Comments on
US EPA National Pollutant Discharge Elimination System-Proposed Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges; Proposed Rule, Federal Register, January 9, 1998.

G. Fred Lee, PhD, PE, DEE and Anne Jones-Lee, PhD
G. Fred Lee & Associates
El Macero, CA
ph: 916-753-9630
fx: 916-753-9956
gfredlee@aol.com
http://members.aol.com/gfredlee/gfl.htm

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We wish to provide the following comments on the US EPA's proposed Phase II regulations governing the regulation of urban area stormwater runoff water quality impacts.

Conclusions and Recommendations

Conclusions

Our overall conclusions regarding the Agency's proposed Phase II regulations are:

- The US EPA has not properly developed the proposed Phase II regulations with respect to evaluating the cost to the public and the water quality benefits of implementing the proposed regulations to the nation's surface water quality;
- The Agency has provided highly unreliable information to the regulated community and the public on the ability of the six Minimum Control Measures set forth in the proposed Phase II regulations to control the concentrations of chemical constituents in urban area stormwater runoff so that this runoff does not contain constituents that will cause exceedance of water quality standards in the receiving waters for the runoff; and
- The implementation of the proposed rule can ultimately lead to massive public expenditures for the construction, operation and maintenance of urban area stormwater runoff treatment systems in order to achieve water quality standards in the treated runoff that will not significantly improve the designated beneficial uses of the receiving waters for the runoff.

Recommendations

The US EPA should withdraw the proposed Phase II regulations and re-promulgate them after:

- the Agency has properly evaluated the chemical characteristics and pathogenic indicator organism concentrations in Phase I and Phase II communities'/public entities' stormwater runoff;
- the Agency has reliably evaluated the ability of the six Minimum Control Measures to achieve water quality standards in the runoff waters with no more than one exceedance of any magnitude for a regulated constituent and aquatic life toxicity or other impairment of the beneficial uses of waterbodies every three years. Attention should be given in making this evaluation to protection of aquatic life and their habitat, domestic water supplies, shellfish harvesting, contact and other recreation, excessive fertilization and other designated beneficial uses of waterbodies;
- the Agency has reliably evaluated the cost of treating urban area and highway stormwater runoff so that it does not cause violations of current water quality criteria/standards at the point of discharge and/or in the receiving waters for the runoff with a frequency greater than once every three years;
- the Agency has provided in-depth, reliable information on the water quality - use impairment benefits that can be expected through full implementation of the proposed Phase II regulations when applied to both Phase I and Phase II communities/regulated entities as well as the cost to the public of achieving the projected benefits; and
- the Agency has evaluated the potential economic burden to the public in the regulated communities associated with implementation of the proposed Phase II regulations relative to society's needs for funds for other water pollution control programs and for addressing other societal needs/problems.

The above information should serve as the foundation for the Agency redeveloping the proposed Phase II regulations to develop a Phase I and Phase II urban area and highway stormwater runoff water quality management program that will enhance existing runoff receiving water beneficial uses and prevent further degradation of these uses in a technically valid, cost-effective manner in which public funds are not spent unnecessarily in the name of water pollution control.

Qualifications

Dr. G. Fred Lee is president and Dr. Anne Jones-Lee is vice-president of G. Fred Lee & Associates, an environmental consulting firm located in El Macero, California. For 30 years Dr. Lee held university graduate-level teaching and research positions at several major US universities, including a Distinguished Professorship of Civil and Environmental Engineering at the New Jersey Institute of Technology. Dr. Jones-Lee held university teaching and research positions for 11 years, including an Associate Professorship of Civil and Environmental Engineering at NJIT. In 1989,they assumed full-time consulting activities through G. Fred Lee & Associates.

Dr. Lee holds a PhD degree from Harvard University in Environmental Engineering and Environmental Sciences and a Master of Science in Public Health degree from the University of North Carolina. He obtained a bachelors degree from San Jose State

University. Dr. Lee has conducted over $5 million in research on various aspects of water quality and solid and hazardous waste management. He has published over 650 papers and reports on this work. He has served as an advisor to numerous governmental agencies and industries in the US and other countries on water quality and solid and hazardous waste management issues.

