Urban Stormwater Runoff Water Quality Management : Challenge of the 2000's

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August 31, 1998

Current Regulatory Requirements

The implementation of the US EPA urban-area stormwater runoff water quality management program has recently established some new, potentially highly significant regulatory requirements for management of chemical constituents and pathogen-indicator organisms in NPDES-permitted urban-area and highway stormwater runoff. In January 1998, the US EPA reaffirmed its previously adopted position that NPDES-permitted urban stormwater runoff shall not cause or contribute to exceedance of the water quality standard for any constituent by any magnitude more than once every three years. In those areas where mixing zones are not allowed for stormwater runoff, that requirement becomes an end-of-discharge-pipe requirement. The implementation pf these requirements could ultimately cost the US public hundreds of billions of dollars. Urban stormwater runoff from residential and commercial areas and highways contains a variety of chemical constituents and pathogen-indicator organisms that will cause stormwater runoff from those areas to violate US EPA worst-case-based water quality criteria, and state water quality standards based on those criteria.

California is at the forefront of regulatory activity for NPDES-permitted urban-area and highway stormwater runoff because many of its cities and metropolitan areas with populations over 100,000 obtained early NPDES permits. Many of the larger cities in California are now well-into the second five-year permit period. As part of their entering that second period, the US EPA has established that NPDES-permitted urban-area and highway stormwater runoff water quality managers in California initiate a BMP ratcheting-down process that has as its goal the control of chemical constituents and pathogen-indicator organisms in the stormwater runoff so it does not cause violations of water quality standards. Under current regulatory requirements, this BMP ratcheting-down process is to take place over a 5- to possibly 10-year period. The exact time-table has not been established and will likely be determined by the courts through litigation filed by environmental groups.

Problems with/Costs of Achieving Water Quality Standards in Urban Stormwater Runoff

The traditional approach for water quality management of urban stormwater runoff involves the development of conventional BMPs such as detention basins, grassy swales, filters, etc. The cost of retrofitting established urban areas with these types of BMPs is being found to be on the order of one- to three-dollars per person per day, in perpetuity,

for the urban population served by the stormwater management system. It is now clear that such conventional stormwater runoff BMPs, however, will not treat urban stormwater runoff in a manner such that it does not cause violations of water quality standards. This means that in order to achieve current regulatory requirements, which are now beginning to be implemented in California and will soon be implemented nationwide, advanced wastewater treatment technologies will have to be used to treat NPDES-permitted urban-area and highway stormwater runoff. Recent estimates of the cost of retrofitting for this type of collection and treatment in the Los Angeles, CA area is on the order of $50 billion. The cost nationwide will be hundreds of billions of dollars.

While urban-area stormwater runoff is often reported to be a major cause of impairment of the water quality of the nation's waters, when critically examined there are significant questions about whether potentially toxic heavy metals and organics that cause exceedance of worst-case-based water quality criteria/standards in urban-area residential and highway stormwater runoff cause real, significant water quality use-impairment in the waters receiving the stormwater runoff. The heavy metals and regulated organics in urban-area stormwater runoff have been found in several studies to be in non-toxic, unavailable forms. Under those conditions, an exceedance of water quality standards can be characterized as an "administrative exceedance" that is an artifact of the use of US EPA worst-case-based water quality criteria as state standards.

California Stormwater Quality Task Force

There is need to critically examine the real water quality use-impairments caused by urban-area and highway stormwater runoff in order to develop water quality management programs that will protect designated beneficial uses of the receiving waters for the runoff without significant, unnecessary expenditures for control of chemical constituents and pathogen-indicator organisms. The state of California urban-area and highway stormwater runoff water quality managers and the State Water Resources Control Board has a Stormwater Quality Task Force in which the regulated community, regulatory agencies, and other interested parties/individuals are working together to develop technically valid, cost-effective approaches for implementing urban-area and highway stormwater runoff water quality management requirements. The Task Force has a number of committees and workgroups, including Stormwater Science Workgroup, BMP Workgroup, Watershed Workgroup, Public Information Committee, and Regulatory Activities Committee, which are addressing aspects of water quality management of urban-area and highway stormwater runoff. Information on the Task Force is available from its website http://www.blymyer.com/swqtf.

Stormwater Science Workgroup

Dr. G. Fred Lee chairs the Stormwater Science Workgroup of the Stormwater Quality Task Force. The objective of this workgroup is to provide guidance to the Task Force on appropriate approaches for implementing the BMP ratcheting-down process. The workgroup is developing a number of reports on various aspects of this process for review by the Task Force. Information on the activities of the Stormwater Science

Workgroup is available from Dr. G. Fred Lee's website http://members.aol.com/gfredlee/gfl.htm. Also available at that website are papers and reports that Drs. Lee and Jones-Lee have developed on issues pertinent to water quality aspects of urban-area and highway stormwater runoff, including impact-evaluation and management.

Stormwater Runoff Science/Engineering Newsletter

Drs. Lee and Jones-Lee have developed a Stormwater Runoff Science/Engineering Newsletter specifically devoted to review of issues pertinent to implementation of the BMP ratcheting-down process. While that newsletter is not a Task Force activity, many of the issues discussed in it are pertinent to Task Force activities and areas of concern. The newsletter is email-based and is available at no cost to anyone interested. To be placed on the mailing list to receive the newsletter, send an email to gfredlee@aol.com indicating interest.

Stormwater Quality Impact Evaluation/Management Short Course

Drs. G. Fred Lee and Anne Jones-Lee have developed a two-day short course on impact and evaluation/management of urban-area and highway stormwater quality. That short course reviews basic issues pertinent to the reliable evaluation of water quality impacts/use-impairment of urban-area and highway stormwater runoff. It also covers some of the issues that should be considered in the selection and implementation of technically valid, cost-effective BMPs to manage real water quality problems associated with urban-area stormwater runoff. The course can be taught at any location at which there are at least 25 participants. For further information on the course, including a detailed course outline and information on its next offering, contact Dr. G. Fred Lee (gfredlee@aol.com).

Qualifications

Dr. G. Fred Lee has worked on water quality aspects of urban-area and highway stormwater runoff for nearly 40 years. During 1960 through 1989 he held university teaching and research positions at several major universities. During that time he conducted more than $5million in research and published more than 500 papers and reports on that work. Water quality aspects of urban-area and highway stormwater runoff was one of the principal areas of his research. Dr. Anne Jones-Lee has worked with him in these areas since the mid-1970's. Since 1989, they have been full-time consultants; a significant part of their activities has been devoted to advising pubic and private interests in urban-area and highway stormwater runoff water quality management. They have published extensively on those topics; many of their more recent publications are available as down-loadable files from their website.

Reference as: "Lee, G.F., and Jones-Lee, A., 'Urban Stormwater Runoff Water Quality Management : Challenge of the 2000's,' Report G. Fred Lee & Associates, El Macero, CA, August (1998)."