

Title: Grade A Dairy Farm Well Water Quality Survey (Study No. 52)

Investigators: Principal Investigator

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Period of Contract: September 2, 1988 through June 30, 1989

Objectives: To estimate the proportion of wells on Wisconsin Grade A dairy farms that contain detectable levels of the most commonly used pesticides and nitrate-nitrogen (NO₃-N), and relative contributions of pesticide application according to label and use contrary to label to detections in groundwater.

Background/Need: This study follows the establishment of the health-based groundwater standards for atrazine and alachlor by the Wisconsin Department of Natural Resources (DNR) in 1988.

Methods: Samples were taken from 534 wells, randomly selected and collected over a six-month period. Pesticide concentrations were determined by the DATCP Bureau of Laboratory Services using the Neutral Extractable Method of the State Laboratory of Hygiene Organics Section. Each detection above an enforcement standard (ES) of 3.5 micrograms per liter (ug/l) was confirmed by resampling and splitting between DATCP and the State Laboratory of Hygiene. For each well found to contain a confirmed exceedance of an ES, a milk sample was collected and a preliminary investigation conducted at the farm to determine sources of contamination. All samples were collected between August of 1988 and February of 1989. Nitrate-nitrogen was determined by the State Laboratory of Hygiene.

Results: 71 out of 534 (13%) of the wells sampled contained detectable levels of one or more pesticides. Atrazine was discovered in 12% of the Grade A wells; 7% of the wells tested had atrazine above the Preventive Action Limit (PAL) of 0.35 ug/l. Alachlor was found in 1% of the wells, all at levels above the ES of 0.5 ug/l. NO₃-N was detected in 65% of the wells; 48% were above the PAL of 2 mg/l and 10% had levels above the ES of 10 mg/l. Follow up investigations revealed only one illegal disposal method where significant concentrations of atrazine were detected in soil samples. Well examinations did not reveal negligent construction factors accountable for pesticide detections.

Conclusions: Investigators concluded that atrazine was detected in the highest concentrations and most frequently of all the pesticides. The South Central Agricultural Statistics District showed the highest percentage of atrazine detection (29%) followed by the Southwest District (17%), which is consistent with atrazine use. The difference in frequency of pesticide

detection may partially reflect variations in geological materials. The South Central District include areas of soils that are shallow to bedrock or formed in loess overlying stratified sand and gravel which permit excessive leaching, whereas the soils of the East Central District are generally formed in medium and heavy textured glacial tills, resulting in a resistance to leaching.

Based on statistical analysis of the data, between 10% and 16% of wells on Wisconsin Grade A dairy farms are estimated to contain detectable levels of the most commonly used pesticides. The proportion of wells containing atrazine in concentrations above the PAL of is estimated between 5% and 9%. The ES for atrazine was exceeded in 3 of the 66 well detections (4.5%), whereas alachlor surpassed the ES in all 5 of the well detections. An estimated 7% to 13% of the wells on Grade A dairy farms in Wisconsin exceed the ES for nitrates.

**Recommendations/
Implications:**

Investigators feel further research is necessary to identify factors contributing to the difference in levels of detection of pesticides in wells throughout the state.

Availability of Report:

A copy of this report can be obtained from:

Wisconsin Department of Agriculture, Trade and Consumer Protection
Agricultural Resource Management Division
P.O. Box 8911
Madison, WI 53708
(608) 266-0157

This report is available for viewing and loan at:

The Water Resources Center
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Alachlor, atrazine, dairy farm, nitrate-nitrogen, pesticides

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