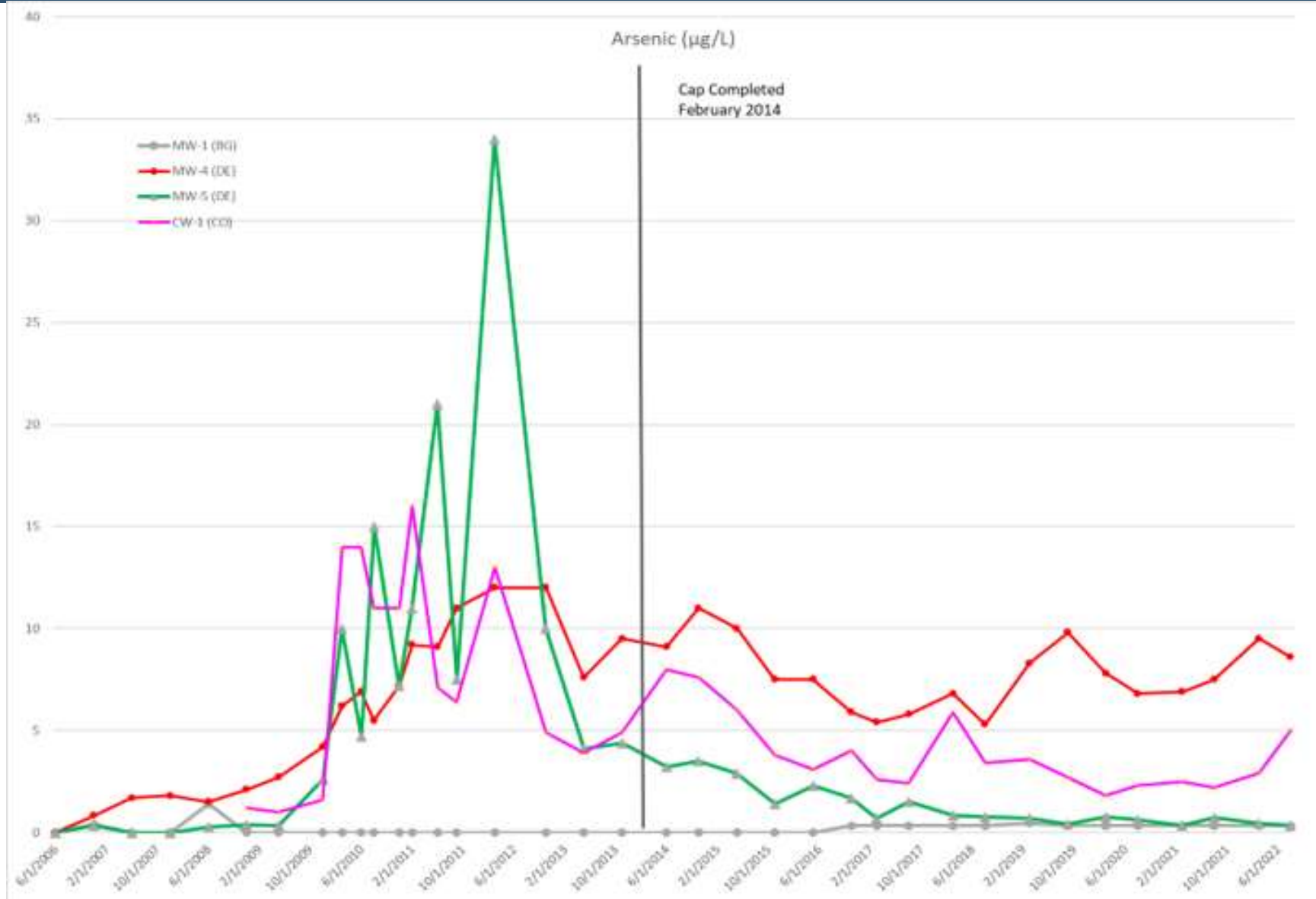


Impermeable Caps for Unlined C&Ds: Boron



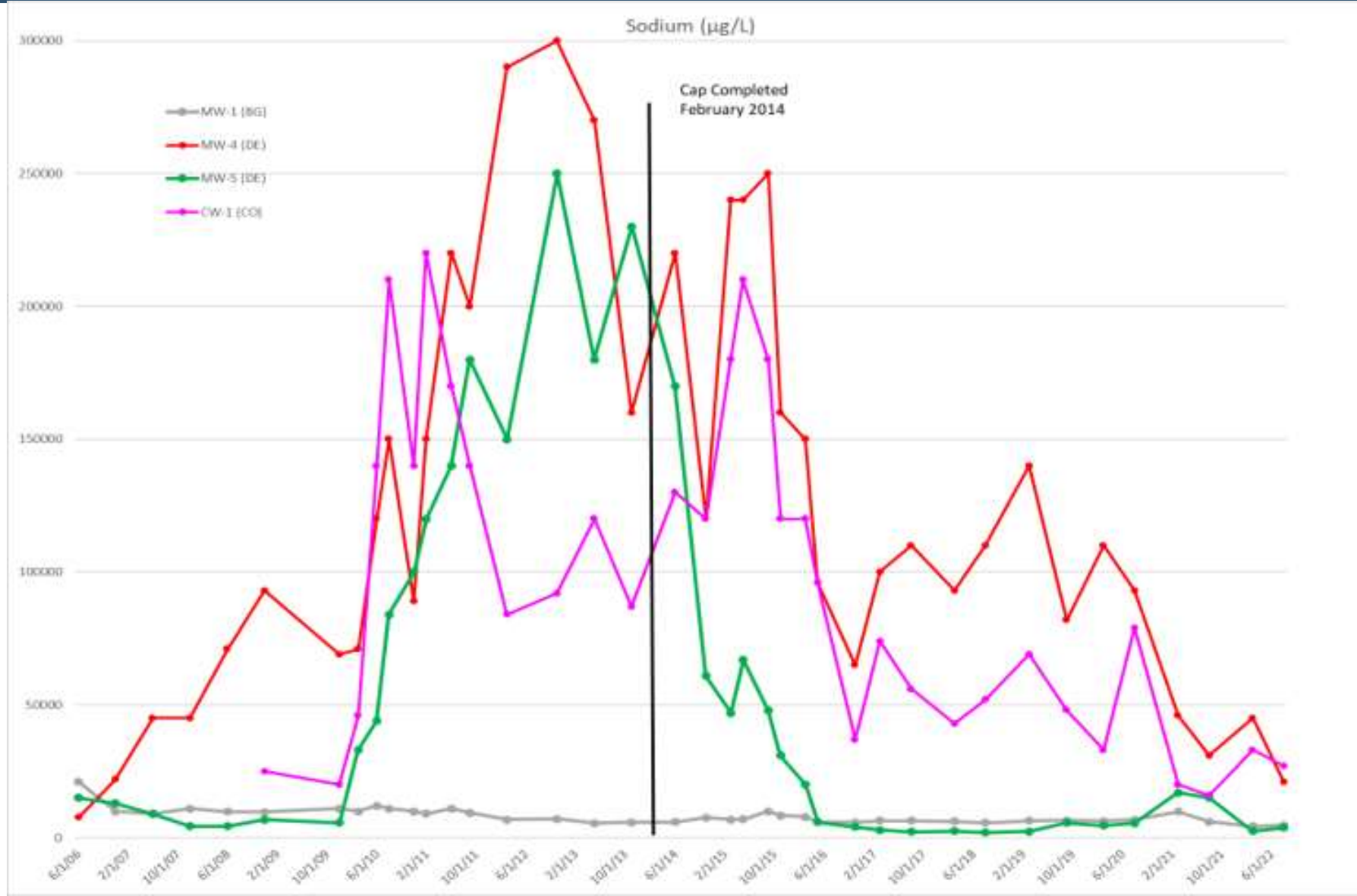


Impermeable Caps for Unlined C&Ds: Arsenic



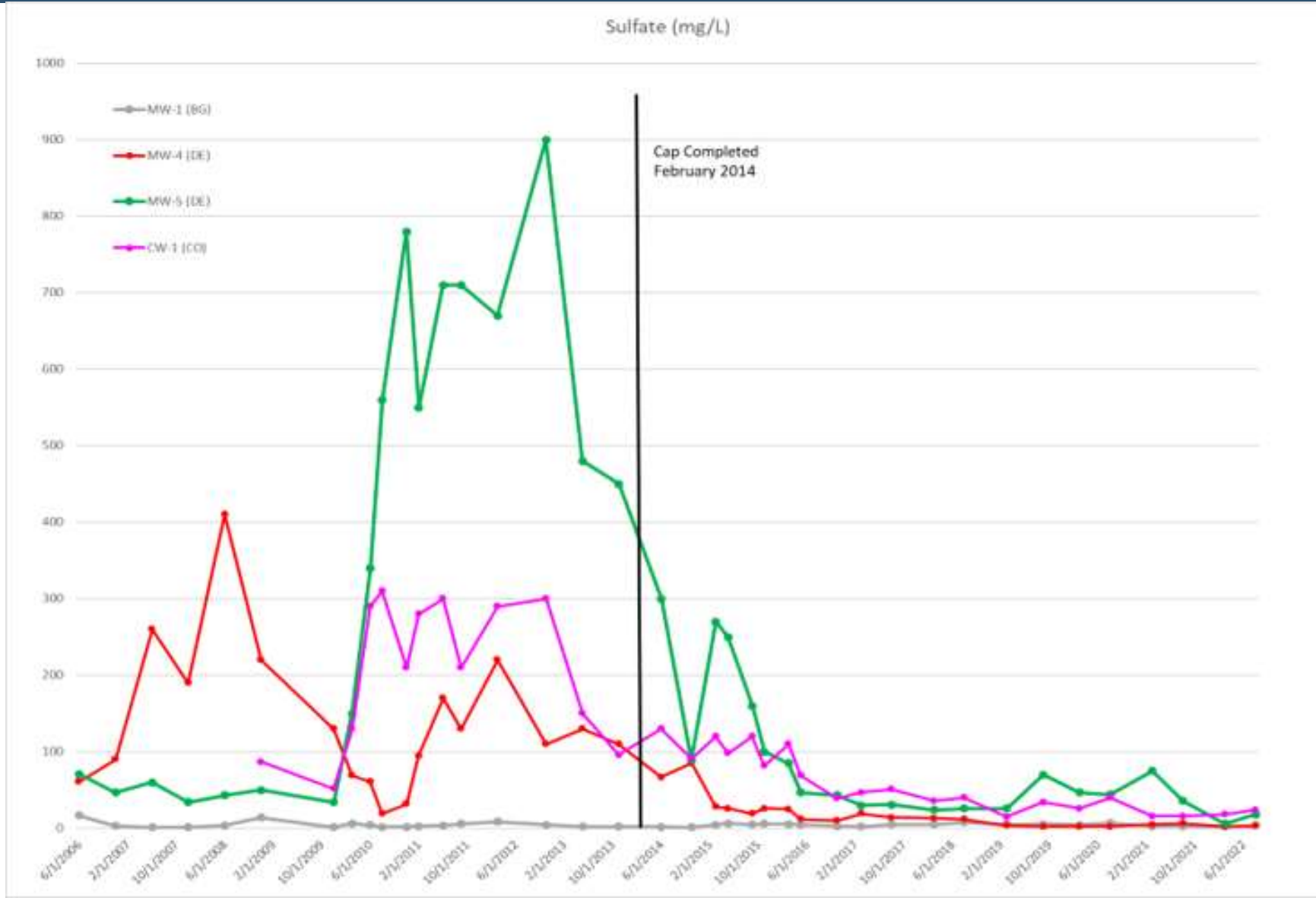


Impermeable Caps for Unlined C&Ds: Sodium



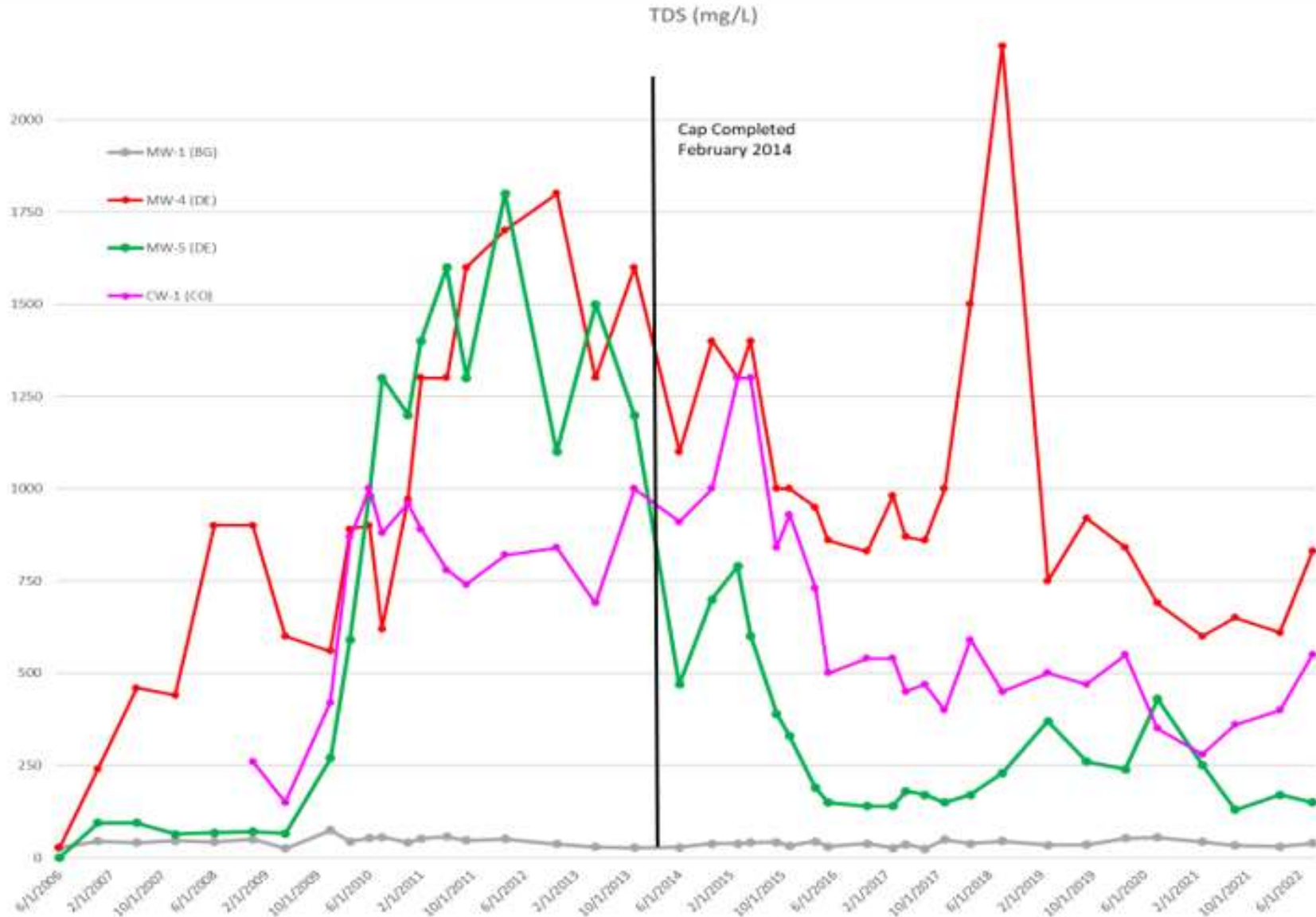


Impermeable Caps for Unlined C&Ds: Sulfate



