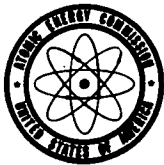


1972

B72-10004



# AEC-NASA TECH BRIEF



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

## Effect Of Thermal Discharges On The Mass Energy Balance Of Lake Michigan

A report analyzing the impact of man made, thermal discharges on the mass energy balance of Lake Michigan considers the effects of electric utility generating stations and steel mills on the physical quality of the lake. The study was based on an extension of the heat exchange model developed by Edinger and Geyer for small lakes and cooling ponds. The Edinger and Geyer model was generalized by incorporating the effect of "atmospheric feedback". The feedback term is needed because the over-lake dew point and over-lake temperature are affected by the temperature of the water surface of a large lake. The generalized model is applicable to all bodies of water.

The study predicts that a thermal discharge increase of one gigawatt into Lake Michigan will increase the surface temperature by  $.8 \pm .2 \times 10^{-3} \text{ }^{\circ}\text{C}$  and increase the water loss due to surface evaporation by  $.25 \pm .06$  cubic meters per second. The lake wide effects of man made discharge are negligible and will remain negligible for the rest of this century.

The report also presents the results obtained when the generalized model was applied to the other four Great Lakes.

The information contained in this report should be of interest to environmental and water resource engineers, designers of electrical power facilities and pollution control agencies.

### Note:

Requests for further information may be directed to:

Technology Utilization Officer  
Division of Technical Information  
U. S. Atomic Energy Commission  
Washington, D. C. 20545  
Reference: TSP72-10004

### Patent status:

Inquiries concerning rights for commercial use of this information may be made to:

Mr. George H. Lee, Chief  
Chicago Patent Group  
U. S. Atomic Energy Commission  
Chicago Operations Office  
9800 South Cass Avenue  
Argonne, Illinois 60439

Source: J. G. Asbury  
Argonne National Laboratories  
under contract to  
Atomic Energy Commission  
(AEC-10013)

Category 03