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Reply to comment by Sushil K. Singh on “A concept of maximum stream depletion rate for leaky aquifers in alluvial valleys”

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[1] I thank S. K. Singh [Singh, 2005] for indicating an earlier mentioning of equation (22b) (not (A16)) by Hantush [1955]. This brief paragraph has been virtually unrecognized for the last four decades after Hantush [1964]. My article included an analysis of this solution in a hydrogeologic context, generalization of solution to the bounded aquifers with different recharge-discharge conditions, introduction of the maximal stream depletion (MSDR) concept, and demonstration of ramifications for water resources management.

[2] The MSDR was defined as a fraction of the pumping rate supplied by stream depletion. This rate is achieved after a hydrologic system arrives at a new equilibrium after the start of pumping. In general, the MSDR may range from 0 to 100% [Hantush, 1955, equation (14); Zlotnik, 2004, equations (22), (24), (28), and (31)]. The pumping rate is supplied by other sources in addition to the stream depletion. The MSDR can be assessed only with full consideration of hydrogeological conditions that include the hydrostratigraphy, geometry of recharge and discharge zones, and location of groundwater withdrawals. For example, the MSDR concept can be applied for analyses of the aquifer water budget considering the phreatophyte effects [Bredehoeft, 2002].

[3] The last point by S.K. Singh is concerned with equivalence of Theis [1941] and Glover and Balmer

[1954] solutions. This equivalence was shown by Hantush [1955] by using $1/B = 0$ in his equation (14). In addition, Hunt et al. [2004] have clarified this issue recently.

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