Was changed to 8 111-4

DEPARTMENT OF THE INTERIOR

INFORMATION SERVICE

OFFICE OF THE SECRETARY

For Release JUNE 28, 1959

AGENCIES REPORT ON LAKE HEFNER, OKLAHOMA, EVAPORATION REDUCTION STUDIES

Evidence that evaporation on large reservoirs can be reduced by the application of a monomolecular "chemical shield" has been published as a report of a collaborating committee of engineers and scientists who conducted tests last summer on Lake Hefner in Oklahoma, the Department of the Interior announced today.

The results indicate that savings of nine percent in water losses from evaporation were achieved under difficult conditions during the nearly 3-month test.

It may be expected that under an operational program on Reclamation reservoirs improved procedures and materials will make it possible to save millions of gallons of water now lost through evaporation and at considerably less unit cost than was experienced at Lake Hefner, Commission of Reclamation Floyd E. Dominy said.

An estimated 11½ million acre-feet of water is lost each year from evaporation from the lakes and streams of the West alone.

"In summary," said Commissioner Dominy, "we have learned a great deal about the possibilities, problems, techniques and methods of analysis in connection with monomolecular layers. Although this information will be very valuable in the ultimate development of practical methods for large reservoirs, much remains to be done before the development reaches a stage where specific recommendations can be made for selected reservoirs based upon firm cost-benefit data."

Mr. Dominy said there was a great advantage in pooling the knowledge and resources of a group of collaborating organizations--each having vast experience in one of the many required activities and also a vital interest in reservoir evaporation reduction--to make the studies on which the final report is based.

Participating in the cooperative effort were the Bureau of Reclamation, the Geological Survey, the city of Oklahoma, the U. S. Public Health Service, the Weather Bureau, and the Oklahoma State Department of Health.

Assistance was also rendered by the photographic section of the Tinker Air Force Base, which took aerial photographs and by the Bureau of Sports Fisheries and Wildlife of the Fish and Wildlife Service.

In addition, assistance was given by the Denver Board of Water Commissioners, the Northern Colorado Water Conservancy District, the city of Loveland, Colorado, and Lowry Air Force Base, who collaborated in auxiliary tests on Ralston Creek Reservoir and Carter Lake.

The 2,500-acre Lake Hefner--municipal water reservoir for Oklahoma City--was selected for the tests because it is one of the few reservoirs of suitable size where the water flowing in and out can be precisely measured and the evaporation accurately determined.

A dry-powder form of hexadecanol was mechanically suspended in water and dispensed on the lake from a motor boat and from a specially built motorized platform. Hexadecanol--one of the most promising of the chemicals which form a protective film--retards the escape of water molecules into the atmosphere. For the 86-day duration of the test--in late July, August and September--the average coverage on the lake was 10 percent. Not more than 89 percent of the lake was ever covered at one time. Winds and rain breaking up the film made maintenance of a cover a difficult problem.

About 800 pounds of the chemical were applied each of the 55 days suitable for application of the film, totaling over 40,000 pounds. Hexadecanol is colorless, odorless, and has no known harmful effect on life. No detectable quantities were found in municipal supplies during the test.

A study of the biological effects of hexadecanol in ponds showed no ill effect on plankton, most aquatic insects, fish, frogs, turtles, ducks, shorebirds, small mammals and other inhabitants of the water body. Many of the plants and animals seemed to make use of the hexadecanol as food. The major physical effect was that water temperatures might be increased as much as three degrees Fahrenheit as a result of less cooling from evaporation. The only ill effects observed were upon insects dependent upon the support of surface film at some stage in their life history. That is, mosquito larvae and water striders could not be supported by the decreased surface tension and were drowned.

The collaborating committee--upon publication of its report--issued the following joint statement:

"It has been demonstrated by the Bureau of Reclamation that techniques are available to cover the 2,500-acre Lake Hefner with a fully compressed monolayer of hexadecanol, given favorable conditions. The Geological Survey obtained the data needed to evaluate the success of the film in suppressing evaporation. Techniques developed as a result of research in recent years were used to measure the actual evaporation and to compute the evaporation that would have occurred if no film had been applied.

"The Geological Survey's evaluation showed that during the period of treatments, July 7 - October 1, 1958, it was possible to achieve an over-all reduction in evaporation of slightly more than nine percent, although weather conditions were not favorable for maintaining the film. It has been demonstrated that the effectiveness of evaporation retardants is lessened at higher temperatures and the nine percent reduction achieved is about one-fourth of the potential reduction with the kind of material used at Lake Hefner and at the water temperatures experienced.

"The water savings by evaporation reduction at Lake Hefner were accomplished at a total cost for labor and hexadecanol approximately equal to the total value of the untreated water saved to Oklahoma City. No hexadecanol could be detected by the Public Health Service in water reaching the inlet of the Oklahoma City water supply. Oklahoma City officials found that concentrations of microorganisms normally present in lake waters increased markedly as a result of feeding on the hexadecanol. However, the purified water met Public Health Service drinking water standards.

"The wind has a very pronounced effect on the behavior of the film. With wind velocities greater than about 20 mph, it was found impractical to maintain a film on Lake Hefner. It may be expected that under an operational program with improved procedures and materials, the costs of evaporation reduction would be considerably less than experienced in the Lake Hefner trial."

x x x