

ENVIRONMENTAL QUALITY

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ABSTRACTS

Measurement of Pollutant Release from Sediments. WAYNE F. ECHELBERGER, JR., School of Public and Environmental Affairs, Indiana University, Indianapolis, Indiana 46223.—In recent years billions of dollars have been spent to reduce and eliminate water pollution, with some attention being given to the control of eutrophication in lakes and reservoirs. With regard to lake pollution, more information is needed concerning the measurement of pollutant release from sediment material. The intent of this research was the development of a relatively non-complex and rapid procedure for evaluating the release of inorganic and organic pollutants from sediments under anoxic conditions.

An electrolysis system composed of measuring instruments, direct current power source and reaction vessel was constructed for the experimental studies. Through the application of voltage and current, reduced conditions were maintained in the reaction vessel. The release of inorganic (ammonia-nitrogen and phosphorus) and organic (measured as chemical oxygen demand) pollutants was evaluated on sediments taken from: Stone Lake and Diamond Lake, Cassopolis, Michigan; St. Joseph Lake and St. Mary's Lake, Notre Dame, Indiana and the Cuyahoga River, Cleveland, Ohio.

It is felt that there are at least two methods of pollutant release from sediments to the overlying waters in lakes and reservoirs. These are diffusion of elements from the sediment water into the overlying water and consolidation which forces the interstitial water directly into the overlying water.

The results of this study indicated that the release of pollutants from limnological sediments is a function of the pollutant concentrations in the interstitial sediment water. The rate of ammonia-nitrogen release was found to be approximately three times that for phosphorus from sediments containing equal concentrations of ammonia-nitrogen and phosphorus. Based on the findings of this study, it would appear that the measurement of pollutant release from limnological sediments under anoxic conditions can be closely approximated by a determination of the specific pollutant concentrations in the interstitial sediment water.

Studies of Snow Acidification in the Indianapolis Indiana Metropolitan Area. MARY GARDNER and THAD GODISH, Department of Natural Resources, Ball State University, Muncie, Indiana 47306.—The effect of the Indianapolis area and associated sources of acidic atmospheric pollutants on the pH of snow was studied. Snow samples were collected along several transects of the metropolitan area immediately after six snow events during the winter of 1979-80. pH values were determined for each sample. In five of the six snow events, the pH of snow samples was observed to decrease along the direction of the wind as the storm passed over

the city. Ten to twenty miles downward, pH values were the same as those measured upwind of the city. For one snow event measured, pH values indicated that considerable acidification of snow occurred before the snow reached the city, and a city-effect was not evident. Results of this study indicate that for most of the snow events studied, that pollutants emitted over the city were likely responsible for a slight decrease of snow pH.

The Natural Toxic Organics in the Aquatic Environment. ROBERT H. L. HOWE and JEAN M. HOWE, West Lafayette, Indiana 47906.—This paper discusses certain toxic organic compounds occurring in the aquatic environment due to natural processes. Some chemical pathways of their synthesis and degradation are presented.

Chamber Studies of Formaldehyde Emissions from Wood Products, Urea-formaldehyde Foam and Carpeting. BRIAN KANYER and THAD GODISH, Department of Natural Resources, Ball State University, Muncie, Indiana 47306.—Formaldehyde emissions from samples of major sources of indoor formaldehyde contamination were studied under laboratory conditions. Formaldehyde sources included particleboard, particleboard paneling, hardwood plywood paneling, urea-formaldehyde foam insulation and carpeting. All emission testing was conducted in modified dessicators using dynamic sampling procedures. Test conditions were controlled for temperature, relative humidity and ventilation rate. Formaldehyde concentrations were determined by using the Parosaniline Method. Initial studies focused on the effect of ventilation on chamber formaldehyde levels and source emission rates. Four ventilation rates 0.1, 0.5, 1 and 2 air changes per hour (ach) were employed for each source. Temperature and relative humidity were maintained at 20°C and 55% respectively. As expected chamber formaldehyde levels declined as ventilation increases. The effect of ventilation was most significant at low air change rates (0.1 to 1 ach). However, as ventilation increased the decline in chamber formaldehyde levels was partially counterbalanced by a significant increase of formaldehyde emission rates. The chamber studies indicate that ventilation as a formaldehyde abatement measure would be most effective under low residential air exchange conditions. These conditions are common during the fall and spring months and in energy efficient buildings. Studies were also conducted on the effect of various source combinations on chamber formaldehyde levels. When several sources were combined antagonistic effects were observed. These antagonistic effects may be due to the suppression of emissions from one source by another and/or one source may serve as a sink. Results from these source combination studies may have significant practical implications for the prescription of abatement measures to control indoor formaldehyde contamination.

Geochemical Characteristics of Coal Refuse Leachage. PATRICK J. SULLIVAN, Ball State University, Muncie, Indiana 47306.—Simulated geochemical weathering or coal refuse was conducted with the soxhlet weathering apparatus. Highly weathered coal refuse from Staunton, Illinois was continuously leached for up to 192 hours. Leachates were analyzed for pH, electrical conductivity, acidity, sulfate, iron, manganese, and aluminum. The results indicate that the soxhlet apparatus removed large amounts of metals and sulfate. Soxhlet weathering demonstrates that coal refuse contains soluble salts to degrade water quality immediately and reduced sulfur compounds that pose a potential long term acid problem.