

This document provides guidance to address agricultural and bulk distribution-related sites that include the use, manufacture, transportation, and/or distribution of chemicals or other processes resulting in nitrogen contamination. For the purposes of this guidance “nitrogen” includes nitrate (measured as total nitrogen) and total Kjeldahl nitrogen (nitrogen + ammonia) (TKN). This guidance can also be used for sites outside the agricultural industry at the discretion of the regulatory program.

This document provides guidelines for the delineation of groundwater, surface water, and soil contamination related to nitrogen. **Under all circumstances**, cleanup levels and decisions are made on a **site by site basis** and take into consideration the nature of the release and site-specific characteristics including the following factors:

1. The location of the site in relation to human health risk.
2. The level of contamination on site.
3. The presence and proximity of municipal utilities including all drinking water receptors.
4. The hydrogeology of the site and groundwater use.
5. The soil characteristics on site.
6. The site history and potential future use.

**Groundwater**

Cleanup action levels for nitrogen contaminated groundwater are determined on a site-by-site basis in accordance with criteria established by the North Dakota Department of Environmental Quality (NDDEQ). Delineation of nitrogen contaminated groundwater uses the following guidance levels:

Parameter	Guidance Level
Nitrate (measured as Nitrogen)*	10 mg/L (milligrams per liter) or ppm (parts per million)
Total Kjeldahl Nitrogen (TKN)	10 mg/L (milligrams per liter) or ppm (parts per million)

\*Based on the National Primary Drinking Water Standards established by the EPA

**Surface Water**

Surface water limits are guidance only from Standards of Quality for Waters of the State.

Parameter	Guidance Level
Nitrate as N <sup>2</sup> *	1.0 mg/L (milligrams per liter) or ppm (parts per million)**

\*Table 1: Maximum limits for substances in or characteristics of Classes I, IA, II, and III streams

NDCC Chapter 33.1-16-02.1 Standards of Quality for Waters of the State

\*\*The standard for nitrates (N) is intended as benchmark concentration when stream or lake specific data is insufficient to determine the concentration that will cause excessive plant growth (eutrophication). However, in no case shall the concentration for nitrate plus nitrite N exceed 10 mg/l for any waters used as a municipal or domestic drinking water supply.

**Soil**

Cleanup action levels for nitrogen contaminated soil are determined on a site-by-site basis in accordance with criteria established by the North Dakota Department of Environmental Quality (NDDEQ). Delineation of nitrogen contaminated soil uses the following guidance levels:

Parameter	Guidance Level
Nitrate (measured as Nitrogen)*	500 mg/kg (milligrams per kilogram)
Total Kjeldahl Nitrogen (TKN)*	500 mg/kg (milligrams per kilogram)

\*Criteria established by the North Dakota Department of Environmental Quality as protective screening levels for human health and the environment.

**Investigation**

Once contamination has been documented, an investigation of contamination should be completed. The investigation must adequately determine the lateral and vertical extent of contamination in the soil and groundwater through soil borings and/or installation of groundwater monitoring wells or other techniques as approved by the NDDEQ. Once the extent of contamination has been determined, a proposal for remediation may be required. A remediation plan, if required, shall be submitted for review and approval by the NDDEQ prior to any action taken. All contamination levels must be established using laboratory analytical methods.

**Guidance Statement**

The purpose of this document is to institute guidance for the investigation and cleanup of nitrogen contamination. The document sets screening levels that are protective of human health and the environment. The document is intended to protect North Dakota’s groundwater resources for future use and prevent future groundwater problems through cleanup of contaminated soil.

**Regulatory Agency**

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