Onsite Testing

Monitoring runoff to support project compliance

By Heather D. Rekalske

Mike Alberson, CPSWQ, CPESC, CISEC—and a national trainer in these three programs—is an expert in storm water pollution prevention. As senior environmental manager for Barnhart Balfour Beatty, he has been training job supervisors and program managers for the past eight years.

Five years ago, Alberson started using Myron L's Ultrameter II to monitor active construction sites' storm water runoff. He uses the unit to meet new and existing state and federal requirements for storm water monitoring. One such application is checking for the presence of pollutants by testing the levels of total dissolved solids (TDS) and conductivity. Alberson also tests storm water pH levels in accordance with 2009 National Pollutant Discharge Elimination System (NPDES) guidelines implemented in California on July 1, 2010, which mandate pH testing for all Risk Level II and III sites (see Figure 1).

Pollution Potential & New Regs

Though TDS and conductivity do not indicate the presence of any specific contaminant, monitoring these parameters generally is a good way to determine an increase in the concentration of dissolved (ionic non-visible) chemical constituents. High TDS or conductivity levels are a red flag to investigate potential pollution sources.

Chemicals used in landscaping and in materials such as cement can dissolve into storm water runoff. Additionally, acidic or basic pollutants impact the quality of water by altering the pH of the runoff. Runoff from cement and gypsum, for example, has a high pH. Monitoring is required because altering the pH alters the types and amounts of chemical constituents in runoff and, thereby, its toxicity. Changes in pH also impact the ecosystem directly when they exceed the narrow range required by biota to live in the receiving waters. The new California NPDES requirements have set a pH range limit of 6.5 to 8.5 pH units. (This limit range is ±1 standard deviation beyond typical runoff pH from a California highway construction site.)

The State Water Quality Board's overall goal in implementing increased monitoring and reporting requirements is to evaluate the effectiveness of best management practices (BMPs) on effluent pollution and the impact that construction activities have on receiving waters. Because pollutants from construction sites generally result when building and landscaping materials are exposed to rain, the best preventative action is to cover and contain building materials that can alter the pH as well as increase turbidity in the runoff. It is not always possible, however, to cover and contain chemicals such as pesticides and fertilizers used in building and landscaping. Developers and inspectors like Alberson are continually challenged with preventing these potential pollutants from leaving project sites; and when that does happen, they need to remediate any adverse affects on the environment.

As a prerequisite to construction, the plan developer must generate and gain approval of BMPs and Storm Water Pollution Prevention Plans (SWPPPs) that take into account the nature of the project's building schedule, phasing of the project, building materials, projected rainfall, percentage of impervious cover and the impact that potential storm water runoff could have on receiving waters. The developer also must address monitoring requirements and critical indicators of specific pollutants projected to discharge from the project site. Alberson uses the Ultrameter II as part of the implementation of his SWPPPs because of its memory storage and data transfer capabilities, simplifying record-keeping compliance.

The site storm water inspector has to ensure that the necessary BMPs are implemented throughout the

Figure 1. Storm Water Effluent Monitoring Requirements by Risk Level (2009-0009-DWQ)

	Frequency	Effluent Monitoring (Section E)
Risk Level I	When applicable	Non-visible pollutant parameters, if applicable
Risk Level II	Minimum of three samples per day during qualifying rain event, characterizing discharges associated with construction activity from the entire project-disturbed area	Turbidity, pH and non-visible pollutant parameters, if applicable
Risk Level III	Minimum of three samples per day during qualifying rain event, characterizing discharges associated with construction activity from the entire project-disturbed area	Turbidity, pH and suspended sediment concentration, if NEL exceeded; Non-visible pollutant parameters, if applicable

length of the project, as defined by its SWPPP, which addresses project-specific site conditions and risk-level determinations. Most the projects Alberson works on fall into the Risk Level II category, which now requires pH monitoring during a rain event of 0.5 in. or more.

Training & Application

New California requirements will require all SWPPP developers and inspectors to be certified by the state as of Sept. 2, 2011, via a special course given by designated State Trainers of Record (TORs). TORs must possess at least one of the following designations: Certified Professional Erosion Sediment Control, Certified Professional Storm Water Quality, Civil Engineer or Registered Geologist/Hydrologist. A TOR also must attend the state's program and pass an exam. Alberson is designated as a TOR and began offering California's new Qualified SWPPP Practitioner and Qualified SWPPP Developers courses in August.

As a trainer, Alberson passes on knowledge gained from his own experience. Through the years, he has seen inspectors send water samples to laboratories for analysis—the results of which would not be known for up to two weeks. In addition, the pH of these samples changed in the time that it took to get the samples to the labs, which is why the U.S. Environmental Protection Agency recommends that it be analyzed within 15 minutes of sampling. Alberson now trains developers and inspectors to use the Ultrameter II to immediately measure pH, thereby ensuring that storm water runoff on project sites is precisely monitored for potential pollutants in real time.

In his work as an inspector, Alberson has used the Ultrameter II to respond to potential pollution issues as they arise. Take, for example, Barnhart Balfour Beatty's Otay Ranch Village No. 6 Elementary School project in Otay Mesa, Calif. Here Alberson developed a remediation solution that prevented environmental contamination from high pH runoff resulting from a required lime treatment of the campus soil.

By performing onsite testing following a rain event, Alberson was able to determine that the potential runoff had a pH level of 12.5. He decided immediately to utilize a retention pond with carbon dioxide (CO_2) percolation control techniques. (CO_2 gas injection bubbling creates carbolic acid, which drives the pH down and self-neutralizes at approximately 6.8 pH.) This remediation tactic worked, using the Ultrameter II to continuously monitor the pH until it was at a level acceptable for release into the receiving waters. SWS

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