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Session Title: Nutrient Removal Treatment and Effluent Reuse

Abstract:

This presentation will link advanced nutrient removal treatment technology challenges with effluent reuse drawing upon recent experiences with utility planning for compliance with a restrictive TMDL on the Spokane River that has included pilot studies and reuse planning. Presentation material will be drawn from the following:

- The Spokane River dissolved oxygen TMDL has resulted in strict effluent limits based on a water quality modeling scenario with very low effluent characteristics for CBOD (4.2 mg/L), ammonia nitrogen (0.21 mg/L), and total phosphorus (0.042 mg/l in Washington, 0.036 mg/L in Idaho).
- The Spokane County Division of Utilities has taken a leadership position in implementing advanced point source wastewater treatment technology and managing a Washington/Idaho bi-state nonpoint source phosphorus management program for the Spokane River. Spokane County has constructed a new 8mgd state-of-the-art membrane bioreactor (MBR) reclamation facility that will produce the highest quality reclaimed water for surface water discharge and for reuse in urban/suburban irrigation of parks, groundwater recharge, wetland restoration, and potentially industrial applications.
- The City of Coeur d'Alene has led the way in investigating treatment technologies capable of producing effluent total phosphorus (TP) less than 0.050 mg/L. In 2006, the City conducted a four-week pilot study with the goal of demonstrating the ability of various technologies to achieve low effluent phosphorus under steady state conditions. Four sand media and membrane filtration technologies were tested. The 2006 pilot study highlighted factors limiting performance and identified some unknowns regarding their potential application at full scale for reliable performance under variable plant influent flows and loads. In May 2010, the City began an 18-month demonstration scale testing program to investigate three candidate phosphorus removal treatment technologies. The three technologies tested in Coeur d'Alene facility were a 2-stage moving bed sand filter, a tertiary membrane filter, and a membrane bioreactor (MBR). Each technology was designed for a 50,000 gallons per day (gpd) average flow with a flow paced influent feed to match the diurnal plant flow. All three technologies have produced extraordinarily high quality effluent with phosphorus concentrations less than 0.050 mg/L. All three technologies produce high quality reclaimed water suitable for reuse in the urban environment.

Professional Background: David Clark is Senior Vice President and Wastewater Market Sector Director for HDR Engineering, Inc. Mr. Clark has extensive background in wastewater collection and treatment, as well as solids processing, biosolids management, water quality planning and nutrient management. Mr. Clark has managed a broad range of wastewater projects from planning to detailed design and construction management, to discharge permit negotiations and TMDL implementation plans.