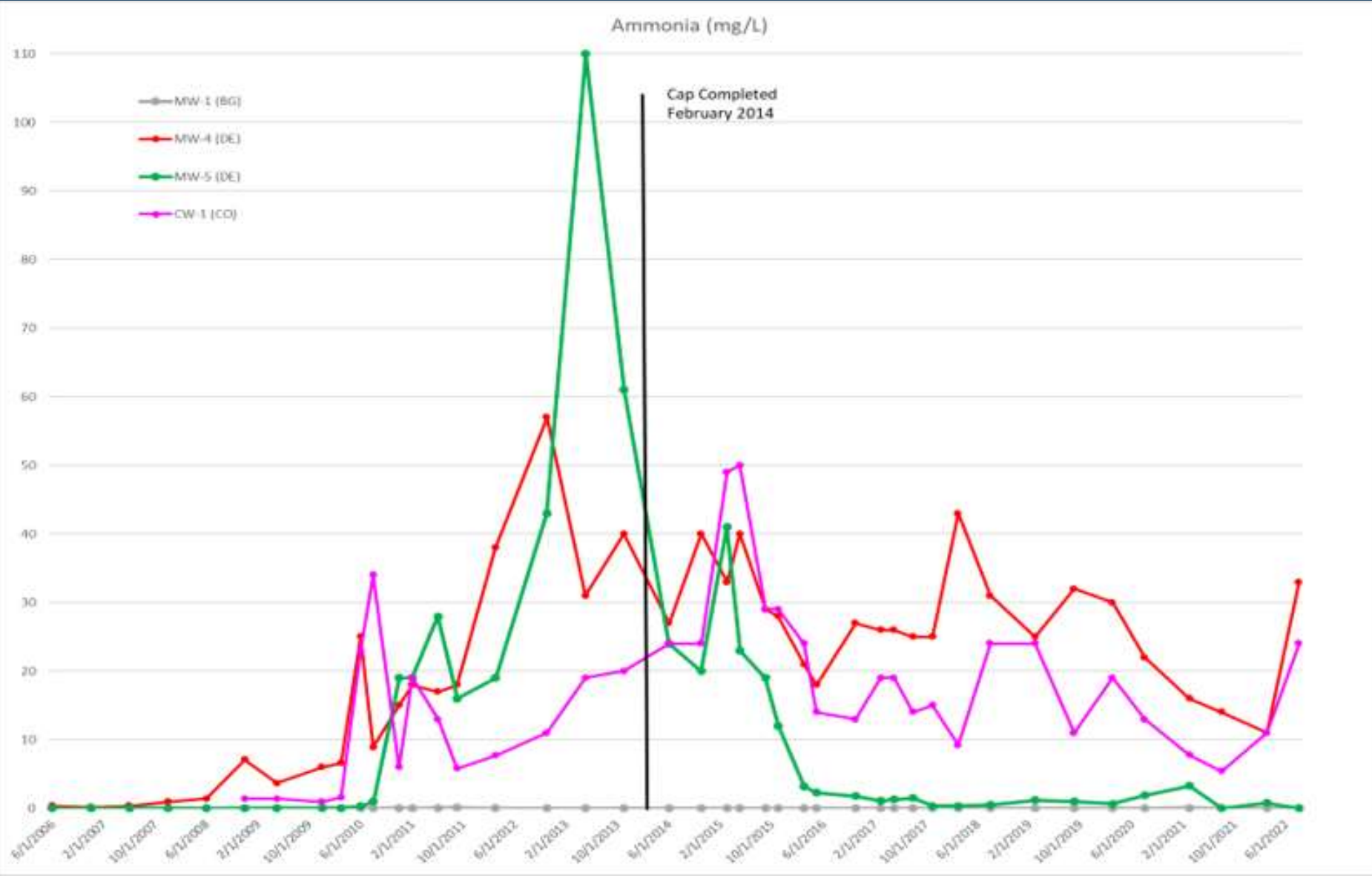


Impermeable Caps for Unlined C&Ds: TDS



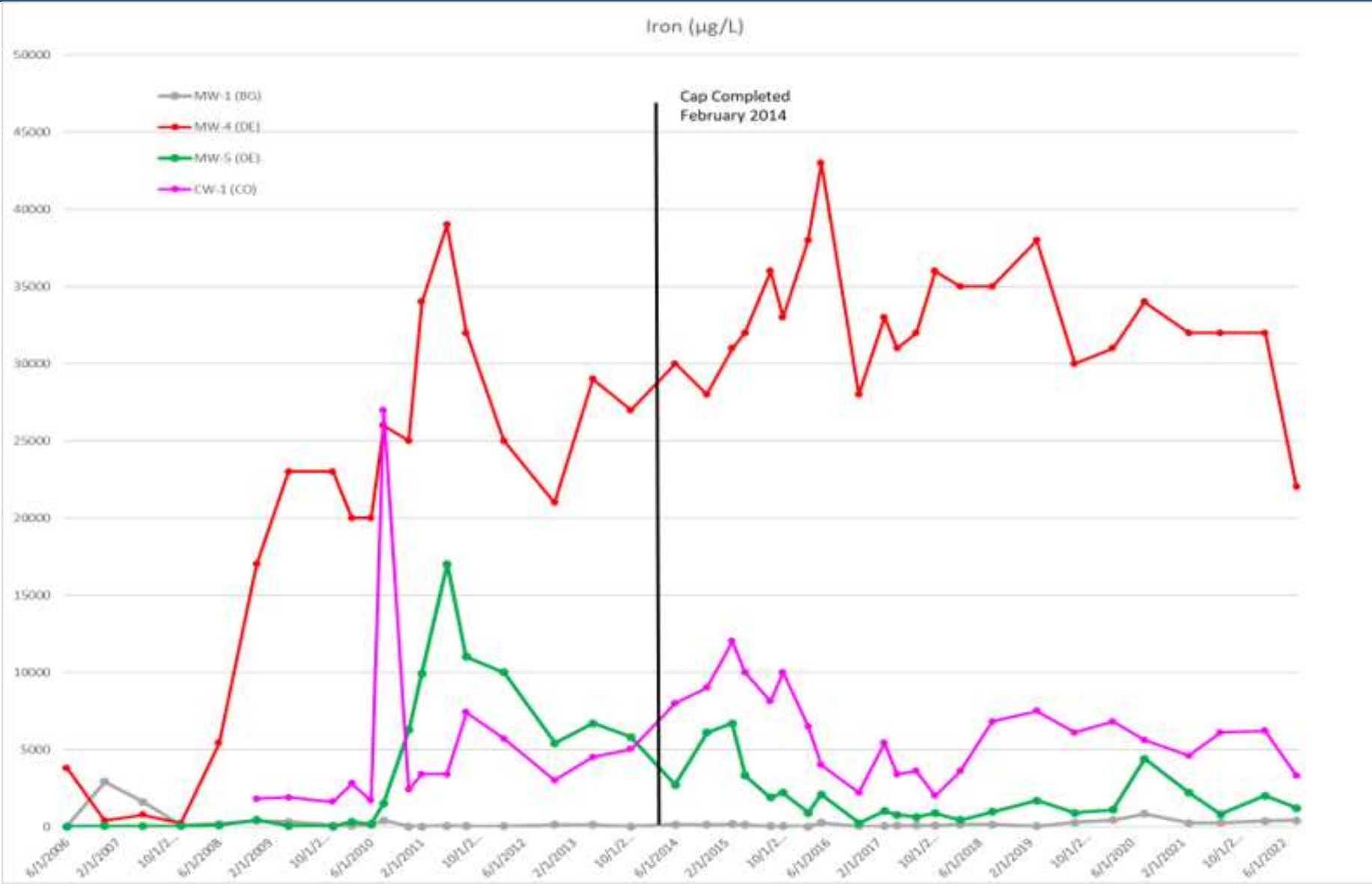


Impermeable Caps for Unlined C&Ds: Ammonia



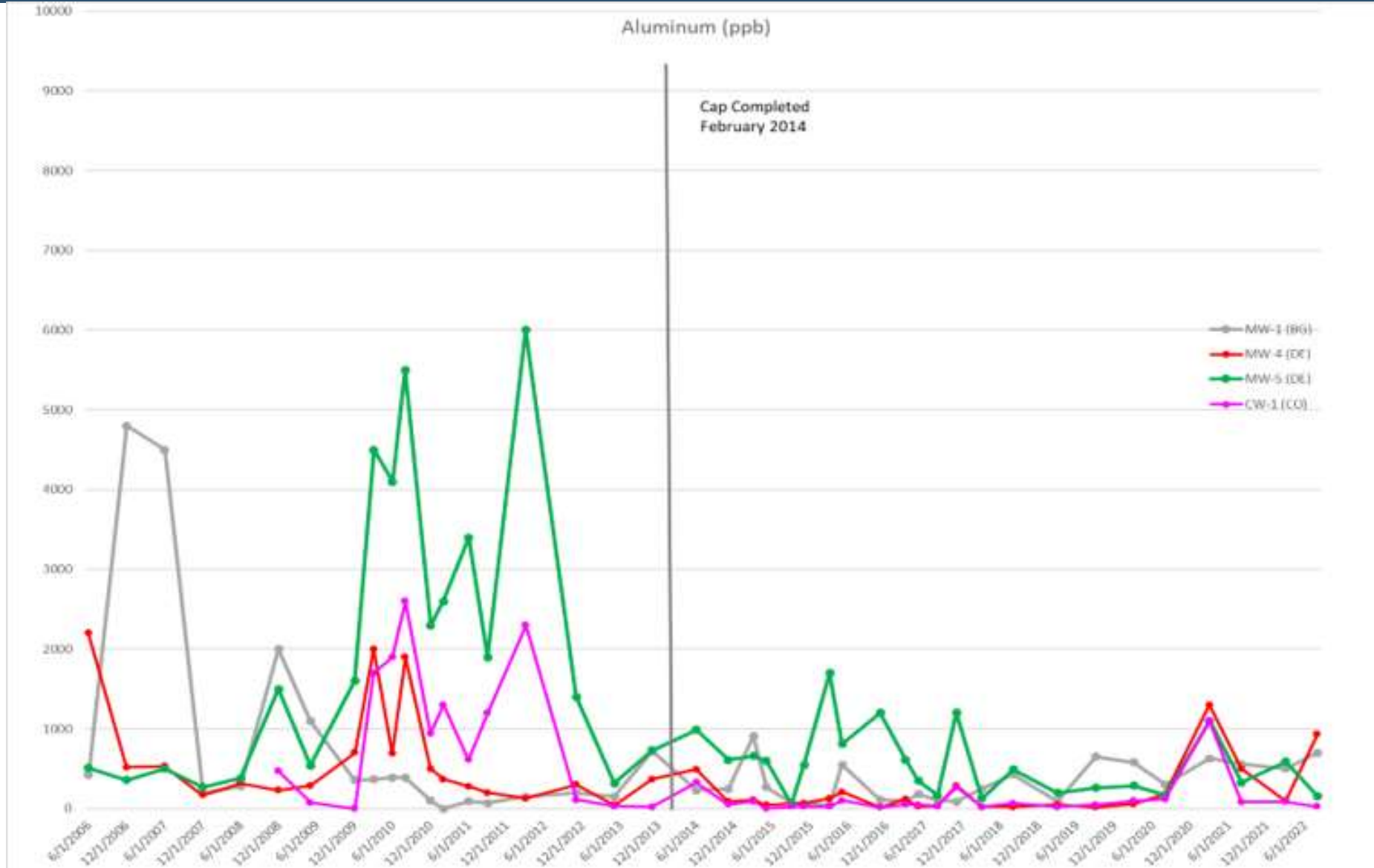


Impermeable Caps for Unlined C&Ds: Iron





Impermeable Caps for Unlined C&Ds: Aluminum





Saufley C&D

- General permit issued in 1990.
- Multiple enforcement actions taken 1990 – 2008.
- Fires 2000, 2002, 2005 and 2006.
- Lawsuit filed 2006.
- Air quality study issued February 2007 (H₂S).
- Height above permitted dimensions.
- Ordered to close in 2008 – site was abandoned.
- Escambia County entered into an agreement with DEP to close the facility.
- Decided to close with synthetic cap.
 - Alternate procedure requested and approved by division.
- Closure activities 2012 - 2013.
 - Included waste removal to bring height down.
- Over \$5 million to close site.
 - Cost estimate \$344,817.
- Monitoring (post LTC) being conducted by county.
- State-funded cleanup list.



