

1) Boundary Conditions

On the north side a no-flow boundary was used in the first model. In the second model, however, a general head boundary is used to allow the inflow from the northern mountainside to the aquifer.



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Figure 4.2.9
Locations of Drain and River Cells

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(3) Calibration of 2nd Model

The model was calibrated using the groundwater level records at 10 observation wells and 60 existing wells from February 1998 to November 1999. The calibration was continued until the appropriate spatial distribution of various hydrological parameters was found so that the differences between the simulated and actual groundwater levels can be minimized. The results are shown in Figure 4.2.10 and Figure 4.2.11. The differences between the simulated and observed groundwater levels are less than 2.0 m.

(4) Influence of Groundwater Development Plan

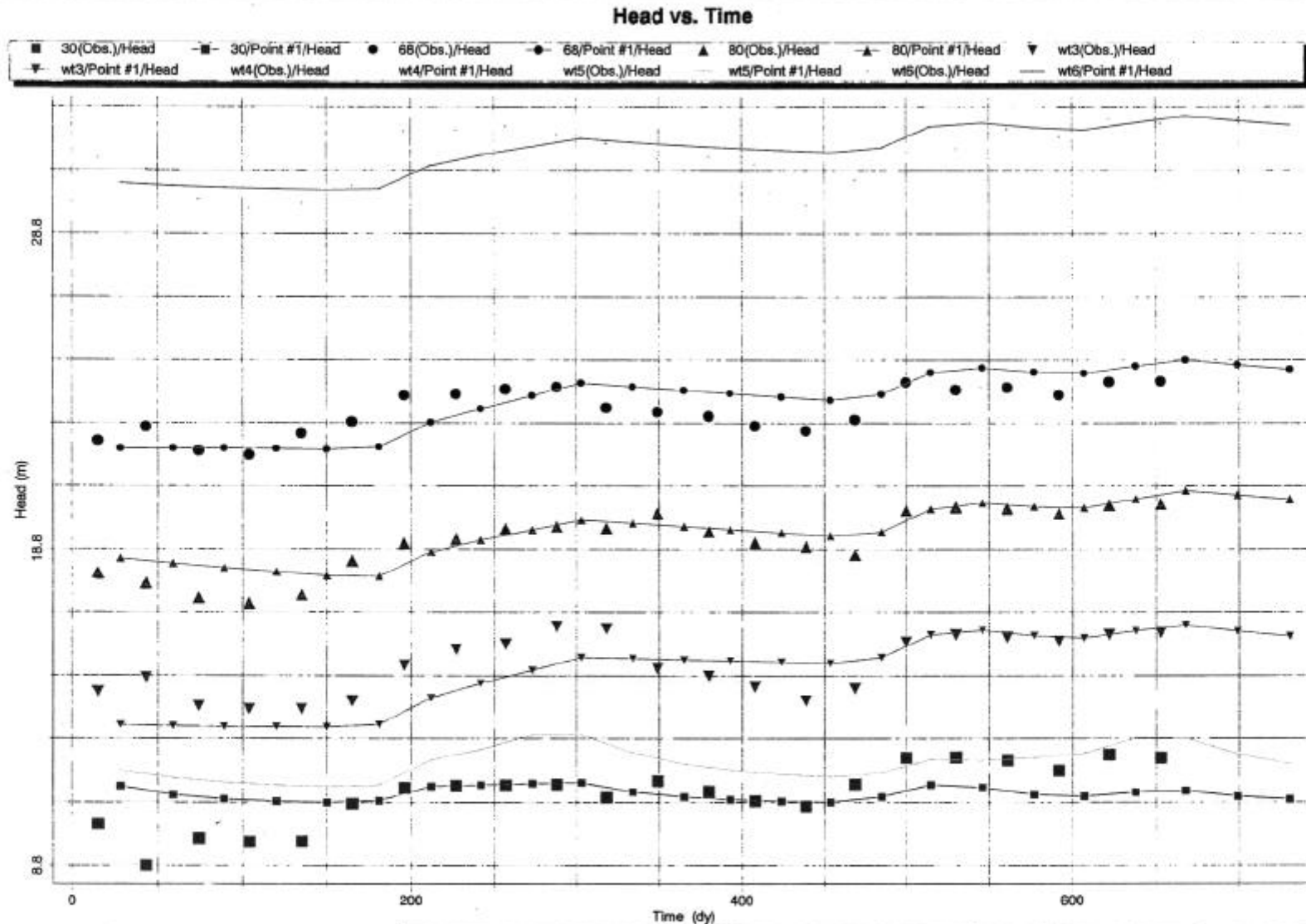
1) Transient Simulation over Five-Year Planning Period

In order to predict the influence by 15 new production wells over the long period, a transient-state simulation was performed for the five-year planning period using the calibrated model. The assumptions are 1) pumping from 15 wells implements and 2) the last 10 years climatic condition continues over the coming five-year period. The initial head values were the heads calculated in a steady-state simulation performed under the present recharge and discharge condition, meaning no groundwater abstraction. The monthly average values of deep percolation, estimated from the rainfall for the last 10 years at Siem Reap airport, were involved in the simulation.

The locations of 15 production wells are shown in Figure 4.2.12. All the pumps are installed in Layer 1 of unconfined aquifer and their pumping rate is 800 m³/day (556 liter/min.) per well totaling 12,000 m³/day.

Location of production wells:	South of West Baray and near Siem Reap airport
Plan of groundwater withdrawal:	800 m ³ /day x15 wells total 12,000 m ³ /day

Because the new production wells are planned with an interval of 400 m, the area around the pumping center is discretized into 10,000 (=100 x 100) finite-difference cells with a size of 100 m so that heads around the 15 new wells can be estimated in detail. Figure 4.2.13 shows the discretization for Layer 1. The same spatial distributions of hydro-geological parameters and recharge used in the models with a cell size of 500 m x 500 m are involved in the model.



February 1998 to November 1999

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Figure 4.2.10
Comparison of Simulated and Observed
Monthly Groundwater Levels



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Figure 4.2.11
Comparison of Simulated and Observed
Groundwater Levels in November 1999