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Pilot Filtration Studies for Turbidity and Nutrient Removal at Lake Tahoe

ABSTRACT

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PILOT FILTRATION STUDIES FOR TURBIDITY AND NUTRIENT REMOVAL AT LAKE TAHOE

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The California Department of Transportation (Caltrans), which is responsible for more than 500 storm water discharge points in the Tahoe Basin, has constructed a small-scale test facility for developing new treatment technologies to meet numeric effluent discharge limits due in 2008. The primary constituents of concern are turbidity, phosphorus and nitrogen. Of particular interest are settling and gravity filtration treatment systems because of their relatively low maintenance requirements and potential for deployment within the Caltrans right-of-way.

Special attention is being given to media to remove the dissolved fraction of phosphorus in the runoff, which can cause violation of the effluent limit even after the particulate fraction is removed. Three grades of sand, activated alumina, and aluminum oxide were tested during the 2001/02 wet season. Fine sand, activated alumina, expanded shale, and limestone were tested during the 2002/03 wet season. During the 2001/02 season, none of the media filters tested were able to meet the surface discharge limits for the primary constituents of concern. Hydraulic application rates were reduced in the 2002/03 season. In some filters, dosing was controlled at the inlet; in others, dosing was controlled at the outlet, leading to submerged conditions. In 2002/03 results, filtration through activated alumina or expanded shale following sedimentation almost always met the surface water discharge limits for turbidity (20 NTU) and total phosphorus (0.1 mg/L). Both media, however, increased pH and contributed dissolved aluminum to the effluent.

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