Doing It Right

Are test methods and protocols keeping up with the times?

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It is hard to believe that it has been 10 years since various storm water treatment verification programs—such as the U.S. Environmental Protection Agency (EPA) Environmental Technology Verification and Washington TAPE and TARP protocols—were started. These programs were the first to tackle the difficult issue of both laboratory and field verification of storm water treatment technologies. Comprising mostly hydrodynamic separator and filtration technologies, much of the difficulty lay with the fundamental definition and measurement of how the primary pollutant parameter, total suspended solids (TSS), was defined and measured, as well as the effective use of limited data sets to evaluate performance against simplistic regulatory goals such as 80% TSS removal.

Though still problematic today, significant progress has been made on how to meet strict protocols, develop sophisticated quality assurance project plans and use the knowledge gained to improve those processes over time.

However, as TSS removal verifications become more commonplace, new issues and parameters are gaining significant attention and need to have standard testing methods, protocols and verification programs—which are currently at an elementary stage at best.

Of particular concern is the question of filtration technology loading characteristics and maintenance frequency and costs. Keep in mind that this concern includes manufactured filters, sand filters, bioretention and biofiltration facilities, which all share the common unit operation of filtration. As the use of these technologies proliferates, the burdensome cost of maintenance needs to be integrated into the life-cost estimates.

However, there are few standardized tests or protocols in place that can be used to produce verification statements or provide quality model input data to reduce uncertainty about rates of media occlusion.

For example, while Sil-Co-106 (a silica material with a d50 of 22um) was selected as surrogate TSS standard for laboratory-based filter verifications, the use of the material for load testing is inappropriate and not representative of the mechanisms that tend to clog and load filters. Protocols and laboratory test procedures need to be researched so that laboratory testing is representative of reality while also being repeatable and uniform from one test or technology to the next. Regulatory bodies working in conjunction with the research and design community need to establish a standard "baseball mud" reference sediment for use in lab scale work comparing the impacts of filter geometry, flow rate, self-cleaning mechanisms and more. This could involve specific methods to collect real storm water sediments that fall within specified ranges of organic matter, particle size distribution, biological activity, etc.

Protocol for field verifications of loading impacts also need to be established. A potential situation could involve keeping detailed observations of filtration rates over time, and a relatively large sample of systems in different operational environments and climatic regions. Detailed accounting of costs needs to be done as well. Then we need to assess how these costs relate to the control measure performance. Is it based on pounds of sediment removed, effluent water quality, runoff volume reduction—or all of the above?

Clearly, there is still a lot of work to be done. Let us use the experience and knowledge we have gained to accomplish this goal in a shorter time frame and at lower cost. We can ill afford to go another 10 years without having validated assessment tools for predicting maintenance frequency and costs. Organizations such as ASTM, American Society of Civil Engineers, EPA, Stormwater Equipment Manufacturers Assn. and others need to collaborate to set this process in motion. SWS

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