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U.S. EPA REGION 10
OFFICE OF WATER

November 9, 2012

Thomas Eaton
Director
EPA Region 10, Washington Operations Office
300 Desmond Dr. SE, Suite #102
Lacey, WA 98503

Dear Mr. Eaton:

The Washington State Department of Agriculture (WSDA) wishes to convey its appreciation to the U.S. Environment Protection Agency in allowing us to provide comments to the recently released *Relation Between Nitrate in Water Wells and Potential Sources in the Lower Yakima Valley, Washington, EPA-910-R-12-003*. The report provides further insight into both the historic and current conditions that have resulted in degraded water quality within the aquifer system underlying the Toppenish and Benton Basins.

It is our hope that this document will provide a foundation on which the recently convened Groundwater Management Area (GWMA) Committee can use to address the long standing issues surrounding nitrate contamination of underground drinking water sources. Recognizing the importance this document may have to the GWMA, WSDA would like to offer the following comments and suggestions.

Overall Comments

The purpose of the study was to investigate the contribution from various land uses to the nitrate levels in groundwater and residential drinking water wells within the lower Yakima Valley. We believe that from an overall perspective, this was accomplished. The results of the study appear to have confirmed the findings of earlier studies/samplings that show that approximately 20% of shallow drinking water wells have been impacted by historical and current land uses. The majority of those land uses have been identified in EPA' report to be agriculturally related. Predominately, agricultural land use is separated into two major areas: livestock operations and irrigated farming. These findings will be helpful in the formulation of a Groundwater Management Area Plan currently under development by Yakima County.

WSDA appreciates the effort made by EPA in attempting to define with greater accuracy the historic and current source(s) of nitrogen that has negatively impacted the underground drinking water source. However, after reviewing the report WSDA is concerned that the report under-emphasizes the degree of uncertainty associated with the identification of specific sources. We are also concerned regarding the over emphasis of the data and the identification of potential sources beyond a reasonable area. The majority of our comments are related to these concerns.

Finally, as an overall comment, the report appears to suffer from a redirection of the study purpose sometime after the initial phase. The study appeared to change from a data collection / research emphasis to a data collection effort with regulatory actions in mind. The result is a report that does not truly satisfy either goal.

Uncertainty Regarding Aquifer Identification and Well Construction

Throughout the study, the authors note their inability to identify the depth to which a majority of the sampled wells were either completed or screened. The lack of this information is critical when comparing water quality data from upgradient wells to those located downgradient from a potential pollution source. The authors are careful to use the term "groundwater flow" rather than aquifer flow direction because of the lack of certainty that an upgradient well is located in the same aquifer as those identified as downgradient. This uncertainty can make it extremely difficult to determine the source(s) of any contamination detected in the downgradient well.

The condition of the wells being sampled is always a factor to consider. Private domestic wells are subject to a higher degree of construction "issues" than are those designed and installed as monitoring wells, or even public water supply wells. Issues regarding casing integrity, adequacy of the surface seal, and screen design can all impact the water quality within the well.

The wells used within the "Dairy Cluster" exhibit many of the uncertainties cited above. The authors are careful to note this in Page ES-5, paragraph one. The uncertainties introduced by the lack of knowledge of the wells and well construction could be a reason for the detection of "contaminants" in upgradient wells thought to be originating from dairy only sources. Statements addressing these findings on pages ES-5 thru ES-7 would indicate the need for further investigation and diminish the data value in a regulatory context.

Additionally, the use of the United States Geological Survey's regional groundwater flow model may not be appropriate for use when characterizing the shallow groundwater movements underlying the subject area of the EPA report. This aquifer(s) is very sensitive to irrigation recharge and in the upper regions may not mirror the regional flow directions. This could prove problematic when determining upgradient and downgradient flow directions. A more comprehensive investigation which includes evaluation of known well logs, and well bore analysis of water levels should be conducted before making pronouncements regarding flow in the shallow aquifer(s).

