

# Removal of Nutrients from Stormwater Using CCPs

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**KEYWORDS:** CCPs, stormwater runoff, nutrients, nitrogen, phosphorus, water quality

Stormwater runoff from both urban and rural areas contains a significant amount of nutrients such as phosphorus and nitrogen. These nutrients contribute to the growth of algae and therefore degrade the quality of surface waters by reducing available oxygen. As a result, state environmental agencies have directed their attention to nutrient concentrations in stormwater runoff by requiring phosphorus and nitrogen removal. However, for the most part, the types of systems being utilized to deal with phosphorus and nitrogen in stormwater runoff have been inefficient and expensive to build and maintain. Many such systems only remove 25% to 50% of the nitrogen and phosphorus in the stormwater runoff. There is a need for an efficient filtering system that is relatively inexpensive, easy to maintain, and which will remove substantial concentrations of phosphorus and nitrogen.

This paper will discuss the problem of stormwater runoff and the use of coal combustion products (CCPs) in an efficient filtration system. Appian Engineers and Full Circle Solutions, Inc. are developing a patented process using CCPs as the filtration media. Column sorption studies designed and performed by Virginia Tech documented the capacity of various CCPs to significantly retain nutrient elements and organics from simulated waste water. The CCPs were effective in removing ammonium-N, ortho-P, and an organic C compound (oxalate) from simulated urban stormwater. We will explore the environmental benefits of expanded CCP utilization in association with this process.

**Submitted for consideration in the 2009 World of Coal Ash Conference,  
May 4-7, 2009.**