CHAPTER 33.1-20-13
WATER PROTECTION PROVISIONS

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33.1-20-13-01. Site characterization.

The department shall require adequate site characterization to ensure that the waters of the state are not or will not be adversely impacted by the solid waste management facility. At a minimum, the site characterization must address the following:

1. Location and water quality of lakes, rivers, streams, springs, or wetlands within one mile [1.61 kilometers] of the site boundary based on available data;

2. Domestic and livestock wells within one mile [1.61 kilometers] of the site boundary. Information collected should include the location, water quality, depth to water, well depth, screened intervals, yields, and the aquifers tapped;

3. Site location in relation to the one hundred-year floodplain;

4. Depth to the thicknesses of the uppermost aquifers;

5. Hydrologic properties of the uppermost aquifers beneath the proposed facility, including existing water quality, flow directions, flow rates, porosity, coefficient of storage, hydraulic conductivity, and potentiometric surface or water table; and

6. An evaluation of the potential for impacts to surface and ground water quality from the proposed facility.

History: Effective January 1, 2019.
General Authority: NDCC 23.1-08-03; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-08-03, 23.1-08-13; S.L. 2017, ch. 199, § 23

33.1-20-13-02. Ground water quality monitoring.

1. An owner or operator of a resource recovery unit, a land treatment unit, a surface impoundment, or a landfill, except an inert waste landfill, must incorporate a ground water monitoring system into the design of the facility. An owner or operator of a CCR unit that is subject to the provisions of chapter 33.1-20-08 is exempt from the requirements of this section. If the owner or operator demonstrates to the department that there is no potential for migration of solid waste constituents to the uppermost aquifer during the life of the solid waste management unit and the postclosure period, the department may suspend this requirement. The demonstration must be based upon factors such as the site characterization, the solid waste characteristics and constituents, the potential capacity of the unit or facility, and the physical, chemical, and biological processes affecting contaminant fate and transport.

2. Ground water monitoring systems must be designed to effectively detect the migration of contamination. At a minimum, a water quality monitoring system shall:

   a. Include one ground water monitoring well located upgradient of the solid waste management unit, and at least two wells located downgradient of the unit. The monitoring wells should be installed at appropriate locations and depths to yield ground water from

the uppermost aquifer and all hydraulically connected aquifers below the solid waste management units on the facility;

b. Represent the elevation of ground water in each well immediately prior to purging so that the owner or operator may determine the rate and direction of ground water flow each time ground water is sampled;

c. Represent the quality of ground water that has not been affected by spills or leakage from solid waste management units;

d. Represent the quality of ground water to ensure detection of contamination passing the compliance boundary;

e. Ground water samples at municipal waste landfills must not be filtered prior to analysis; and

f. The frequency and number of samples collected must be consistent with statistical procedures for evaluating ground water data. A minimum of four independent samples from each well must be collected for analysis during the first sampling event for establishing background data at upgradient (subdivision c) and downgradient (subdivision d) wells, unless four or more sampling events occur prior to acceptance of solid waste by the facility. The monitoring frequency must be semiannual during the active life of the facility and during the postclosure period. The department may specify an alternate frequency for sampling based upon such factors as site hydrogeological characteristics, solid waste characteristics, evidence of a spill or leakage, or resource value of the aquifer.

3. Additional wells may be required in complicated hydrogeological settings or to define the extent of contamination detected.

4. A written ground water monitoring plan must be developed for approval by the department and implemented as part of the permitting process. The plan must include:

   a. Number and location of wells;

   b. Procedures for decontamination of drilling and sampling equipment;

   c. Procedures for sample collection;

   d. Sample analytical procedures;

   e. Chain of custody control;

   f. Parameters for analysis;

   g. Quality assurance or quality control procedures;

   h. A monitoring schedule;

   i. Data statistical methods and analysis procedures; and

   j. Reporting of a statistically significant increase over a background value or of an exceedance of a maximum concentration limit or a water quality standard.

