

# Active Capping Treatment Materials

- **Bulk Placement Through Water** – Ease of Application
- **Control of Treatment Layer Thickness** – In Single Lift
- **Implement Treatment Trains** – Multiple Contaminants
- **Monitor Treatment Effectiveness** – Conventional Cores

**AquaBlok**® was developed as a technology to deliver materials to a sediment surface. Although most applications to date have focused on establishing a low permeability cap with a bentonite-based material, significant success has been achieved in applying our unique **delivery system** to a wide range of other materials. Use of the AquaBlok approach provides many advantages over existing and alternative methods, such as use of a Reactive Core Mat™ (RCM) or a range of injection or mixing systems and it is an efficient and more cost effective means to deliver materials through a water column.

**The primary benefits of the AquaBlok-based Active Capping treatment materials are as follows:**

- Organoclay
- Activated Carbon
- Zero Valent Iron (ZVI)
- EHC-M™ (Adventus Group)
- Sulfur Compounds
- Aluminum Sulfate
- Clinoptilolite
- Organic Carbon

## Bulk Placement Through Water Ease of Application



Materials can be handled with conventional excavation equipment or a wide range of more high volume material handling equipment that can place a large amount of material in uniform thin layers quickly. Generally, no sub-surface preparation is necessary with bulk material placement—material will conform to debris or other variations. Bulk placement is not limited by water depth such as many of the injection or sediment mixing technologies. Unlike treatment mats, placement of AquaBlok eliminates the need for divers, anchor trenches, ballast, or the need to seams panels.

Application techniques permit the placement of a specified volume of treatment material per square foot, based on modeling that can identify treatment efficiency over time. This eliminates the need to add multiple layers of treatment mats to enable placement of sufficient active material as may be needed to address a volume of contaminants for a target life. Although one of the advantages of injection and sediment mixing technology is the ability to use the quantity of treatment material necessary to achieve a target residual contaminant level, this approach can be limited by access or water depth issues. The ability to place larger quantities of treatment material directly through the water column can provide longer life for the active capping layer at relatively lower life-cycle costs, and, if need be, AquaBlok caps can be relatively easily augmented or replaced.



## Control of Treatment Layer Thickness In Single Lift

## Implement Treatment Trains Multiple Contaminants



It is well known that many complex sediment sites suffer from a range of contamination that no single treatment can effectively or efficiently address. With ground water contamination mixed contaminants are often addressed by use of a series of treatment materials/methods that can sequentially and more effectively remove the desired contaminants. Use of bulk placement not only enables this treatment train strategy, but provides flexibility often not practical with other approaches. For example, one or more layers can be placed at

varying thickness in various areas or “hot spots” and layers of varying thicknesses can be employed in combination with low permeability capping systems in Funnel and Gate type configurations to provide a more focused point for monitoring. Although it is possible to utilize treatment mats in series, due to relatively low residence times, layers of sand or other materials are generally needed between multiple mat layers.

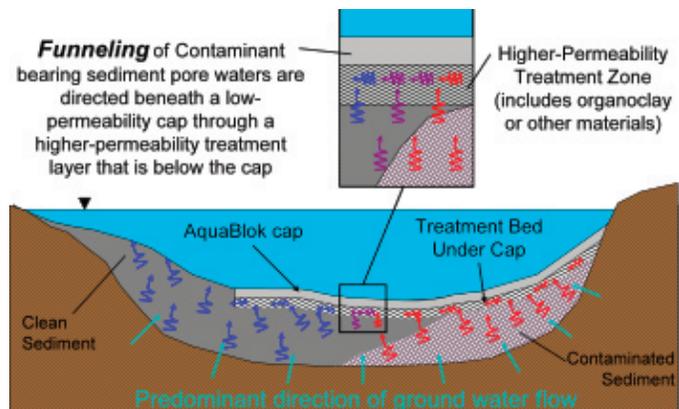


Long-term monitoring presents challenges to an active capping system since it now becomes necessary to evaluate the relative effectiveness and/or remaining capacity of the treatment materials within the capping system. Biological monitoring, often used as a performance criteria, is slow and expensive. Conventional sediment coring techniques for sampling and monitoring are very applicable to an AquaBlok Active Cap. These samples are considered to be very representative of field conditions, and the layer can be easily analyzed to determine material performance. If armor layers are used, it is also possible to pre-place cores prior to the application of the armor for future use. Unlike sand caps, an AquaBlok core can demonstrate that subsequent surficial contamination did not originate from below a cap.

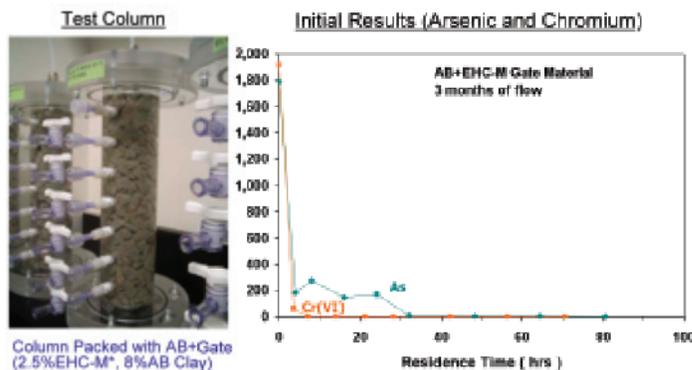
**Monitor Treatment Effectiveness**  
Use of Conventional Cores

**Material Application/Design**  
Within a Capping System

Treatment materials have been employed at a number of full-scale projects. It is believed that organoclay-based treatment materials have been the most widely used to date. As illustrated in the adjacent graphic, a full-scale installation that integrated the use of treatment materials with a low-permeability cap was performed in 2008 in New York State.



The use and/or application of AquaBlok bulk treatment material can range from simple mixing of the treatment materials with existing soil or sand—to provide some level of binding or adsorption capacity, to mixes of treatment materials (i.e. use of a treatment train) for combinations of contaminants or more unique designs of caps blending permeable and low-permeability materials to address more challenging application environments (i.e. ebullition, ground water flux, etc.).



**Active Treatment Materials/Results**

Laboratory testing has been completed on a range of materials to establish removal effectiveness. The data presented (left) shows removal results for arsenic and chrome using an amended active capping material with a hydraulic conductivity close to a sand control.

EHC-M™ is a product of Adventus Group.

FOR MORE INFORMATION,  
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