

MEMORANDUM

To: Lew Dodgion, Administrator/Dick Reavis, Bureau Chief

From: John Nelson, Water Permits Branch

Subject: Groundwater Study Requirements

Date: January 28, 1991

In putting together the groundwater study requirements the following steps should be followed:

- 1) Determine which groundwater basins may be subject to possible degradation from septic systems.
 - 1) I have developed a model using the basin groundwater storage and the surface recharge. This model creates a density limit for each basin that would trigger the need for the groundwater study. Based on the model the density limits for each basin are found in attachment 1.
 - 2) Once any portion of groundwater basin has an approved septic system density equal to or greater than the density noted in attachment 1 a groundwater study would be required.
- II) Prior to performing the study the area of the study must be determined by a hydrologist. The area of the study shall be determined using as a minimum the following survey requirements.
 - 1) Locate the area that is proposed for development using septic systems.
 - 2) Determine the area of the aquifer that will be impacted the most by the development of proposed septic system.
 - 3) Determine other source areas that will contribute contaminates to the areas identified above.

The area to be studied shall include the combination of the three areas mentioned above.

III) Evaluate the existing water quality of the area to be studied and characterize the ground-water regime.

- 1) Groundwater samples must be obtained for the shallow aquifers in each area. Also the groundwater elevations shall be reported.
- 2) The groundwater shall be sampled for Nitrates, Chlorides, and Total Dissolved Solids.

IV) A conceptual model shall be developed of the study area.

- 1) The geologic and hydrologic setting of the area must be described. Existing reports such as the U.S.G.S. and Nevada Division of Water Resources should be referenced.
- 2) Data from domestic wells and monitoring wells must be used to update existing information and to determine the present conditions.
- 3) Geologic conditions must be evaluated to determine the influence on vertical and horizontal groundwater movement.
- 4) The Mixing of recharge and septic effluent discharge must be evaluated.

V) Next a numerical model must be developed to simulate the response of an aquifer both hydraulically and chemically to stresses on a set of contiguous blocks. The blocks shall be arranged in rows and columns which comprise the model grid. Each block in the grid shall be no longer than 500 feet by 500 feet. The input data for the model shall have the following parameters and may require additional parameters if necessary.

- 1) Groundwater elevation data:
- 2) Transmissivity and Storage Coefficient:
- 3) Nitrate Concentration in the Groundwater:
- 4) Contribution of existing septic systems:

- VI) The model shall then be run for the following simulations with a minimum time period of 50 years:
- 1) Simulate for approved septic systems which have not been constructed to date.
 - 2) Simulate for proposed development with all previously approved septic systems.
 - 3) In areas where the existing groundwater depth is less than 100 feet from the natural ground surface, perform a groundwater mounding analysis.