5. Ground water monitoring data obtained under this section must be analyzed within a reasonable period of time after completing sampling and laboratory analysis to determine whether or not a statistically significant increase over background values or an exceedance of

a maximum concentration limit or water quality standard has occurred for each parameter required in the monitoring plan or permit. Statistical methods must, as appropriate:

a. Be appropriate for the distribution of the data and, if inappropriate for a normal theory test, be transformed or a distribution-free theory test must be used.

b. Control or correct for seasonal and spatial variability in the data.

c. Account for data below the limit of detection that can be reliably achieved by routine laboratory techniques, using the limit as the lowest concentration level for a chemical parameter which is below detection.

d. Be protective of human health and environmental resources.

History: Effective January 1, 2019; amended effective July 1, 2020.
General Authority: NDCC 23.1-08-03, 23.1-11-05, 23.1-11-11, 61-28-04, 61-28-05; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-08-03, 23.1-11-05, 23.1-11-06, 23.1-11-08, 23.1-11-11, 61-28-04; S.L. 2017, ch. 199, §§ 23, 26

33.1-20-13-03. Water quality standards.

1. All solid waste management systems, operations, units, and facilities must be designed, constructed, operated, maintained, closed, and maintained after closure so as to be in compliance with North Dakota Century Code chapter 61-28, and water quality standards defined in articles 33.1-16 and 33.1-17. Compliance with these standards is enforceable at the compliance boundary of the facility.

2. Whenever ground water monitoring is required, the department must specify in the facility permit the specific elements of ground water monitoring, including indicator parameters which are constituents in or derived from solid waste, the maximum concentration limits in ground water for each parameter not otherwise defined by subsection 1, and the compliance boundary, considering:

   a. The physical and chemical characteristics of the waste, including the potential for migration in surface water, in the unsaturated zone beneath the facility, and in ground water;

   b. The hydrogeological characteristics of the site and the surrounding land;

   c. The existing quality and quantity of ground water, other possible sources of contamination, and the direction of ground water flow;

   d. The detectability of the indicator parameters or constituents in surface water or in ground water; or

   e. The proximity of the facility to surface waters; and

   f. Appropriate parameters from the list in table 1.

3. The compliance boundary shall be located on land owned by the owner of the facility and no more than five hundred feet [152.4 meters] from a landfill or landfill disposal cell.

TABLE 1 List of Parameters for Assessing Ground Water Quality

a. Parameters measured in the field:

(1) Appearance (including color, foaming, and odor)
(2) pH[1]
(3) Specific conductance[2]
(4) Temperature
(5) Water elevation[3]

b. General geochemical parameters:

(1) Ammonia nitrogen
(2) Total hardness
(3) Iron
(4) Calcium
(5) Magnesium
(6) Manganese
(7) Potassium
(8) Total alkalinity
(9) Bicarbonate
(10) Carbonate
(11) Chloride
(12) Fluoride
(13) Nitrate + Nitrite, as N
(14) Total phosphorus
(15) Sulfate
(16) Sodium
(17) Total dissolved solids (TDS)
(18) Total suspended solids (TSS)
(19) Cation/anion balance

c. Heavy metals:

Group A:
(1) Arsenic
(2) Barium
(3) Cadmium
(4) Chromium
(5) Lead
(6) Mercury
(7) Selenium
(8) Silver

Group B:
(9) Antimony
(10) Beryllium
(11) Cobalt
(12) Copper
(13) Nickel
(14) Thallium
(15) Vanadium
(16) Zinc

d. Total organic carbon (TOC)

e. Chemical oxygen demand (COD)

f. Naturally occurring radionuclides:

(1) Radon
(2) Radium
(3) Uranium

g. Volatile organic compounds, both halogenated and nonhalogenated:

Halogenated:
Acrylonitrile
Allyl chloride
Bromochloromethane
Bromodichloromethane
Bromoform
Bromomethane
1,1-Dichloroethylene
1,2-Dichloropropane
cis-1,3-Dichloropropene
cis-1,2-Dichloroethylene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene

