

Augmenting Holding Basins with Relatively Low-Permeability Liner Systems

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Geologically derived sediments occurring in riverine, lacustrine, or estuarine environments that are impacted by organic or inorganic contaminants are typically what one thinks of when considering the issue of contaminated sediments and the management of sediments for the purpose of environmental protection. However, other types of non-geologically derived sediments also exist that could also pose an environmental threat, if not managed properly. Solids comprising pollution-control by-products or other materials suspended in process water slurries or wastewater streams that are discharged to holding basins and subsequently settle out can be considered within this general class of non-geologic, or "non-natural" sediments. If discharged to non-lined or inadequately lined basins, contaminants associated with such accumulating sediments could potentially migrate into and impact underlying groundwater resources. Constructing new, fully lined holding basins for the receipt of sediment-bearing discharge waters is costly, and may be impossible due to site constraints. When new basins are impractical, the retrofitting of existing basins would require a cessation of operations, thus making augmentation of existing basins with relatively low-permeability liner systems an attractive and cost-effective option. Allowing for continued use of the basin *during* the retrofitting process is more attractive still.

AquaBlok™ is an engineered and patented, composite-particle product typically composed of a central dense aggregate core surrounded by a clay layer fixed with polymers. AquaBlok can be applied across a targeted sediment surface through a standing water column, thus eliminating the need to drain a basin to facilitate material placement. Once in place, the AquaBlok particles hydrate and expand, coalescing into a relatively low-permeability barrier that minimizes migration of surface waters - as well as sediment-borne contaminants - into the underlying strata. If needed, the product can also be amended with special materials to increase attenuation of dissolved contaminants.

In this paper, we present a case for AquaBlok use in a basin liner augmentation system (based on an existing situation), including an analysis of additional, progressive reductions in seepage resulting from incremental liner placement over interior basin slopes, over and above liner placement over the basin bottom. In order to more effectively illustrate a case for AquaBlok use in such a liner augmentation system, hydraulic and geotechnical data associated with the actual project site are incorporated into the paper.