Irrigated Crop Fields

The findings presented by the authors indicate that the irrigated fields (subject in the report) are sources of nitrate, bentazon, and monensin detected in downgradient wells used for monitoring purposes based on detections within soil samples collected in those fields. The quote is, "*This finding suggests that bentazon and monensin detected in the crop field soil are likely migrating to groundwater and nearby water wells. Possible manure application to the hop field could account for the monensin detected in the downgradient residential well.*"

While the "findings" suggest a source, it does not identify a source. The findings also may open the possibility of other sources different from the mint fields from which samples SO-11 and SO-12 were taken. This is a point that the authors fail to mention and a technique that is used several times in various places in the report. Without the benefit of data from an upgradient well, it is impossible to say if the subject fields are "likely the source". The source very well could be another land use activity somewhere upgradient, other fields upgradient, or leakage from unlined irrigation laterals that may transport contaminants from other locations. The point is that there is sufficient uncertainly (caused by lack of upgradient well data) to identify a "likely" source of the detected contaminants.

Nitrate Estimate

WSDA is concerned that the applied nitrogen value cited on page 12 of the report, fails to represent best available data and may therefore not represent the true current conditions. It is important that when attempting to identify (and therefore quantify) total nitrogen loading for the purposes of characterizing basin conditions that best available data be used. WSDA supplied EPA with its GIS layer that represents the current condition of cropping in the Valley down to the field level. It does not appear that this data was used in the nitrogen loading calculation. WSDA collects this data every two years. Additionally, the irrigation methods used on those fields are included in the WSDA data set, making an irrigation estimate possible. WSDA is concerned that when provided with this far more recent and detailed information (for which the QA/QC plan for collection has been approved by EPA-HQ), EPA Region 10 chose not to use it.

WSDA, has concerns regarding the accuracy of the conclusions presented in section 4, page 13.

Waste Management

WSDA has reviewed the results of EPA estimates of liner leakage contained on pages 33 and 34 and find them to be excessive. The authors fail to specify the head within their lagoon scenario. Additionally, the soil permeably that is assumed appears to be that characterized for the surface soils, which in most cases varies downward at the 60" levels. These two parameters, when considered, yield drastically different leakage rates than those estimated by EPA. Due to the biochemical process underlying most liners, what leakage does exist generally does not contain significant amounts of nitrate. In most cases, there is a much greater potential for nitrate loss to the underlying aquifer through over-application at the surface followed by excessive irrigation.

Data Interpretation and Source Identification

Throughout the report conclusions are made regarding the identification of sources for many of the contaminants identified in shallow drinking water wells. It must be emphasized that the sampling conducted by EPA in this phase of the investigation was only conducted once. As such the results should

be viewed as a snapshot and a possible precursor to subsequent investigations. In the case of the identified dairy and irrigated agriculture source(s), one sampling is not adequate to provide a statistically significant increase over background for any particular contaminant. It should be noted that in both EPA and Department of Ecology site investigation and groundwater guidance, a statistically significant increase of a contaminant in downgradient well(s) over that observed in upgradient well(s) is necessary to establish a cause and effect relationship for regulatory purposes. The EPA data does not support this type of conclusion.

Conclusion

The EPA report *Relation Between Nitrate in Water Wells and Potential Sources in the Lower Yakima Valley, Washington, EPA-910-R-12-003,* provides further verification of earlier findings regarding the status of shallow groundwater in the Yakima Valley. Additionally, the report substantiates earlier theories regarding the overall potential sources of nitrate in the Valley groundwater. The report is limited in its ability to identify specific sources of nitrate. It is effective in identifying areas within the Valley where hydrogeologic and land use conditions interact to more adversely impact groundwater quality.

The report raises many questions that should provide the Groundwater Management Area Committee a technical starting point. The degree of uncertainties raised in the report is limiting as to its use for regulatory purposes. Questions regarding sources and the degree to which these sources may or may not be contributing to groundwater contamination, should be addressed thru further investigation and refinement of estimates presented in the report.

Sincerely,

Kirk V. Cook, LG, LHG
Washington Department of Agriculture
Agency Hydrogeologist
Natural Resource Assessment Section