Dr. Anne Jones-Lee obtained a bachelor's degree in biology from Southern Methodist University and a Master of Science and PhD degrees from the University of Texas at Dallas in Environmental Sciences. She has worked with Dr. Lee since the late 1970s where she has been a co-author on many of the papers and reports that he has developed.

Dr. Lee's work on urban stormwater quality impact evaluation and management began in the late 1960s while he was a professor at the University of Wisconsin-Madison. He and his graduate students did some of the first work done on this topic. He has been active in evaluating and developing management approaches for urban area, street and highway stormwater runoff water quality for over 30 years. He and Dr. Jones-Lee have published extensively on the approaches that should be used to develop technically-valid, cost-effective best management practices for urban area, street and highway stormwater runoff. A list of his recent publications on this topic is available upon request.

Dr. Lee's most recent work on stormwater runoff evaluation and management has been devoted to the development of the evaluation monitoring approach. This approach focuses on finding real water quality use impairment in receiving waters for stormwater runoff and then developing technically-valid, cost-effective BMPs to control the water quality impacts to the maximum extent practicable without significant unnecessary expenditures for chemical constituent control.

Further information on Drs. G. Fred Lee's and Anne Jones-Lee's stormwater runoff water quality-related publications and activities is available from their web site:

(http://home.pacbell.net/gfredlee/waterqual.html).

Discussion

Unreliable Information

At the March 6, 1998 hearing organized by the US EPA-Washington, D.C. that was held in San Francisco, George Utting, Office of Wastewater Management who is listed as the contact person in the January 9, 1998 Federal Register for questions and who is reported to be the person who is responsible for developing the Phase II regulations, informed the audience that it is the US EPA's belief that the regulated Phase II communities can meet water quality standards in stormwater runoff by implementing the Minimum Control Measures set forth in the draft regulations. These Minimum Control Measures include:

1. Public education and outreach on stormwater impacts.
2. Public involvement/participation in developing stormwater management program.

3. Illicit discharge detection and elimination.
4. Construction site stormwater runoff control.
5. Post-construction of stormwater management in new development and re-development.
6. Pollution prevention/good housekeeping for municipal operations.

A discussion of the Minimum Control Measures is presented on pages 1639-1641 of this Federal Register.

When Mr. Utting was asked if the Phase II stormwater dischargers would ultimately have to meet water quality standards in the discharge waters where there is no allowed mixing zone for stormwater runoff with no more than one exceedance for a regulated constituent every three years including narrative requirements for controlling toxicity, etc., he indicated that it was US EPA policy that NPDES-permitted stormwater runoff cannot cause or contribute to violations of water quality standards. He stated however, that it was the US EPA's conclusion that water quality standards could be met by implementing the above-listed six Minimum Control Measures. He was then asked what type of review the Agency had conducted to develop that conclusion. A specific question was asked about whether the Agency had a report based on a review of the information of the chemical characteristics of urban area stormwater runoff and the ability of the six Minimum Control Measures to impact the chemical characteristics of urban stormwater runoff. Mr. Utting indicated that the Agency had not critically reviewed this information in developing the proposed Phase II regulations and admitted that the Agency had not conducted the necessary studies to determine whether implementation of the six Minimum Control Measures as outlined in the proposed regulations would enable a Phase II or Phase I regulated community to meet water quality standards in the receiving waters for the stormwater runoff. He also stated there were no reports on the conclusion that the Minimum Control Measures would enable a Phase II community to meet water quality standards in the stormwater discharge waters. His comment was that somebody in Texas had made a statement at a previous Phase II hearing that they were already meeting theses standards and that there was no need for the Phase II regulations.