Carbon disulfide
Carbon tetrachloride
Chlorobenzene
(monochlorobenzene)
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
Dibromomethane
1,2-Dibromo-3-chloropropane
1,2-Dibromoethane
Dichloroacetonitrile
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Dichlorodifluoromethane
1,1-Dichloroethane
1,2-Dichloroethane
trans-1,4-Dichloro-2-butene
Dichlorofluoromethane
Dichloromethane (methylene chloride)
1,3-Dichloropropene
2,3-Dichloro-1-propene
Pentachloroethane
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Trichlorofluoromethane
1,2,3-Trichloropropane
1,1,2-Trichlorotrifluoroethane
Vinyl acetate
Vinyl chloride

Nonhalogenated:

Acetone
Benzene
Cumene
Ethylbenzene
Ethyl ether
Methyl butyl ketone
Methyl ethyl ketone
Methyl iodide
Methyl isobutyl ketone
Pyrene
Styrene
Tetrahydrofuran
Toluene
m-Xylene
o-Xylene
p-Xylene

h. Pesticides:

Aldrin
Chlordane
Chloroform
4,4 DDT
Dibenzofuran
Dieldrin
Dimethoate
Endosulfan
Endrin
Heptachlor
Lindane
Methyl bromide
Methyl methacrylate
Methylene bromide
Naphthalene
Parathion

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[1] Two measurements: in field, and immediately upon sample's arrival in laboratory.
[2] As measured in field.
[3] As measured to the nearest 0.01 foot in field before pumping or bailing.

History: Effective January 1, 2019; amended effective July 1, 2020.
General Authority: NDCC 23.1-08-03, 23.1-11-05, 23.1-11-11, 61-28-04, 61-28-05; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-08-03, 23.1-11-05, 23.1-11-06, 23.1-11-08, 23.1-11-11, 61-28-04; S.L. 2017, ch. 199, §§ 23, 26

33.1-20-13-04. Monitoring well construction.

1. All monitoring wells must be cased in a manner that maintains the integrity of the monitoring well bore hole. This casing must allow collection of representative ground water samples.

Wells must be constructed in such a manner as to prevent contamination of the samples, the sampled strata, and between aquifers and water bearing strata.

2. All soil borings or ground water monitoring wells must be completed by a driller licensed in North Dakota and must meet design and construction requirements as stipulated in North Dakota Century Code chapter 43-35 and article 33.1-18.

History: Effective January 1, 2019.
General Authority: NDCC 23.1-08-03, 43-35-19, 43-35-19.1, 43-35-19.2; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-08-03, 43-35-19, 43-35-19.1, 43-35-19.2; S.L. 2017, ch. 199, §§ 23, 45, 46, 47

33.1-20-13-05. Assessment monitoring, remedial measures, and corrective action.

1. Within ninety days of finding that a parameter has been detected at a statistically significant level exceeding the ground water standards established under sections 33.1-20-13-02 and 33.1-20-13-03, the owner or operator shall initiate an assessment of remedial measures. An owner or operator of a CCR unit that is subject to the provisions of chapter 33.1-20-08 is exempt from the requirements of this section. The assessment must:

   a. Be completed within a reasonable time period, unless otherwise specified by permit or the department;

   b. Include an evaluation of the nature and extent of the release of the constituents including pathways to human and environmental receptors;

   c. For municipal landfills, include ground water sampling and analysis for all parameters listed in appendix 1 of this chapter. The department may delete any of the appendix 1 parameters if it can be shown that the removed constituents are not reasonably expected to be in or derived from the waste within the leaking facility;

   d. Include an analysis of the effectiveness of potential remedial measures in meeting all requirements of subsection 2 and include the following:

      (1) The performance, reliability, ease of implementation, and potential impacts of each potential remedial measure;

      (2) The time required to begin and complete each potential remedial measure;

      (3) The costs of implementation of each potential remedial measure; and

      (4) The permit requirements or other environmental or public health requirements that may substantially affect implementation of each potential remedial measure; and

   e. When requested by the department, the owner or operator must discuss results of the assessment of remedial measures, prior to selection of a corrective action remedy, in a public meeting with interested and affected persons.

2. Based on the results of the assessment of remedial measures conducted under subsection 1, the owner or operator must select a corrective action remedy within thirty days which, at minimum, meets the following standards:

   a. Is protective of human health and environmental resources;

   b. Attains the ground water protection standards under sections 33.1-20-13-02 and 33.1-20-13-03;

c. Controls the sources of release so as to reduce or eliminate, to the maximum extent practicable, further releases of constituents that may pose a threat to human health or environmental resources; and

d. Complies with this article and other applicable environmental statutes and rules.

