A review of EPA Report 910-R-12-003

Entitled "Relation Between Nitrate in Water Wells and Potential Sources in the Lower Yakima Valley, Washington"

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This review was conducted at the request of the Washington State Dairy Federation

My comments will be focused on study methodology of the EPA report and based on my field-research experience during the past 8 years. I have conducted collaborative research with the Washington State Dairy Industry (WSDF) and Washington State Department of Ecology (WDOE) Environmental Assessment Division to evaluate the relationship between forage and manure application management, and shallow ground water nitrate concentrations on a commercial dairy. (Nitrate in Groundwater, Soil, and Grass in a Manured Field Overlying the Sumas-Blaine Aquifer)

The EPA study has several design elements that are of concern:

1) Lack of replication of samples (water, manure, soil) overtime

Published research and multi-year studies conducted by WSU in collaboration with WSDF and WSDOE have demonstrated seasonal and yearly variability for the types of samples collected when evaluating the relationship between forage and manure application management, and shallow ground water nitrate concentrations on a commercial dairy.

2) Soil samples collected at 1 inch of depth

When conducting environmental studies (manure storage and application and ground water) it is common to take samples at a depth of 1 ft or multiples of 1 ft depths to determine the concentration of a constituent of interest, particularly when trying to inter-relate the concentration of a constituent and ground water. At best, a shallow (1 inch) soil sample might be appropriate when evaluating the relationship between the constituent and surface water contamination.

3) Relating aged water (16 to 42 years) to: 1) contemporary (2010) analytes in soil, water, and manure, and 2) contemporary dairy management factors

Samples of soil, water, and manure were collected in 2010 and analyzed for specific components. The soil and manure samples were of contemporary time (2010) while the water was aged, 16 to 42 years old. In addition, the report summarized current (2010) management aspects of the farms, for instance animal numbers and acreage used for crop production. It is well known that the dairies have increased in size over the past few decades, but no effort was made to factor this into the calculations. No evidence was cited that would suggest what the transport rate is of the analytes of interest from soil to ground water.

4) Lack of specific data on ground water flow direction

General reference was made in the report of the flow of groundwater in the region of interest. No indication is given if the flow of ground water is affected by seasonal precipitation, snow melt, and irrigation practices. Studies we have conducted in Whatcom County suggest seasonal flow changes during the course of a given year and can impact the recharge of shallow ground water. If changes in the flow of ground water do change throughout the year in the region of interest, then the groundwater could be influenced by multiple sources of nitrogen from different direction.

General Summary Comments

Due to the concerns mentioned above, and the lack of information confirming the integrity of the wells from which water was obtained, the report does not accomplish its goal of providing information on "the contribution from various land uses to the high nitrate levels in groundwater and residential drinking water wells".

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