

### **Engineering Seminar # 3: Water - Managing its Quality and the Role of Science**

Speaker: Mr. Alan H. Vicory, Executive Director and Chief Engineer, ORSENCO (Ohio Valley Water Sanitation Commission), Cincinnati, Ohio

Date: June 26, 2009

Time: 1:00 to 3:00 p.m. (2 hours)

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This seminar was given by Mr. Alan H. Vicory, Executive Director and Chief Engineer, ORSENCO (Ohio Valley Water Sanitation Commission), Cincinnati, Ohio on June 26, 2009 in 643 Baldwin Hall from 1:00 to 3:00 p.m. Appointed to the position in May 1987 after previous responsibilities with the Commission staff as Environmental Engineer and Manager of Technical Services, Mr. Vicory directs the programs of the Commission, which include establishment of regulatory requirements for discharges, water quality and biological monitoring systems, detection and response to spills, applied research, coordination of states and federal programs and public education and involvement. ORSANCO, known worldwide for its accomplishments in water pollution control on a watershed basis, was established in 1948 by state compact. Members of the Commission represent Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia, West Virginia and the United States.

Mr. Vicory received a B.S. degree in Civil Engineering from Virginia Military Institute in 1974. He is a Registered Professional Engineer and Board Certified in environmental engineering (water and wastewater) by the American Academy of Environmental Engineers. He is a former Chairman of the International Water Association's Watershed and River Basin Management Specialist Group, and is a member of the Association's Strategic Council. He also is a Past President of the American Academy of Environmental Engineers (AAEE) and the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA).

The topics of his presentation included:

1. ORSANCO
2. Global water perspective
3. How we approach water quality in the U.S.
4. Ohio River water quality
5. Leading edge management issues
6. The role of science in public policy

**ORSANCO:** The Ohio River Valley Water Sanitation Commission is an interstate pollution control agency comprised of representatives from New York, Virginia, Pennsylvania, West Virginia, Ohio, Kentucky, Indiana, Illinois and the federal government. ORSANCO is charged with overseeing implementation of the 1948 Compact signed by Governors and Congress. The compact is a pledge from one state to another to work together to eliminate interstate pollution. The guiding principal is that states don't want pollution from one state seriously impacting waters used by another. This collaborative approach is uncommon. The Commission is comprised of three commissioners appointed from each state and three commissioners appointed by the President for a total of 27. ORSANCO has an annual budget of \$3.5 to \$4 million dollars. ORSANCO's programs include:

- Water quality/biomonitoring and assessment.
- Setting discharge requirements for the Ohio River.
- Detection/notification of spills – any spill into the Ohio River becomes an interstate situation. An average of one spill is reported each day, most of which are small.

- Coordination of states' efforts – determining the actions of each state and planning/implementing collaborative efforts.
- Applied Research.
- Public Education.

*Global water perspective:* Director Vicory used a comparison of the true value of diamonds and water. Excluding industrial use, diamonds are useless but expensive while water is crucial to life but relatively inexpensive. He posed the question why this is true. He then showed a graph of global water resources. Saltwater comprises 97% of all water and can't practically be made freshwater. Freshwater makes up 3%, of which 70% is tied up in glaciers, 30% is ground water and less than 1 percent is accessible for use. He then showed a graph of water availability in 2025, which showed a shortage of water in much of the world.

*How we approach water quality in the U.S.:* The framework is provided by U.S. Clean Water Act, which requires ALL waters to have designated uses (e.g., recreation, water supply, aquatic life) and establishes criteria to protect human use (swimming, drinking, consumption of fish) and the protection of aquatic biota (reproduction, growth, balanced communities). The criteria are driven by scientific studies such as:

- Bench scale studies – how long does it take for organisms to be impaired or die?
- Modeling
- Risk to humans - criteria are 1:1000 chance of getting sick from bacteria from swimming and 1:1,000,000 chance of getting cancer from drinking the water
- Aquatic Risk – mortality, morbidity and reproduction

Director Vicory's conclusion was that there is little science compared to need for it and, then again, the science used is assumptive and inexact. U.S. water pollution studies indicate that 39% of rivers, 45% of lakes, and 51% of estuaries in the U.S. are polluted. He showed another graph of the top 15 causes of water pollution. The three largest are sediments and nutrients (derived mostly from nonpoint sources – streets, farms, mine areas, which are not directly governed by federal law) and pathogens. U.S. water quality improvements have flattened.

*Ohio River water quality:* Director Vicory showed a table of Ohio River impairments – the “Report Card” of how things are going in each state. Upper river areas generally seem to be in great shape, but lower reaches are having problems. The biggest concerns center on sewage overflows from combined sewers and treatment plant “blow-outs” when it rains. Correction of the problem in Cincinnati and Northern Kentucky will cost an estimated 3 billion dollars. Significant impairment for fish consumption occurs because of PCB's and dioxins. He then showed a graph of changes in attainment by use from 2004-2008, which showed the greatest concern to be fish consumption. Phosphorus, another concern, is increasing basin-wide.

*Leading edge management issues:* Director Vicory identified five areas that constitute the “leading edge” of Ohio River Basin management. They are: taking a watershed approach, including connections between air quality and water quality; addressing infrastructure needs, including the cost of maintenance and replacement; developing cap and trade programs; developing new technologies; and controlling emerging pollutants, such as personal care products.

*The role of science in public policy:* Director Vicory stated that science rarely drives public policy. Instead perception and misinformation typically are the driving force. A single set of data may have many interpretations. The interpretations may be used to support a variety of “scientific” positions.

The session concluded with questions and answers.