3. When selecting a corrective action remedy under subsection 2, the owner or operator shall consider these factors:

a. The short-term and long-term effectiveness of the potential remedial measure considering:

(1) Magnitude of reducing exposure to constituents;

(2) Likelihood of further releases;

(3) Practical capability of technologies; and

(4) Time until the standards are achieved.

b. The ease or difficulty of implementing the potential remedial measure considering:

(1) Availability of equipment and specialists;

(2) Long-term management needs such as monitoring, operation, and maintenance; and

(3) Need to coordinate with and obtain necessary approvals or permits from other agencies.

c. The need for interim measures to control the sources of the release and to protect human health and environmental resources.

d. The schedules for initiating, conducting, and completing the potential remedial measure.

e. Practical capability of the owner or operator.

4. The owner or operator shall provide the department with a document fully describing the remedial measures assessment under subsection 1 and the selected corrective action remedy under subsections 2 and 3.

5. Upon selection of the corrective action remedy under subsection 2 and with the concurrence of the department, the owner or operator shall establish and implement the remedy.

a. During implementation, the owner or operator shall monitor the effectiveness of the remedy.

b. Implementation shall be considered complete when all actions and standards required to complete the remedy have been satisfied and approved by the department.

c. Upon completion of a corrective action remedy, the owner or operator shall place in the operating record a certification that the corrective action remedy has been completed. Within fourteen days of completion of the certification, the owner or operator shall notify the department that the certification has been placed in the operating record.

History: Effective January 1, 2019; amended effective July 1, 2020.
General Authority: NDCC 23.1-08-03, 23.1-11-11, 61-28-04, 61-28-05; S.L. 2017, ch. 199, § 1
Law Implemented: NDCC 23.1-08-03, 23.1-11-02, 23.1-11-06, 23.1-11-08, 61-28-04; S.L. 2017, ch. 199, §§ 23, 26

Acenaphthene
Acenaphtylene
Acetone
Acetonitrile; Methyl cyanide
Acetophenone
2-Acetylaminofluorene; 2-AAF
Acrolein
Acrylonitrile
Aldrin
Allyl chloride
4-Aminobiphenyl
Anthracene
Antimony
Arsenic
Barium
Benzene
Benzo[a]anthracene; Benzanthracene
Benzo[b]fluoranthene
Benzo[k]fluoranthene
Benzo[ghi]perylene
Benzo[a]pyrene
Benzyl alcohol
Beryllium
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC;Lindane
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl)ether; Dichloroethyl ether
Bis-(2-chloro-1-methylethyl) ether;
2,2'-Dichlorodiisopropyl ether; DCIP
Bis-(2-ethylhexyl) phthalate
Bromochloromethane; Chlorobromomethane
Bromodichloromethane; Dibromochloromethane
Bromoform; Tribromomethane
4-Bromophenyl phenyl ether
Butyl benzyl phthalate; Benzyl butyl phthalate
Cadmium
Carbon disulfide
Carbon tetrachloride
Chlordane
p-Chloroaniline
Chlorobenzene
Chlorobenzilate
p-Chloro-m-cresol; 4-Chloro-3-methylphenol
Chloroethane; Ethyl chloride
Chloroform; Trichloromethane
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chloroprene
Chromium
Chrysene
Cobalt
Copper
m-Cresol; 3-methylphenol
o-Cresol; 2-Methylphenol
p-Cresol; 4-Methylphenol
Cyanide
2,4-D; 2,4-Dichlorophenoxyacetic acid
4,4'-DDD
4,4'-DDE
4,4'-DDT
Diallate
Dibenz[a,h]anthracene
Dibenzofuran
Dibromochloromethane; Chlorodibromomethane
1,2-Dibromo-3-chloropropane; DBCP
1,2-Dibromoethane; Ethylene dibromide; EDB
Di-n-butyl phthalate
o-Dichlorobenzene; 1,2-Dichlorobenzene
m-Dichlorobenzene; 1,3-Dichlorobenzene
p-Dichlorobenzene; 1,4-Dichlorobenzene
3,3'-Dichlorobenzidine
trans-1,4-Dichloro-2-butene
Dichlorodifluoromethane; CFC 12
1,1-Dichloroethane; Ethyldidene chloride
1,2-Dichloroethane; Ethylene dichloride
1,1-Dichloroethylene; 1,1-Dichloroethene
Vinylidene chloride cis-1,2-Dichloroethylene;
cis-1,2-Dichloroethene
trans-1,2-Dichloroethylene;
trans-1,2-Dichloroethene
2,4-Dichlorophenol
2,6-Dichlorophenol
1,2-Dichloropropane; Propylene dichloride
1,3-Dichloropropane; Trimethylene dichloride
2,2-Dichloropropane; Isopropylidene chloride
1,1-Dichloropropene
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Dieldrin
Diethyl phthalate
O,O-Diethyl O-2-pyrazinyl
phosphorothioate; Thionazin
Dimethoate
p-(Dimethylamino)azobenzene
7,12-Dimethylbenz[a]anthracene
3,3'-Dimethylbenzidine
2,4-Dimethylphenol; m-Xylenol
Dimethyl phthalate
m-Dinitrobenzene
4,6-Dinitro-o-cresol 4,6-Dinitro-2 methylphenol
2,4-Dinitrophenol