Site Layout





Cap Placement



1-800-723-7425
Photo by Florida Aerial Services, Inc

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Cap Placement





Cap Placement





Cap Placement



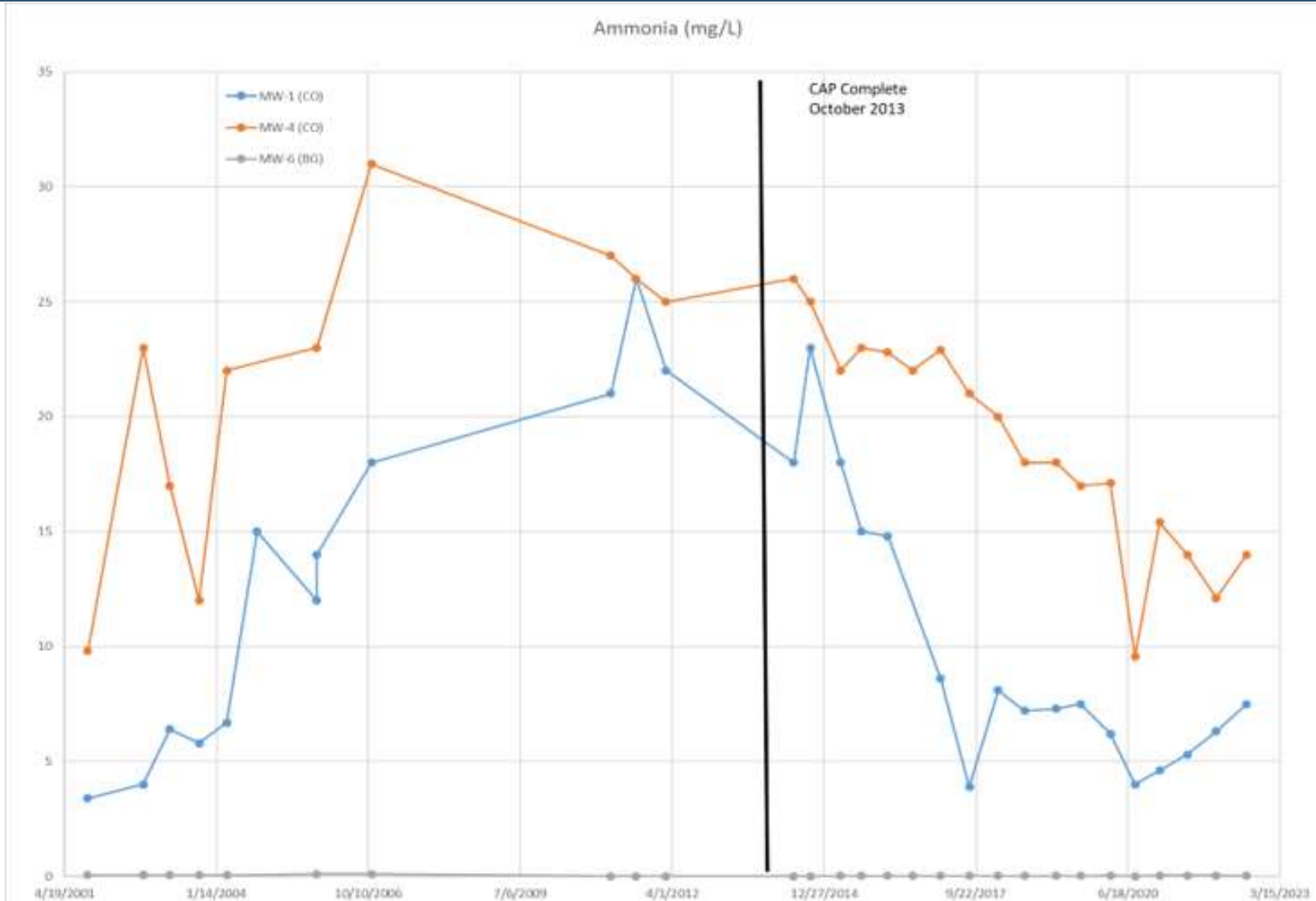


Site Layout: Second Look



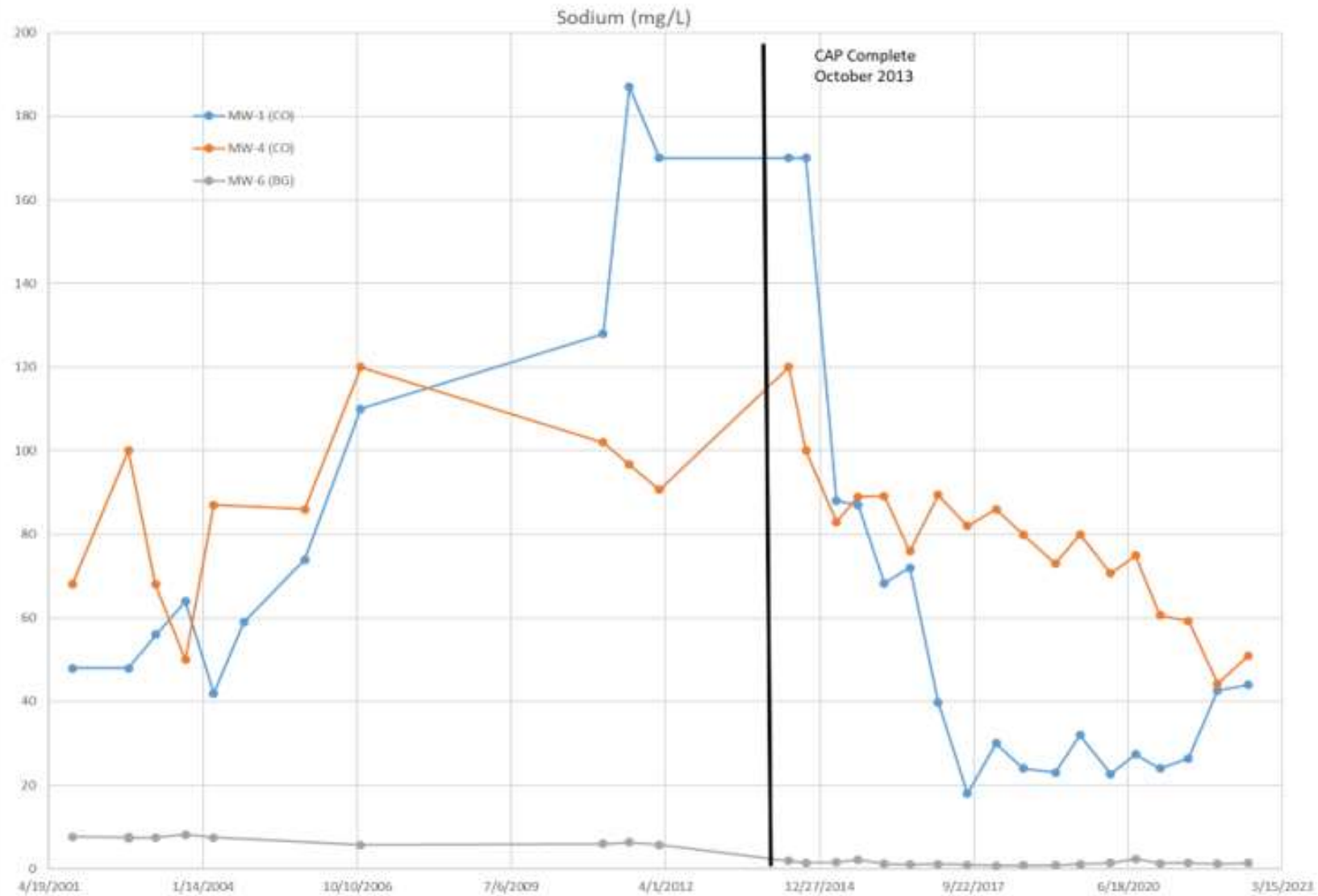


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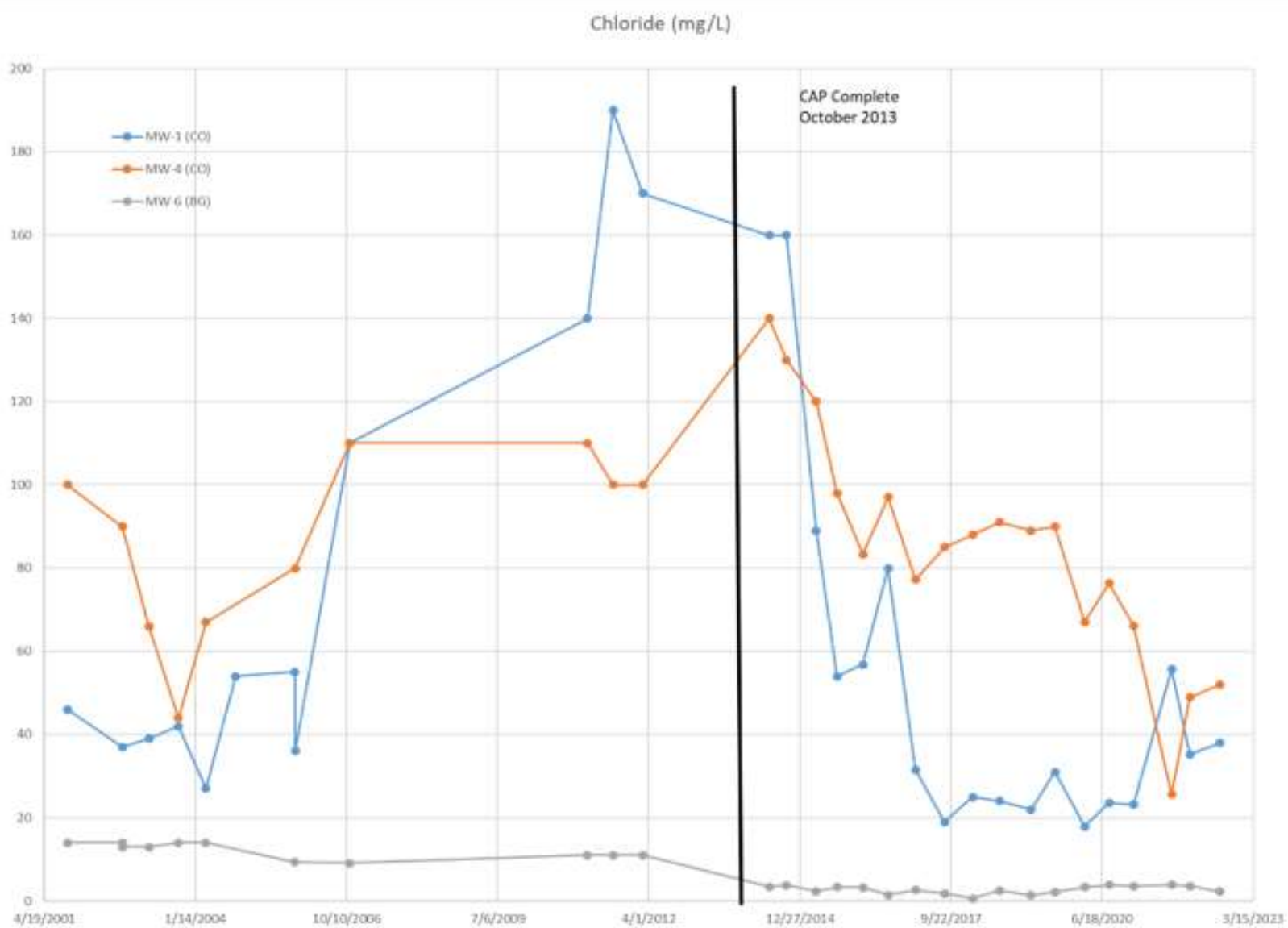


