

Experience With Assessment and Management of Hydrogen Sulfide At Hydropower Projects

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This presentation provides an overview of experience from assessing hydrogen sulfide at hydropower projects throughout the United States. Like many other anoxic products sulfide levels vary significantly between reservoir projects; however, it is more likely to occur at projects where the DO in the bottom of the lake is low (near zero) for periods greater than about 30 days, the nominal residence time for water passing through the reservoir is about 50 days or more, and the withdrawal zone from the reservoir extends to the bottom of the lake. This observation is based on experience at over 80 hydropower projects.

Following is a list of topics that will be covered in the presentation:

- Hydrogen sulfide concentrations at the following hydropower projects: Douglas, Cherokee, Chatuge, Nottely, Tims Ford, Wallenpaupack, McConaughy
- Considerations for the importance of analytical methods for hydrogen sulfide
- Rates of oxidation for hydrogen sulfide
- Laboratory results on release rates and characteristics of sediment water interactions from studies on sediments from Douglas Reservoir
- Considerations for the effects of iron on sulfide concentrations
- Considerations for sulfide as a dissolved gas (i.e., stripping at gas/water interfaces, contribution to total dissolved gas pressures)
- Implications as an oxygen demand for achieving DO objectives
- Biological considerations (i.e., toxicity, fish avoidance behavior)
- Achieving odor limits

In-lake management alternatives include oxygenation using line diffusers and side-stream supersaturation systems. Other alternatives can be considered depending on site-specific considerations. Some important considerations for in-lake treatments will be presented, e.g., water currents induced by bubble plume upwelling, the volume to consider for treatment, the use of CE-QUAL-W2 in the design of in-lake treatments.