

PSU Researcher Finds Minimal Effects from Power Plant Discharge

Dumping hot water from electric power plants into rivers and lakes is not necessarily an obvious case of harmful thermal pollution, a Penn State biologist has determined.

Dr. Dean Arnold, assistant professor of biology, studied the effects of waste heat from five

electric power plants on Great Lakes waters bordering the state of Michigan and couldn't find any gross effects directly attributable to the heat.

A serious environmentalist, Arnold admits that the results of his study were "not what we expected. However, though

we didn't find any, there may be undesirable effects from these discharges,—more subtle than we originally thought."

In the study, water sampling was carried out at each plant in the intake and discharge areas as well as at one or two locations far enough away to be relatively unaffected. The researchers measured temperature, dissolved oxygen, plant growth, alkalinity, chlorophyll content, and various other factors related to the health and well-being of living organisms. The differences in temperature between intake and discharge areas ranged from 2.8 degrees to almost ten degrees and the highest water temperature recorded in a discharge area was 85.6 degrees.

Arnold reports, "In general, there was little variation in conditions between open lake stations far from shore and reference stations near the power plants, except for temperature."

However, he cautions, "the absence of readily identifiable short-term effects does not mean that more subtle, long-term effects do not exist which will later become obvious or serious."

The data do show, according to Arnold, that "the location and design of intakes and discharges at power plants appear to be more important in controlling ecosystem damage than do temperature levels—at least on Great Lakes shores."

The five power plants (one nuclear, the rest coal-fired) dispose of their waste heat by circulating lake water through a cooling condenser to carry unused heat out of the plant. In the process, fish and smaller plants and animals are sucked through the condenser and eventually are redeposited in the lake. Except for fish trapped on screens at the intake pipe, Arnold says the trip leaves most of the plants and animals none the worse for wear. Although, he adds, "in most cases, microscopic animals suffered significant but not great mortality and the growth of microscopic plant populations was slightly inhibited." A more detailed study of the effects on the fish was not completed.

Despite the fact that he found none of the electric power plants doing any obvious damage,

Arnold doesn't believe that we can all relax. Research, he says, should continue to see if any cumulative effects result from several plants on the same body of water. He notes: "Such effects may well be much worse than the effects of a single plant and, of course, other wastes such as radioactive materials were not covered by this study."

Arnold's study, sponsored by the Atomic Energy Commission, was conducted from May 1971 to December 1972 while he was a member of the Great Lakes Research Division of the University of Michigan. He joined the Penn State faculty this year and also serves as Assistant Unit Leader of the Pennsylvania Cooperative Fishery Unit, U. S.

Bureau of Sport Fisheries and Wildlife.

A native of Elmira, New York, Arnold received the bachelor's degree from the University of Rochester and the M. S. in fishery biology and the Ph.D. in aquatic ecology from Cornell University. His current research interests include lake restoration and aquatic productivity.

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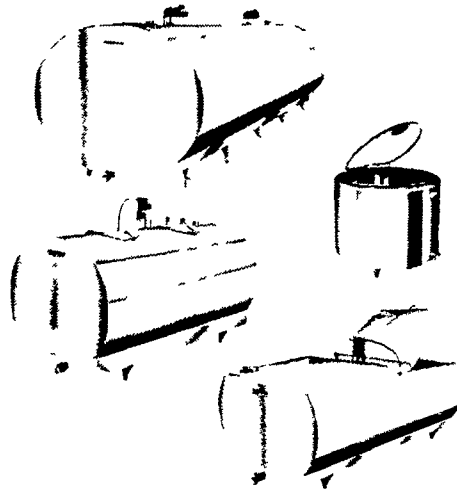
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