Actiflo® Ensures Compliance for Coal Yard Runoff

Power | Case Study

The Client

Storm water runoff from a 37-acre coal storage yard utilized as part of daily operations at an industrial site in Southwester Pennsylvania posed a problem when the Pennsylvania Department of Environmental Protection (DEP) updated the facility’s NPDES permit.

The Client’s Needs

Contaminated storm water resulting from rainfall and snowmelt was previously collected in two large basins. As the basins approached capacity, the storm water was treated in situ and discharged to the river.

The new NPDES permit for the discharge contained limitations for total suspended solids, iron and manganese that the existing treatment system could not consistently achieve, along with a compliance deadline. To further complicate matters, the amount of space available for the installation of additional treatment system components was limited.

The Benefits

• Actiflo technology enabled the facility to comply with new discharge limitations for iron and manganese in runoff from its coal pile storage yard, meeting a strict compliance deadline.
• The deadline was met within eight months of project start-up by utilizing a temporary mobile unit to treat the storm water during design, procurement, and installation of the permanent system.
• The temporary mobile system provided operating data to verify process parameters and optimize the design of the permanent system while producing clean water for discharge to the receiving stream.
• Veolia prepared the permit applications for installation as well as the design engineering and project management services for both the temporary and permanent treatment systems. Equipment procurement services were also provided.

The Solution

Veolia’s Actiflo treatment process provided the solution to the facility’s problem. This innovative technology utilizes sand-ballasted settling to treat water with changing flow rates within a small footprint, typically less than 10 percent of the area required for conventional settling technology. Veolia combined the high-rate settling process with pH adjustment and chemical pretreatment to precipitate the metals of concern and produce an effluent of consistent, compliant quality.

On-site investigations were first conducted to determine whether modifications or improved storm water management practices could be implemented to enable the facility to meet the new limitations.

Bench-scale treatability studies were then performed to assess the ability of Veolia’s Actiflo clarification process to achieve the required discharge quality.

In order to meet the compliance deadline, Veolia oversaw the installation and operation of a temporary treatment system using a mobile Actiflo. Data generated from the temporary system were used to validate the process, establish design parameters, and optimize operating conditions for the permanent treatment system.
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Process Description

The key to the success of this technology is the use of microsand. While most conventional systems use polymer to aid in the settling process, Actiflo combines the polymer addition with fine-grained sand that is recycled in the process. In the treatment tank, the polymer, microsand, and other small particles in the water conglomerate in a floc that settles very fast. The microsand provides both a « sees » for floc formation and a ballast to enhance settling. The settled sand and solids are pumped from the bottom of the tank to a hydrocyclone where the sand is separated from the solids and recycled.

The enhanced rate of settling allows for compact clarifier designs with high overflow rates and short detention times. These improved operating parameters result in system footprints that are from 5 to 20 times smaller than those of conventional clarification systems with similar capacity. In industrial applications, this process is able to remove suspended solids, oil and grease and heavy metals quickly and efficiently.

Results

The performance of the system for the constituents of concern is shown in the table below. The permanent treatment system has been installed and is currently providing consistent compliance with the facility’s permit limitations. The values shown represent both the pilot and full-scale systems.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Effluent Range (mg/l)</th>
<th>Average Monthly Limit (mg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids (TSS)</td>
<td>&lt;4.0 – 9.6</td>
<td>35</td>
</tr>
<tr>
<td>Total Manganese</td>
<td>0.20 – 0.92</td>
<td>2.0</td>
</tr>
<tr>
<td>Total Iron</td>
<td>0.47 – 1.4</td>
<td>3.5</td>
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</tbody>
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Veolia Water Technologies

tel. +1 412 809 6000 or 800 337 0777

water.info@veolia.com

www.veoliawatertech.com