The Kappe Lecture Series

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The 2017 Kappe Lecturer

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Education

- B.S., Chemical Engineering, Lamar University, 1977
- M.S., Chemical Engineering, Caltech, 1979
- Ph.D., Chemical Engineering, Caltech, 1982

Professional Associations

- American Academy of Environmental Engineers and Scientists (AAEES)
- American Association of Environmental Engineering & Science Professors (AEESP)
- American Institute of Chemical Engineers (AIChE)
- American Society of Civil Engineers (ASCE)
- National Academy of Engineering (NAE)

Dr. Danny D. Reible is the Donovan Maddox Distinguished Engineering Chair at Texas Tech University. He was previously the Bettie Margaret Smith Chair of Environmental Health Engineering in the Department of Civil, Architectural and Environmental Engineering and the Director of the Center for Research in Water Resources at the University of Texas in Austin.

Dr. Reible holds a Ph.D. in Chemical Engineering from the California Institute of Technology, and is a Board Certified Environmental Engineer, a Professional Engineer (Louisiana), and was elected to the National Academy of Engineering in 2005 for the "development of widely used approaches for the management of contaminated sediments".

His research is focused on the fate, transport, and management of contaminants in the environment and the sustainable management of water resources. The research has been applied to the management of a number of large contaminated sites including sites such as Portland Harbor, OR, Hudson River, NY, and the Fox River, WI.

Dr. Reible has authored or edited six books and more than 150 journal articles and book chapters.

Abstracts of Lectures Offered

Sustaining Water Availability in Rural Communities: *Expanding Use of Poor Quality Waters*

Water is critical, not only to meet personal water needs, but to support a healthy economy and to meet the challenges of food for an ever growing world population. Increased climate variability and conflicting demands for water requires us to fundamentally rethink how we should manage our limited groundwater and surface water resources so that energy production and economic vitality does not come at the cost of potable water availability, food security and environmental quality.

Much of the recent research has focused on securing water for large urban centers. While the challenges facing large urban centers are significant, these communities typically have much greater resources to address their problems than small communities and rural areas where water security challenges are equally serious. Particularly challenging is water for agriculture and agricultural communities which receive important but limited economic benefits from water and therefore are hard pressed to support expensive solutions. Further stressing rural and agricultural water sources in some areas is intensive water use for energy development such as oil and gas production. Water systems in rural and small urban communities are also less resilient to both human and natural factors.

These issues will be explored using the example of the southern high plains emphasizing cost-effective solutions for the water challenges facing rural and agricultural areas and to support water-intensive industry in such areas. The primary focus will be on taking advantage of poor quality water including saline and brackish waters to supplement conventional water resources. Energy production, and the extraction of petroleum and other minerals, use enormous amounts of water but much of this demand could be met with poor quality waters including brackish groundwater and produced water. Brackish waters could also be employed for agriculture and agricultural communities to extend conventional water resources. Cost-effective approaches for use of these waters will be explored and challenges to their implementation identified. More effective exploitation of these poor quality waters can protect potable and near-potable waters for human consumption and food production and help sustain rural and agricultural communities.

Managing Water Quality through Innovations in Sediment Assessment and Remediation

As we have improved our ability to treat and control wastewater effluents, contaminants that have accumulated in the sediments as a legacy of past practices are now posing risks to the overlying water. We have historically managed sediments strictly on the basis of the total inventory of contaminants in the sediments but the environmental risks due to sediments are instead largely associated with the mobility and availability of those contaminants. Sediment contaminants, including hydrophobic organics such as PAHs and PCBs and metals such as mercury, are influenced by a variety of physical, chemical and biological processes that limit their availability and control their mobility and fate. Assessment and remedial approaches must directly address the availability and mobility of contaminants to be effective and efficient. These processes and their implications for the effective management of sediments will be summarized.

Recent advances in in-situ passive sampling has helped measure directly the available and mobile forms of both organic and inorganic contaminants and better assess the potential risks of the sediments. Passive sampling of hydrophobic organic contaminants is generally accomplished by insertion of sorbing phases that equilibrate over time with the typically low in-situ available concentration in the interstitial waters. A rate-based sampler is typically employed for inorganic contaminants. The use, interpretation and limitations of these devices will be evaluated and compared to other approaches for monitoring exposure and risk to contaminated sediments.

In-situ remedial approaches that directly address the available and mobile forms provide a cost-effective approach to managing sediment contaminants. These approaches include sediment capping and treatments using sorbing amendments. These are increasingly being used in the sediment environment to eliminate the high cost and negative consequences of traditional removal approaches. Passive sampling also provides opportunities for monitoring the performance of these approaches. Recent experiences in the design, implementation and performance of these remedial methods will be discussed. The potential benefits to selected large sediment remedial programs currently in progress will be emphasized.

"A man's debt to his profession is to help those that follow."

STANLEY E. KAPPE, P.E., DEE, a successful environmental engineer, believed he owed a debt to the profession that rewarded him so well. During his life, he gave of himself to his university and to his profession through countless hours of volunteer activity. And, through this Lecture Series, he continues to share his good fortune with tomorrow's environmental engineers and scientists.

He graduated from Pennsylvania State University in 1930 with a bachelor's degree in sanitary engineering. He served with the Pennsylvania State Health Department and the U.S. Army Corps of Engineers before joining the Chicago Pump Company as its Eastern Regional Manager in 1935. In 1945, he founded Kappe Associates, Inc., a water supply and wastewater equipment company headquartered in Rockville, Maryland, and continued as its Chief Executive Officer until his death in 1986.

His peers recognized his contributions to the profession by numerous awards, including the AWWA Fuller Award, the WEF Arthur Sidney Bedell Award, the WPCAP Ted Moses and Ted Haseltine Awards, and the AAEES Gordon Maskew Fair Award. In 1985, Pennsylvania State University named him Outstanding Engineer Alumnus.

Stanley E. Kappe was an activist member and leader in several national and Chesapeake region professional societies. He served as the Executive Director of the American Academy of Environmental Engineers (now the American Academy of Environmental Engineers and Scientists) from 1971 to 1981.

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