2,4-Dinitrotoluene
2,6-Dinitrotoluene
Dinoseb; DNBP; 2-sec-Butyl-4,6-dinitrophenol
Di-n-octyl phthalate
Diphenylamine
Disulfoton
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Ethylbenzene
Ethyl methacrylate
Ethyl methanesulfonate
Famphur
Fluoranthene
Fluorene
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachloropropene
2-Hexanone; Methyl butyl ketone
Indeno(1,2,3-cd)pyrene
Isobutyl alcohol
Isodrin
Isophorone
Isosafrole
Kepone
Lead
Mercury
Methacrylonitrile
Methapyrilene
Methoxychlor
Methyl bromide; Bromomethane
Methyl chloride; Chloromethane
3-Methylcholanthrene
Methyl ethyl ketone; MEK; 2-Butanone
Methyl iodide; Iodomethane
Methyl methacrylate
Methyl methanesulfonate
2-Methylnaphthalene
Methyl parathion; Parathion methyl
4-Methyl-2-pentanone; Methyl isobutyl ketone
Methylene bromide; Dibromomethane
Methylene chloride; Dichloromethane
Naphthalene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
Nickel
o-Nitroaniline; 2-Nitroaniline
m-Nitroaniline; 3-Nitroanile
p-nitroaniline; 4-Nitroaniline
Nitrobenzene
o-Nitrophenol; 2-Nitrophenol
p-Nitrophenol; 4-Nitrophenol
N-Nitrosodi-n-butylamine
N-Nitrosodiethylamine
N-Nitrosodimethylamine
N-Nitrosodiphenylamine
N-Nitrosodipropylamine; N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine
N-Nitrosomethylethalamine
N-Nitrosopiperidine
N-Nitrosopyrrolidine
5-Nitro-o-toluidine
Parathion
Pentachlorobenzene
Pentachloronitrobenzene
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
p-Phenylenediamine
Phorate
Polychlorinated biphenyls; PCBs; Aroclors
Pronamide
Propionitrile; Ethyl cyanide
Pyrene
Safrole
Selenium
Silver
Silvex; 2,4,5-TP
Styrene
Sulfide
2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid
1,2,4,5-Tetrachlorobenzene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene; Tetrachloroethene; Perchloroethylene
2,3,4,6-Tetrachlorophenol
Thallium
Tin
Toluene
o-Toluidine
Toxaphene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane; Methylchloroform
1,1,2-Trichloroethane
Trichloroethylene; Trichloroethene
Trichlorofluoromethane; CFC-11
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol

1,2,3-Trichloropropane
O,O,O-Triethyl phosphorothioate
sym-Trinitrobenzene
Vanadium
Vinyl acetate
Vinyl chloride; Chloroethene
Xylene (total)
Zinc

History: Effective January 1, 2019.