CASE STUDY

RESTORED FILTER MEDIA USING A
TWO-STEP CLEANING PROCEDURE

FLORAN®

INTRODUCTION

Blue Earth Products' is the leader in innovative approaches to water quality standards. Our suite of products reduces chlorine demand and disinfection by-products (DBPs) in water systems by eliminating organic and inorganic scale, enabling utilities to comply with EPA Stage 2 DBP rules.

The city of Tom's River, NJ, operates an iron-removal facility to treat part of its well water supply. The treatment involves aeration, alum coagulation, settling and filtration. Lime and sodium hypochlorite are fed post-filtration. The water is filtered through an Infilco Automatic Backwash (ABW) Filter that allows for continuous operation. The filter media was replaced in the spring of 2006, but during the summer, heavy fouling of the media significantly reduced the performance. CH2M Hill recommended using Media Master® chemical cleaning to restore filter flow and performance.

The first step in the Blue Earth Products' cleaning process is to conduct an extensive laboratory analysis of the filter media to determine both the composition and extent of the contamination. This analysis also determines the optimal dosing required for thorough cleaning. Analysis of media samples from the ABW filter began in March of 2007.

Microscopic analysis showed that the anthracite and sand had mostly aggregated to mudballs. Individual filter media particles were not visible. Washing could not effectively break up the media aggregates.

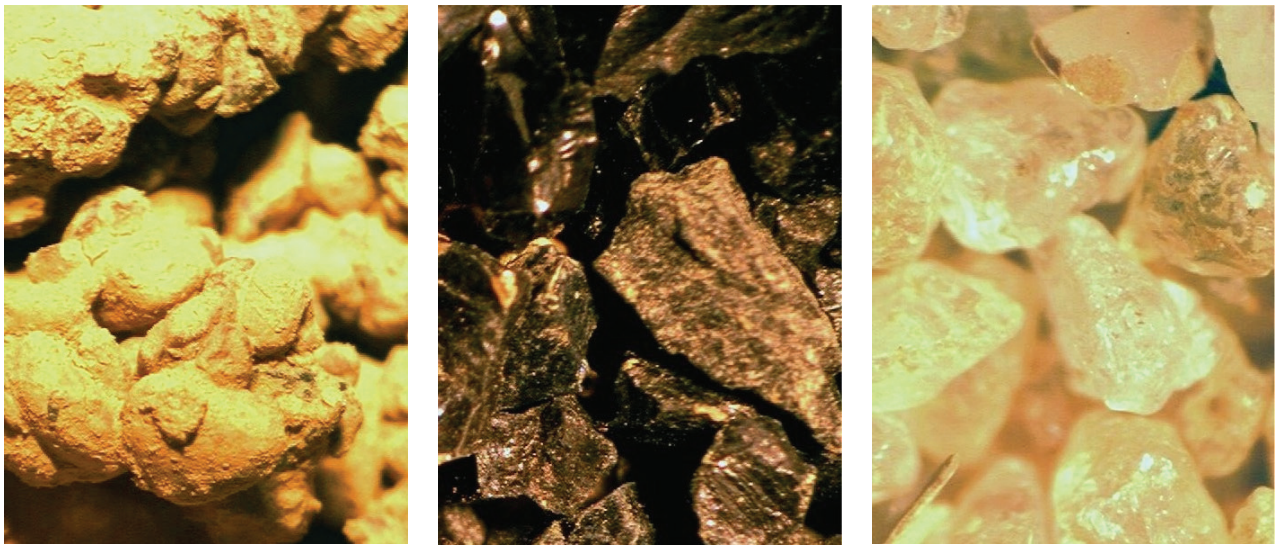

Figure 1 - Microscopic images of fouled filter media before (left) and after (center, right) Floran® treatment

Numerous chemical combinations of various Blue Earth Products' Floran cleaning chemicals were explored. This particular media fouling proved to be especially resilient and required a two-step process. The most effective treatment consisted of first applying 0.2 gallons of Floran® Biogrowth Remover and 0.2 gallons of Floran® Catalyst per ft^3 of filter media and allowing the reaction to go to completion. After backwashing, eight pounds of Media Master was applied in granular form along with 0.2 gallons of Floran Catalyst, per ft^3 of filter media. This treatment protocol resulted in a dry weight loss of ~20%.

The filter bed was treated in 2007. After treatment, the media bed was topped off with anthracite to restore original filter specifications. CH2M Hill conducted the comparison of the costs for in-situ filter treatment and media exchange, evaluated the current water treatment procedures and designed adjustments in order to prevent the future rapid fouling of the filter.

RESULTS

The media treatment generated a large amount of foam and broke up the "mud" in the filter bed. The runoff contained a large amount of suspended solids, which were removed together with the foam through backwashing. The runoff that was generated was pumped into the backwash holding tank, neutralized and discharged to the sanitary sewer. After the treatment, the filter was operated for several days in "filter-to-waste" mode to remove residual, dislodged deposits.

The field results were consistent with the laboratory test results obtained prior to treating the filter (see Figure 1). The improvement of the filter media was dramatic. Prior to the treatment, it was not possible to distinguish anthracite from sand. The media was heavily coated and had aggregated into mudballs. After treatment, the original particle size, shape and density of the media components were restored. Based on the laboratory calculations, 8-10,000 pounds of buildup had been removed from the filter.

After topping off the anthracite, the filter was returned to service and the recommended adjustments to the treatment procedure were made. The filter ran at the specified capacity and consistently produced the targeted water quality.

DISCUSSION

Blue Earth Products' two-step cleaning treatment effectively returned a substantially fouled filter bed to near new operating conditions. This treatment restored the filtration capacity and effluent water quality once completed at a substantial savings, in both time and money, compared to filter replacement. The entire project was completed by a two-man crew in two days and removed approximately 8-10,000 pounds of contaminants (based on estimates from the lab testing) from the filters with no noticeable side effects.

Since the cleaning in 2007, this particular customer has performed yearly cleaning treatments to maintain optimal filter performance.