



**NITRATE**

**Background**  
 Unlike most other minerals in groundwater, nitrate is not dissolved primarily from the minerals in geological deposits. Nitrate is leached downward into groundwater from sources, such as: a) surplus nitrogen fixed to soil by plants, such as alfalfa and legumes; b) animal wastes; c) fertilizers; d) sewage effluent from lagoons, septic fields, septic tanks, effluent irrigation; e) industrial waste chemicals. Elevated nitrate concentrations can occur from either direct discharge of contaminated surface water around a well or by natural infiltration by "contaminated" water into an aquifer.

The Canadian Drinking Water Guidelines recommend nitrate concentrations of less than 45 mg/L. Concentrations higher than this are undesirable, since they may have a toxic effect on infants or young children. High nitrate concentrations can also be dangerous to people with low stomach acid levels. Cattle can be affected by concentrations of nitrate that exceed 100 mg/L. A high nitrate level should also be considered as a warning that harmful (pathogenic) bacteria may be present and testing should be carried out to assess this possibility.

Nitrate can only be removed by demineralization or distillation processes.

**Current Situation**  
 For the Grimshaw Aquifer, over 300 tests for nitrate have been carried out. Over 80% of all tests measured less than 5 mg/L. The average nitrate concentration is about 0.6 mg/L. In general, elevated nitrate levels appear to coincide with areas of reduced clay cover. Reported incidences of nitrate concentrations are shown on the adjacent figure, which includes all historical nitrate levels. However, more recent tests from the same well may indicate lower levels. This figure includes tests taken both on and off the Grimshaw Gravels Aquifer. Samples of higher nitrate concentration, as identified in the 1995 farmstead well water quality survey, are identified with a '(1995)' subscript.

**Management Considerations**  
 Sites with elevated nitrate levels represent areas that are more sensitive to groundwater contamination. In these areas, an increased level of care is required to ensure contamination does not occur. These areas should be regularly monitored to determine if nitrate levels are above the acceptable standard, and whether they are increasing or decreasing.

Source of Data: Alberta Environmental Protection Groundwater Information Centre Chemistry data file (to March, 1996).

		<b>GRIMSHAW GRAVELS AQUIFER</b>	
		<b>WATER QUALITY MAP: NITRATE CONCENTRATION</b>	
Scale AS SHOWN	Date JULY, 1996	PFRA No.	FIGURE B9