Mr. Utting was specifically asked if the US EPA had conducted an economic analysis of what it would cost the Phase II communities to meet water quality standards in the stormwater discharge with no more than one exceedance every three years. He indicated that the Agency has not done this and stated that there were very little data on the characteristics of stormwater runoff upon which such an assessment could be made. He was asked if he or the Agency had reviewed the large amounts of data that have been generated in the last five years in California on the chemical and biological characteristics of stormwater runoff as part of the Phase I program. He indicated that he and the Agency had not reviewed these data. The conclusion that can be reached from Mr. Utting's response to questions raised by members of the audience is that the US EPA is promulgating Phase II regulations which bring into the regulated community a large number of municipalities with populations greater than 50,000 that are not now included in the Phase I regulations, i.e. populations greater than 100,000, where the Agency has

not performed a critical review of the effectiveness and cost required as part of developing the proposed regulations.

Mr. Utting stated in response to a comment that Dr. Lee made regarding the inability of conventional stormwater BMPs such as detention basins, etc. to "treat" urban stormwater runoff sufficiently so that the discharge waters would meet US EPA water quality criteria/state standards for protection of aquatic life and domestic water supplies, that the Agency is supporting the ASCE review of what can be achieved through conventional BMP treatment of urban area stormwater runoff. He stated that the Agency believes it will not be necessary to use conventional BMPs to achieve water quality standards in the runoff waters. However, if it is found that these six Minimum Control Measures do not control regulated constituents so that there are no exceedances of water quality standards, then conventional BMPs could be used. He specifically indicated that the Agency does not believe that advanced wastewater treatment will be needed to treat urban stormwater runoff so that there will be no more than one exceedance of a standard every three years.

Mr. Utting responded during questioning that the US EPA is promoting watershed planning. The Federal Register presenting the proposed Phase II regulations mentions this approach. There seems to be a mistaken belief that somehow conducting watershed planning will eliminate the need for urban stormwater dischargers to meet water quality standards in the discharge waters. Mr. Utting was asked whether the US EPA would waive the requirement of meeting water quality standards in the urban area stormwater runoff if the discharge were part of a watershed planning program. He said he did not know and that he was not familiar with this topic area. It is our finding that while watershed planning will enable some types of dischargers to trade pollutant loads, it will not eliminate the need to meet water quality standards in discharge waters. Basically, watershed planning is being developed to bring the unregulated agricultural community under regulation and not to provide relief for the regulated community from meeting overly-protective water quality standards.

Adequacy of BMPs

As part of Dr. Lee's responsibility as chair of the state of California Stormwater Quality Task Force Stormwater Science Workgroup, he has discussed the proposed Phase II regulations and especially the comments made by Mr. Utting at the San Francisco hearing with a number of individuals representing California Phase I communities who are now in their second five-year stormwater NPDES permit. His discussions have specifically focused on the Phase I community representatives' findings with respect to the ability of the six Minimum Control Measures set forth in the proposed Phase II regulations to control regulated chemical constituents for which there are water quality criteria/standards as well as meet the narrative standards of no discharge of toxic constituents in toxic amounts and other narrative standards, such as controlling excessive fertilization, etc. Dr. Lee has yet to find anyone familiar with this topic who concludes that the US EPA's six Minimum Control Measures would provide sufficient control of chemical constituents, toxicity, nutrients and fecal indicator organisms so the stormwater

runoff would not cause violations of water quality standards - use impairments more than once every three years.

There is unanimous agreement among those with whom Dr. Lee has discussed this issue, many of whom now have five or more years of Phase I stormwater runoff water quality monitoring data, that the US EPA has not properly evaluated the ability of the six Minimum Control Measures to control chemical constituents in the stormwater runoff so the runoff does not cause water quality standards violations in the receiving waters. Further, there is widespread agreement that the conventional stormwater runoff BMPs such as detention basins, filters, grassy swales, etc. will not "treat" urban area and highway stormwater runoff so that it does not cause or contribute to exceedance of water quality standards in the receiving waters for the runoff. There is growing consensus among those familiar with the topic that in order to achieve water quality standards of the type currently in place, including those that will be implemented through the US EPA Region 9's California Toxics Rule that Phase I and Phase II NPDES permit regulated stormwater dischargers will have to collect, store and treat the stormwater runoff using advanced wastewater treatment processes, as well as disinfection and removal of any residual disinfectant. The cost of such treatment will typically be on the order of many tens of millions to, for communities such as the Los Angeles area, hundreds of billions of dollars to retrofit urban area stormwater runoff conveyance structures with the necessary collection, storage and treatment works to treat stormwater runoff so that it does not cause or contribute to water quality standards violations in the receiving waters.