Impermeable Caps for Unlined C&Ds: Sodium



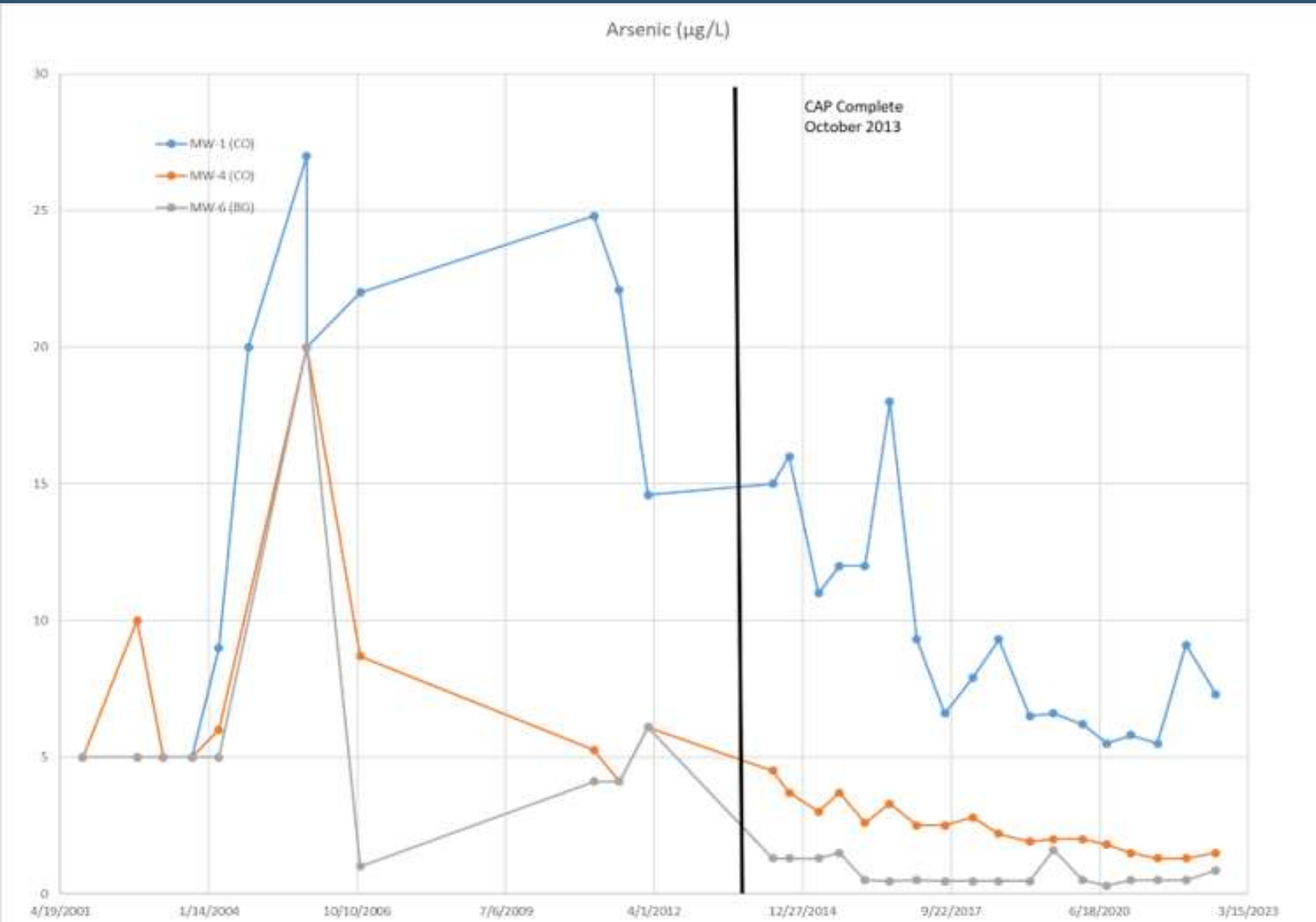


Impermeable Caps for Unlined C&Ds: Chloride



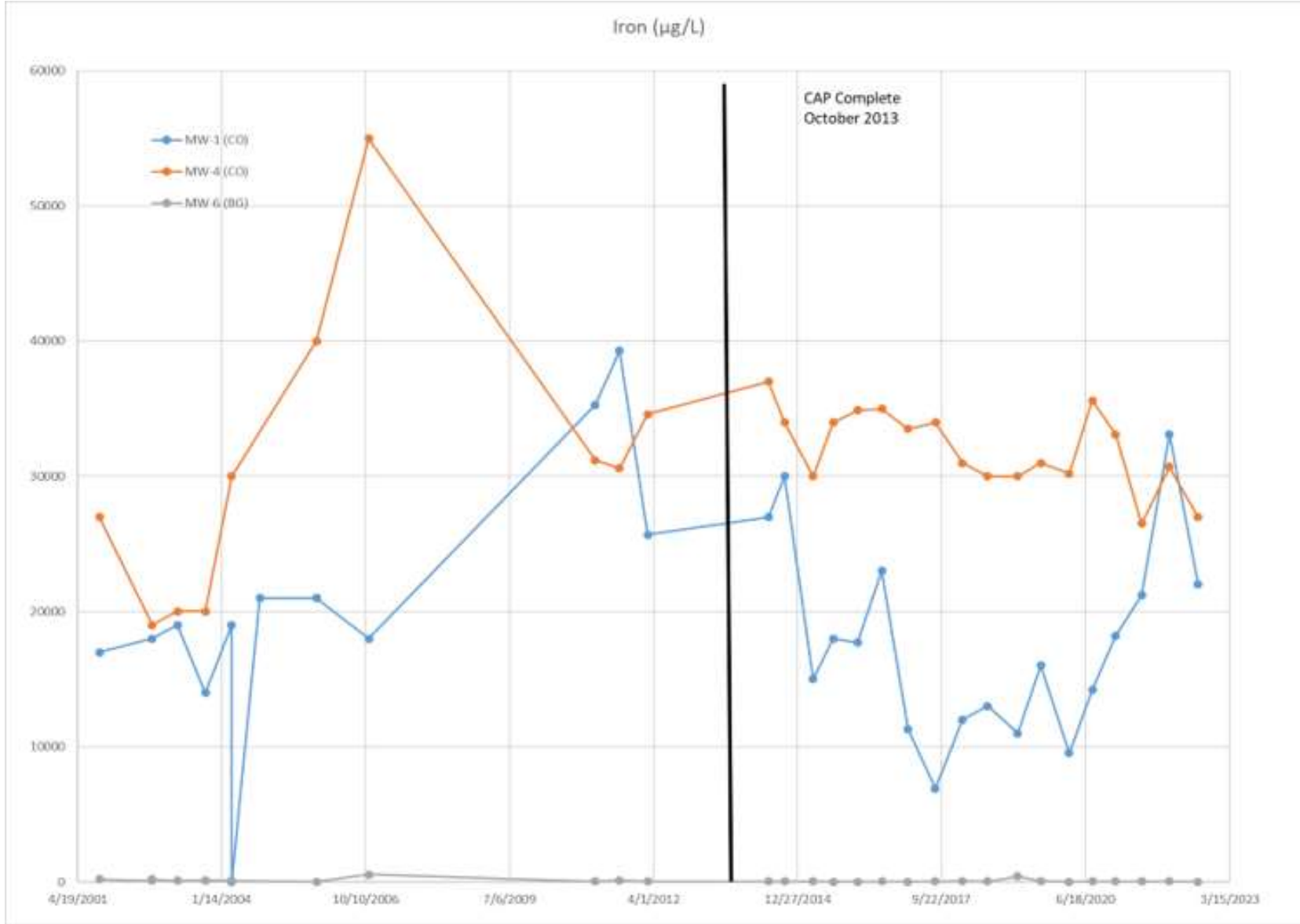


Impermeable Caps for Unlined C&Ds: Arsenic



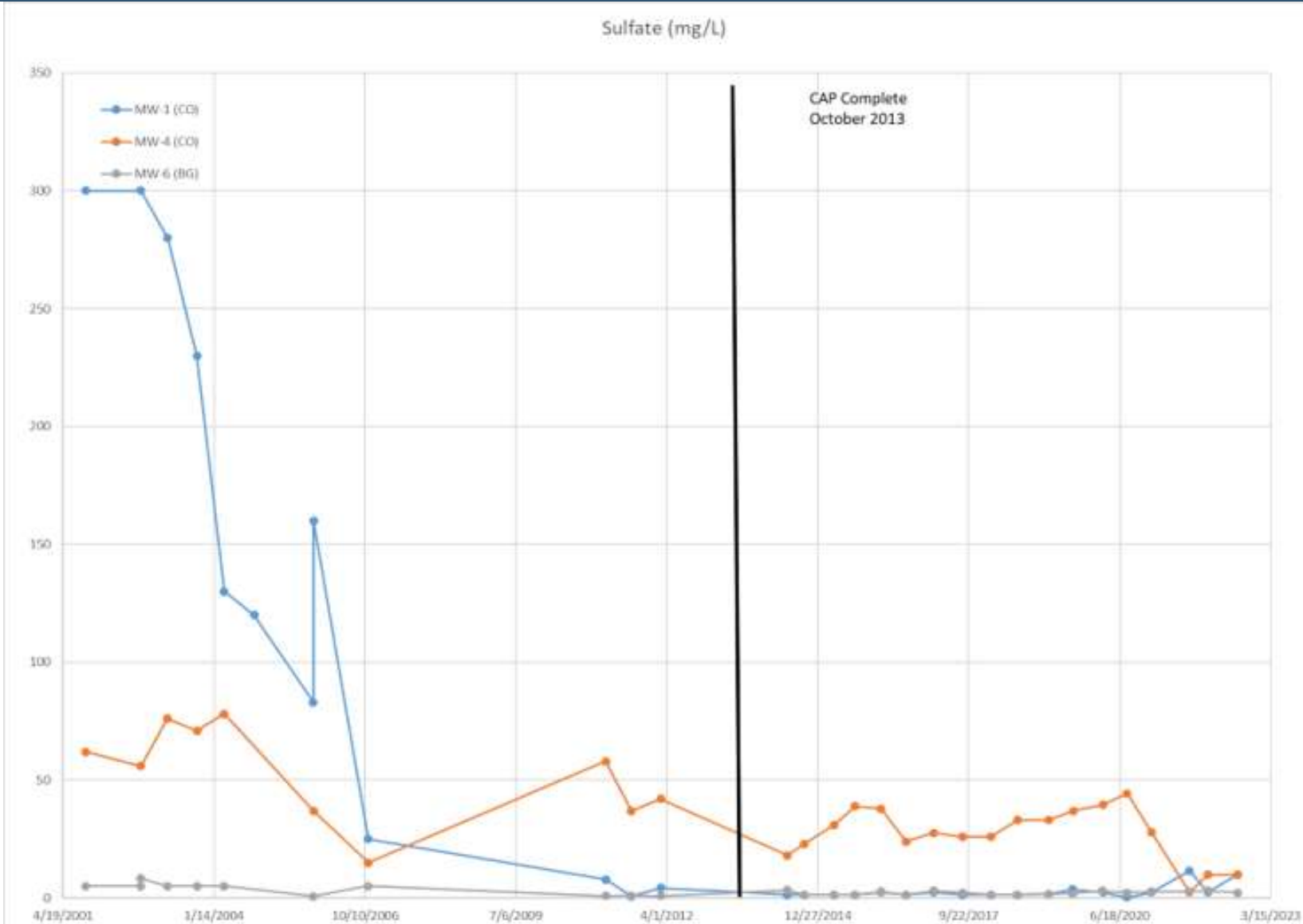


Impermeable Caps for Unlined C&Ds: Iron



