

Summary: Michigan Department of Agriculture Groundwater Monitoring Program Ag Expo 2007

The Michigan Department of Agriculture (MDA) and the Michigan Groundwater Stewardship Program sponsored a domestic well water sample screening at the 2007 Michigan State University Agricultural Exposition (Ag Expo). MDA laboratory staff screened 1,798 samples for atrazine, nitrate, and nitrite. This was an increase of nearly 200 samples over Ag Expo 2006. Participants were asked to fill out a short questionnaire about well characteristics and land use.

Samples were tested for the presence of the triazine herbicide *atrazine* using ELISA (enzyme-linked immunosorbent assay) methods. The ELISA kits used also react in varying degrees to other triazines, including simazine and prometon, and some of their breakdown products.

Samples were screened for nitrate and nitrite using a simple strip test. Test strips were dipped in samples, and color development on the strip was compared to standards and color charts to estimate nitrate and nitrite concentrations. Results letters were mailed to all participants. Recommendations for further action were included in the letters to participants with triazine detections, or with elevated nitrate or nitrite detections. Free resamples were offered to all participants with a triazine detection.

Atrazine: Results showed 15 samples tested positive for atrazine or other triazines. Of those, 3 tested positive at trace levels, between 0.07 and 0.09 ppb (parts-per-billion). One part-per-billion is equal to one µg/L (microgram-per-liter). Samples from 11 wells had triazine levels between 0.1 and 0.6 ppb. The highest concentration detected during the 2007 screening was 4 ppb, found in one sample. A Maximum Contaminant Level (MCL) is the highest level of a contaminant that is allowed in a public water supply. MCLs are enforceable standards for public water supplies. The MCL for atrazine in drinking water is 3 ppb.

Nitrite (NO₂): Only 7 wells tested positive for nitrite, at a detection limit of 0.15 ppm (parts-per-million) nitrite-N. One part-per-million equals one mg/L (milligram-per-liter). Four wells had a level of 0.15 ppm. Two other wells had a level of 0.3 ppm, still below the nitrite MCL of 1 ppm nitrite-N. One well, however, had a nitrite concentration estimated at 1 ppm nitrite-N. The three highest levels of nitrite were all from wells with elevated concentrations of nitrate (above 5 ppm nitrate-N), as were two of the low-level nitrite detections.

Nitrate (NO₃): Nitrate results are summarized in the table below. The nitrate MCL is 10 ppm nitrate-as-nitrogen (nitrate-N). This means 61 samples, or 3.4 % of the samples submitted, were above the nitrate MCL. Nitrate-N levels of 2 ppm or less can occur naturally. Nitrate-N levels above 2 ppm usually mean human activities have affected water quality.

Table 1. Nitrate results for the Ag Expo 2007 MDA domestic well screening.

Ag Expo 2007 Well Screening Results for Nitrate						
	Nitrate-N Levels in ppm (parts-per-million, equivalent to mg/L)					Total Samples
	≤ 2	≥2 and <5	≥5 and <10	≥10 and ≤20	>20	
Total and Percent of Total by Nitrate-N Level	1560 86.8%	32 1.8%	145 8.1%	59 3.3%	2 0.1%	1798 100%

Nitrate levels above the MCL of 10 ppm in drinking water are not usually a concern for healthy people, but infants under 6 months of age, some elderly, and pregnant women can be at risk for certain problems. Anyone drinking water with nitrate-N levels of 10 ppm or higher should talk with health care professionals such as a doctor or local health department staff.