In connection with presenting a paper at the Water Environment Federation conference, "Advances in Urban Wet Weather Pollution Reduction," to be held in Cleveland, Ohio in June 1998, Drs. Anne Jones-Lee and G. Fred Lee have developed a paper, "Stormwater Managers Beware of Snake-Oil BMPs for Water Quality Management." A preprint of this paper is appended to these comments and is part of them. This paper reviews the ability of various stormwater runoff "BMPs" to treat urban area and highway stormwater runoff so that it does not cause water quality standards violations in the receiving waters for the runoff. Further, specific guidance is provided in this paper on how stormwater managers should proceed to develop technically valid, cost-effective BMPs to reliably treat urban area and highway stormwater runoff so that the runoff waters do not contain constituents that cause or contribute to water quality standards violations. It is found that there is considerable misinformation being provided to stormwater runoff water quality managers by the US EPA and others on the ability of the six Minimum Control Measures as well as the conventional stormwater runoff BMPs to control constituents in the runoff waters to a sufficient degree to prevent water quality standards violations.

Inappropriate Water Quality Standards

Dr. G. Fred Lee has worked on the development, implementation and evaluation of water quality criteria and standards since the mid-1960s. He and Dr. Jones-Lee have discussed (see attached list of publications) the inappropriateness of regulating urban area and highway stormwater runoff using current US EPA water quality criteria and state standards based on these criteria that allow no more than one exceedance every three

years. Drs. Lee and Jones-Lee have prepared another paper, "Appropriate Application of Water Quality Standards to Regulating Urban Stormwater Runoff," which will be presented at the WEF Cleveland, Ohio conference. A preprint of this paper is appended to these comments and should be made part of them. This paper provides a summary of information on why current US EPA water quality criteria and state standards based on these criteria are not appropriate goals that should be used by urban area and highway stormwater runoff water quality managers and regulatory agencies in the BMP ratcheting-down process that is currently in effect in regulating Phase I communities and will be in effect in regulating Phase II communities if the US EPA's proposed Phase II regulations are adopted.

The basic problem with the current US EPA water quality criteria is that they tend to be significantly over-protective for many of the constituents of concern in urban area stormwater runoff, such as the heavy metals, copper, zinc and lead, because of the potential to cause water quality standards violations and under-protective for the unregulated constituents, i.e. those for which there are no water quality criteria/standards. The current US EPA water quality criteria/standards were developed based on worst-case assumptions involving toxic available forms of constituents and extended durations of exposure of aquatic life to these forms. The way these criteria have been implemented, involving Independent Applicability of chemical criteria/standards and the grossly over-protective averaging period as well as allowed exceedance frequency, causes their application to most urban area and highway stormwater runoff regulated constituents to be significantly over-protective. Many of the constituents in urban area and high stormwater runoff are in non-toxic, non-available forms. Further, aquatic organisms in receiving waters for the stormwater runoff normally receive exposures from toxic available forms which are less than the critical concentration exposure relationship that are adverse to aquatic organisms in the receiving waters for the stormwater runoff. Therefore, the exceedances of water quality standards in the stormwater runoff typically reflect administrative exceedances related to the over-protective nature of the water quality criteria/state standards currently in use. These administrative exceedances do not reflect significant water quality use impairments of concern to the public who must ultimately pay for urban area and highway stormwater runoff water quality management.

