BONNEVILLE NAVIGATION LOCK GROUND WATER TEMPERATURE MONITORING PROGRAM AND GROUND WATER MODEL FOR THE NEW FISH HATCHERY WELL SYSTEM

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infiltration will affect ground water flow and ground water temperatures and will have an unknown effect on the fish hatchery's relocated well field.

PURPOSE AND SCOPE

The objectives of this project is two-fold. The first part is devising a ground water temperature monitoring program to provide the earliest possible warning for the Bonneville Fish Hatchery and to document changes in ground water temperatures for future predictions. The second part involves continued development of the ground water model for the Bonneville terrace using the Fortran code HST3D, from the U.S. Geological Survey, so it simulates the ground water conditions involving the new fish hatchery wells.

The ground water temperature monitoring program was developed in order to provide an early warning system for the fish hatchery. By using past and present trends, prediction of future patterns in ground water temperatures can be made early on and alternate measures can be drawn up. Determining long-term temperature changes for the new fish hatchery wells can be done utilizing temperature versus time plots,
temperature versus depth plots, and isothermal contour maps in both cross-sectional and plan view. Because the dewatering activity from the construction of the new lock affects ground water temperatures, ground water elevation versus time plots and contour maps were also included in the project scope. Ground water temperatures and elevations were provided on a computer disk from the Army Corps of Engineers at the Bonneville Navigation Dam site. Data was extracted from the disks and formatted for maps and graphs. The data was presented so that information can be viewed easily by the managers.

Simulation of the ground water system was done using a computer model run on an Intergraph Interserve 200 computer. The ground water modeling program, HST3D (Heat and Solute Transport in 3 Dimensions), was developed by Kenneth L. Kipp Jr. (Kipp, 1987), for the United States Geological Survey. The program utilizes Fortran code with finite-difference techniques resulting in a three-dimensional ground water flow simulation with associated heat and solute transport. By utilizing values of existing conditions, the ground water model was run for many days and the output was then compared
to conditions found at the Bonneville terrace with the new hatchery wells.

Products of this study are as follows:

1) Temperature versus time plots for terrace piezometers in the PSA aquifer;

2) Temperature and total pumping rates versus time for PSA wells;

3) Depth versus temperature for each piezometer;

4) Plan view contour maps of temperature distributions and corresponding changes;

5) Cross-sectional view contour maps of temperature distributions and corresponding changes;

6) Plan view contour maps of ground water elevations and changes;

7) Cross-sectional view contour maps of ground water elevations and change

8) Ground water model updated with new fish hatchery wells.