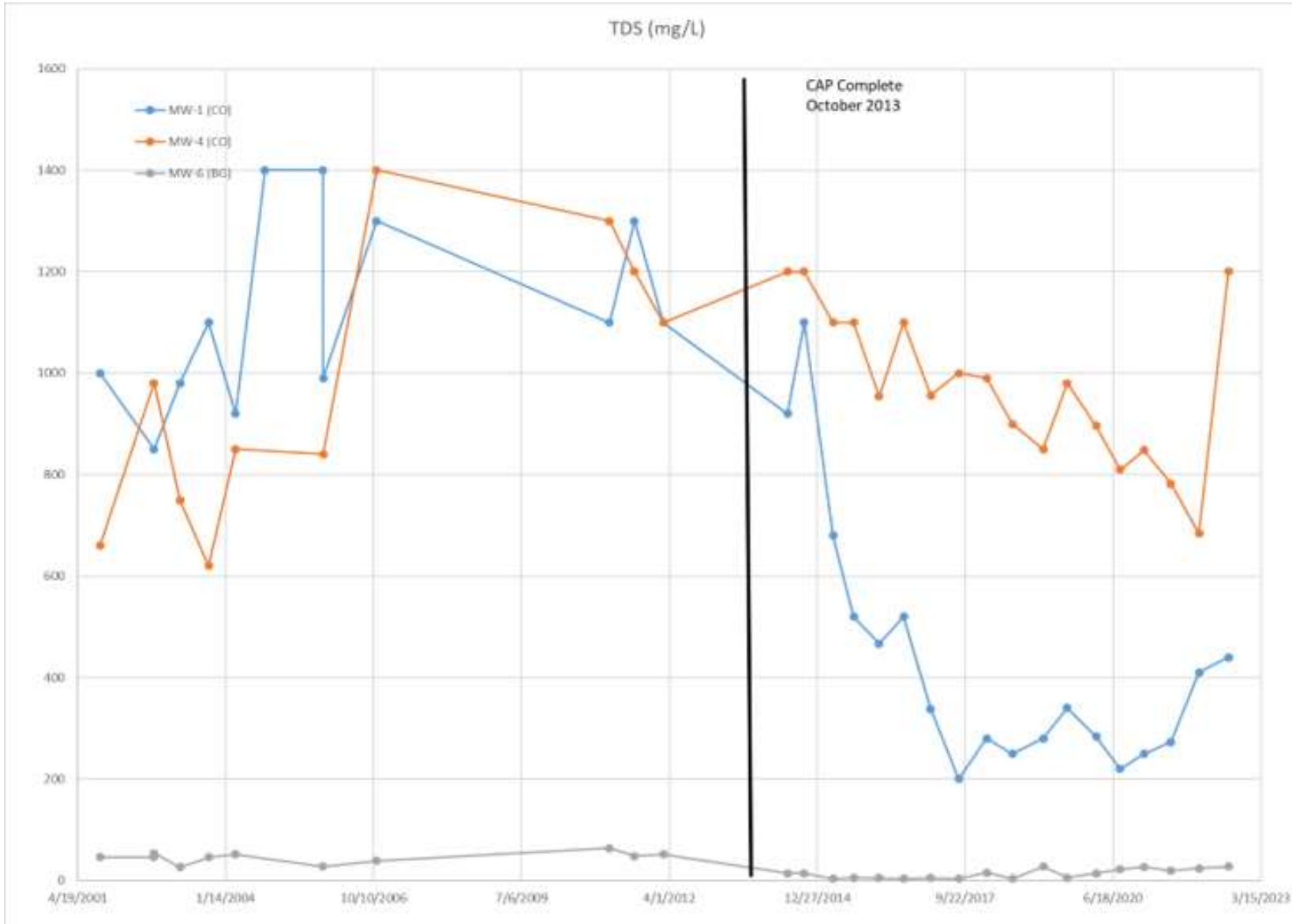


Impermeable Caps for Unlined C&Ds: Sulfate



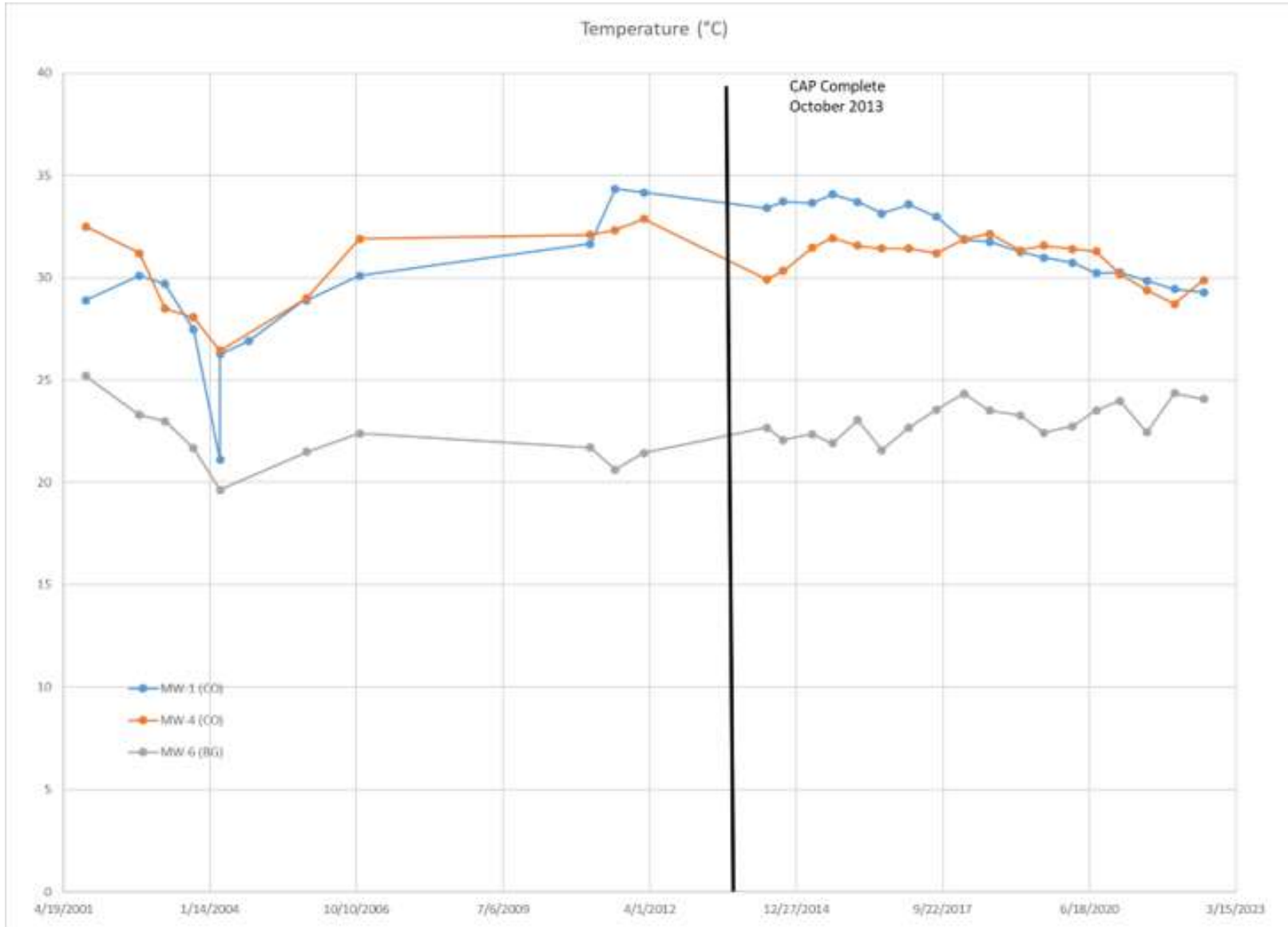


Impermeable Caps for Unlined C&Ds: TDS





Impermeable Caps for Unlined C&Ds: Temperature





Summary

- Requirements for C&Ds have changed since they were first regulated.
- Unlined C&Ds are known to cause groundwater contamination.
- New constituents of concern have appeared.
- Are impermeable caps a solution?
 - Will the concentrations continue to decrease?
 - Cost versus traditional treatment?



THANK YOU

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