The inappropriateness of using an exceedance of current US EPA water quality criteria and state standards based on these criteria in evaluating water quality in receiving waters for urban area and highway stormwater runoff as a measure of a water quality use impairment has caused the US EPA to unreliably report on the magnitude of the urban area stormwater runoff-caused water quality use impairments that are occurring in US waters in the Agency's biennial National Water Quality Inventory reports to Congress. Congress has been told by the US EPA every two years for a number of years that urban area stormwater runoff is one of the major causes of water quality use impairment in the nation's waters. However, as discussed by Lee and Jones-Lee (see attached reference list), the way in which the US EPA develops the information for the National Water Quality Inventory inappropriately lists any exceedance of a water quality standard in a receiving water as a water quality use impairment. Those familiar with how US EPA water quality criteria are developed and implemented know that this approach is not technically valid

and tends to significantly over-estimate the real water quality use impairments that are occurring in the nation's waters due to urban area and highway stormwater runoff-associated constituents for which there are water quality criteria/standards.

Use impairments for potentially toxic constituents should be based on a significantly reduced number, types and altered characteristics of desirable forms of aquatic life in the receiving waters for urban area and highway stormwater runoff that is caused by runoff-associated constituents. Similarly, for constituents that tend to bioaccumulate to excessive levels in aquatic organism tissue to cause an exceedance of human health advisories for the consumption of the organism as food, there should be excessive tissue concentrations of the constituent of concern. There are many situations where exceedance of water quality criteria/standards for potentially toxic or bioaccumulatable chemicals do not cause significant aquatic life toxicity or excessive bioaccumulation in the receiving waters for stormwater runoff.

As discussed by Drs. G. F. Lee and A. Jones-Lee, one of the first steps in developing a technically valid, cost-effective and protective urban area and highway stormwater runoff water quality management program is to develop appropriate goals/standards that will protect the designated beneficial uses from runoff-associated constituents without significant over-regulation. They have developed the Evaluation Monitoring approach that is designed to determine the real water quality use impairment in receiving waters for urban area and highway stormwater runoff. Where use impairments are found, the cause of these impairments is determined and through forensic studies, the source of the constituents responsible for the use impairment is determined. The Evaluation Monitoring approach is formulated on a watershed-based, stakeholder-developed, consensus approach for defining and managing real water quality problems in the receiving waters for the stormwater runoff using site-specific, appropriate BMPs to the maximum extent practicable. Exceedance of water quality standards are used an indication of a potential water quality problem that requires site-specific evaluation to determine if the exceedance represents a real use impairment. Information on the Evaluation Monitoring approach is provided in references cited in the attached list of publications.

Summary

The US EPA's proposed Phase II regulations have been developed without proper evaluation of the real water quality problems caused by urban area and highway stormwater runoff in the receiving waters for the runoff. The proposed Phase II program perpetuates the current technically invalid approach of ultimately requiring that Phase II regulated communities meet the same regulatory requirements as currently imposed on Phase I regulated communities of not causing violations of current US EPA water quality criteria/state standards for any regulated constituent by any amount more than once every three years. These regulations are to be implemented in a BMP ratcheting-down process using US EPA water quality criteria/state standards as the ultimate goal in the ratcheting down process. As applied to urban area and highway stormwater runoff-associated

constituents, this goal is not technically valid since the criteria/standards typically tend to significantly over-regulate chemical constituents in urban stormwater runoff.

The US EPA has provided significant amounts of technically invalid, unreliable information at the San Francisco, California hearing for the proposed Phase II regulations. Contrary to the statements made by US EPA Washington, D.C. representatives at this hearing, the six Minimum Control Measures set forth in the proposed Phase II regulations will not enable Phase II or Phase I regulated communities to achieve compliance with water quality standards in urban area and highway stormwater runoff. Further, even the conventional stormwater runoff BMPs, such as detention basins, filters, etc., which the US EPA claims may need to be implemented as part of the BMP ratcheting-down process if the six Minimum Control Measures do not control the concentrations of regulated constituents in stormwater runoff to prevent causing or contributing to exceedance of water quality standards more than once in three years, will not "treat" urban area and highway stormwater runoff sufficiently to prevent water quality standards violations. Advanced wastewater treatment technology will be needed to treat urban area and highway stormwater runoff so this runoff does not cause exceedance of water quality standards.

