Nitrate study comments

Wangemann, Stephen to: R10YVNitrate 11/27/2012 01:54 PM

From: "Wangemann, Stephen" <Stephen.Wangemann@bia.gov>
To: R10YVNitrate@EPA

Please accept this corrected version of my prior comments, which were sent on 11/5/2012.

While large dairy and livestock operations present a significant potential for groundwater contamination, the current study does not provide the level of scientific proof that I believe is needed to implicate individual operators. The one inch soils samples, for example, are an extremely weak circumstantial link to groundwater contamination, because they do not reflect the nitrate component lost from the root zone by leaching. However, I would agree that by-pass flow via the soil macro-pore system, which was not evaluated, could be a significant contributor. Secondly, the crop contribution from alfalfa was non-existent in the study, but could be a major contributor in the lower valley. I fully support the efforts of the Washington State Department of Ecology and the EPA in undertaking the issue of ground water contamination in the lower valley. Unfortunately I cannot entirely support the inferences derived from this study. I hope EPA continues this effort in the lower valley so that all potential sources of groundwater contamination can be definitively dealt with. As an employee with the Bureau of Indian Affairs, I sincerely appreciate EPA's recognition of an underserved lower valley population deserving of Environmental Justice, relative to this matter.

Please include the following comments in the record for the Relation Between Nitrate is Water Wells and Potential Sources in the Lower Yakima Valley, Washington study.

1. A distinction was made between the 15N-NO3 and 18O-NO3 isotopic composition derived from fertilizer versus animal waste, but symbiotic bio-genically derived 15N-NO 3 and 18O-N03 in alfalfa was not examined.
2. In addition, an alfalfa field producing 8 tons to the acre has an approximate root mass of 1 ton. Given a value of 15% crude protein for the root mass, this would contain approximately 50 pounds of nitrogen.
3. Alfalfa is produced in the lower valley on a large number of acres in support of the dairy industry. It is a known fact that significant quantities of nitrogen can leach below the root zone and into the water table, especially if alfalfa is followed by corn. Many dairy operators try to capture this nitrogen leached below the corn root zone by including either a fall or sometimes a spring triticale planting, which sends down roots considerably deeper than corn. It would be a mistake for any study tasked with "Investigating the Contributing sources of Nitrate", to not consider the contribution of

alfalfa in the mass balance.

4. No matter whether organic or inorganic, the potential to leach nitrogen below the root zone also increases, based on the irrigation system. Corn under furrow irrigation has a much higher leaching potential, especially if surge or cut-back methods of furrow irrigation are not used and on farm water metering is not employed. Neither on farm water metering nor water budgeting are common practices within the Wapato Irrigation Project. Page 17 and & 68 both refer to Nitrate-N soil samples that were collected for analysis. Table 28, on page 70, indicated that the nitrate content at the 1 inch soil depth increment was above the MCL for drinking water. I would assert that the nitrate content in the one inch soil depth increment was an extremely poor parameter to use in relation to drinking water contamination. I would expect the Nitrate value at this depth to be high, especially if nitrogen has been applied based on expected crop needs. It is the percent that leaches below the root zone that is important, with respect to groundwater contamination, as such deeper soil samples (6 foot depth) should have been taken.

5. The study did not include up gradient to down gradient well pairing with a specific source separation. As a result flow paths cannot be demonstrated.

6. Nutrient leaching estimates from Agricultural Waste Lagoons contained a very wide spread in the estimated gallons leached per year. No attempt was made to install nested monitoring wells to verify flow paths or nutrient plumes around agricultural waste lagoons. No mass balance was accomplished for liquid entering or leaving the storage lagoons.

7. The wells were not stratified by depth and no long term trend was established for nitrate contamination even though several studies have been completed in the lower valley over the past 30 years. One such study, completed by the Department of Ecology in 2010, included samples from 453 well sites, that were collected between 1990 through June of 2005. This study also included stratification of the data by well depth.

Steve Wangemann
Soil Scientist, Ph.D.
BIA-Yakama Agency