USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

Title: Assessment of Environmental Estrogens in Wastewater: Potential for Developmental and Reproductive Toxicity in Fish

Duration: September 1, 1997 to September 30, 2000

Fiscal Year 1997 Federal Funds: $34,524

Non-Federal Funds Allocated: $69,948

Co-Principal Investigators, University, and City:

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Congressional District No: District No. 1

Water Problem, Need for Research:

Environmental estrogens refer to substances in the environment that mimic the effects of the endogenous hormone estrogen. A number of environmental contaminants possess estrogenic activity including chlorinated hydrocarbon pesticides, degradation products of high-use industrial surfactants, and by-products of industrial processes such as pulp and pulp production. Included in this list are potent natural and synthetic estrogens which find their way to the aquatic environment through animal waste or municipal sewage effluent. In mammals, exposure to environmental estrogens has been linked to reproductive disorder and disruption of developmental processes. In fish and wildlife, reproductive disorders resulting from exposure to environmental estrogens may include reductions in fertility and decreased viability, as well as alterations in hormone levels or adult sexual behaviors. Each of the preceding adverse effects may have further implications, particularly in wildlife population dynamics.

The overall goal of the proposed research is to assess wastewater effluents for the presence of environmental estrogens and evaluate the potential of microbial transformation of steroid hormones in activated sludge. Further, the research design seeks to explore the underlying mechanisms of developmental and reproductive toxicity due to compounds present in wastewater effluents which may disrupt the fish endocrine system. This proposal addresses Mississippi and Tennessee Water Research as well as South Atlantic-Gulf region priorities related to water quality, particularly surface waters, and agricultural and municipal wastewater.