The US EPA should withdraw the currently proposed Phase II regulations and basically start over with respect to developing these regulations so that the revised regulations will protect the designated beneficial uses of the receiving waters for urban area and highway stormwater runoff without significant unnecessary expenditures for chemical constituent control. In developing the revised proposed Phase II regulations, the Agency should incorporate the readily available information that now exists on the current characteristics of urban area and highway stormwater runoff. Particular attention should be given to the ability of the six Minimum Control Measures to control the concentrations of chemical constituents and pathogenic indicator organisms as well as aquatic life toxicity and other use impairments so that the runoff waters do not cause or contribute to violations of water quality standards in the receiving waters for the runoff.

The Agency should also make reliable estimates of the costs of adequately treating Phase II and Phase I regulated communities' urban area stormwater runoff so that the runoff associated constituents do not cause or contribute to violations of water quality standards. Further, the Agency should evaluate for representative communities across the US, the economic burden that is associated with requiring NPDES-permitted Phase II and Phase I communities to meet current water quality standards in runoff waters. Based on this information, the Agency should redevelop the Phase II regulations in cooperation with all interested stakeholders including the existing and potential regulated community, regulatory agencies, environmental groups, and others who are interested in appropriately regulating the real water quality impacts associated with urban area and highway storm water runoff in a technically valid, cost-effective manner.

The Agency needs to immediately implement a major effort devoted to developing appropriate goals for Phase II and Phase I regulated communities that will protect the designated beneficial uses of receiving waters for the stormwater runoffs without

significant, unnecessary expenditures for chemical constituent control. As part of this effort, the Agency needs to abandon its ill-conceived Independent Applicability policy which focuses the nation's water-pollution control efforts on chemical constituent concentration control rather than the appropriate goal of chemical impact control. Further, the Agency needs to develop appropriate approaches for reporting to Congress on the real role of urban area stormwater runoff associated constituents as a cause of water quality use impairments of significance to the public.

Additional Information

Additional information on the issues discussed in these comments is available in publications developed by the authors. A list of many of the recent publications is appended to these comments. Copies of the papers and reports listed are available from the authors' website at:

http:// home.pacbell.net/gfredlee/waterqual.html as well as from the authors. Hard copies of these papers and reports are available from the authors upon request.

List of Enclosures

Appropriate Applications of Water Quality Standard to Regulating Urban Area Stormwater Runoff

Stormwater Managers Beware of Snake-Oil BMPs for Water Quality Management

Recent Stormwater Runoff Contaminant Impact and Control Publications Developed by G. Fred Lee and Anne Jones-Lee

A copy of the two above-listed papers as well as the papers and reports listed in the appended list are available as a downloadable file from the authors' website at

http:// home.pacbell.net/gfredlee/waterqual.html.

Recent Stormwater Runoff Contaminant Impact and Control Publications Developed by G. Fred Lee and Anne Jones-Lee

Lee, G.F. and Anne Jones-Lee, "Appropriate Application of Water Quality Standards to Regulating Urban Stormwater Runoff," Proc. Water Environment Federation conference "Advances in Urban Wet Weather Pollution Reduction," Cleveland, OH, June (1998) (in press).

Jones-Lee, Anne and G.F. Lee, "Stormwater Managers Beware of Snake-Oil BMPs for Water Quality Management," Proc. Water Environment Federation conference "Advances in Urban Wet Weather Pollution Reduction," Cleveland, OH, June (1998) (in press).

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Reference as:"Lee, G.F., and Jones-Lee, A., 'Comments on US EPA National Pollutant Discharge Elimination System-Proposed Regulations for Revision of the

Water Pollution Control Program Addressing Storm Water Discharges; Proposed Rule, Federal Register, January 9, 1998,' G. Fred Lee & Associates, El Macero CA April (1998)."