

Chapter NR 140

GROUNDWATER QUALITY

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Subchapter I — General

NR 140.01 Purpose. The purpose of this chapter is to establish groundwater quality standards for substances detected in or having a reasonable probability of entering the groundwater resources of the state; to specify scientifically valid procedures for determining if a numerical standard has been attained or exceeded; to specify procedures for establishing points of standards application, and for evaluating groundwater monitoring data; to establish ranges of responses the department may require if a groundwater standard is attained or exceeded; and to provide for exemptions for facilities, practices and activities regulated by the department.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85.

NR 140.02 Regulatory framework. (1) This chapter supplements the regulatory authority elsewhere in the statutes and administrative rules. The department will continue to exercise the powers and duties in those regulatory programs, consistent with the enforcement standards and preventive action limits for substances in groundwater under this chapter. This chapter provides guidelines and procedures for the exercise of regulatory authority which is established elsewhere in the statutes and administrative rules, and does not create independent regulatory authority.

(2) The department may adopt regulations which establish specific design and management criteria for regulated facilities or activities, if the regulations will ensure that the regulated facilities and activities will not cause the concentration of a substance in groundwater affected by the facilities or activities to exceed the enforcement standards and preventive action limits under this chapter at a point of standards application. The department may adopt more stringent regulations under authority elsewhere in the statutes based on the best currently available technology for regulated activities and practices which ensure a greater degree of groundwater protection or when necessary to comply with state or federal laws.

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(3) Preventive action limits serve to inform the department of potential groundwater contamination problems, establish the level of groundwater contamination at which the department is required to commence efforts to control the contamination and provide a basis for design and management practice criteria in administrative rules. Preventive action limits are applicable both to controlling new releases of contamination as well as to restoring groundwater quality contaminated by past releases of contaminants. Although a preventive action limit is not intended to always require remedial action, activities affecting groundwater must be regulated to minimize the level of substances to the extent technically and economically feasible, and to maintain compliance with the preventive action limits unless compliance with the preventive action limits is not technically and economically feasible.

(4) The department may take any actions within the context of regulatory programs established in statutes or rules outside of this chapter, if those actions are necessary to protect public health and welfare or prevent a significant damaging effect on groundwater or surface water quality for present or future consumptive or nonconsumptive uses, whether or not an enforcement standard and preventive action limit for a substance have been adopted under this chapter. Nothing in this chapter authorizes an impact on groundwater quality which would cause surface water quality standards contained in chs. NR 102 to 105 to be attained or exceeded.

History: Cr. Register, January, 1992, No. 433, eff. 2-1-92; reprinted to restore dropped copy, Register, March, 1992, No. 435.

NR 140.03 Applicability. This subchapter and subch. II apply to all facilities, practices and activities which may affect groundwater quality and which are regulated under ch. 85, 93, 94, 101, 144, 145, 146 or 147, Stats., by the department of agriculture, trade and consumer protection, the department of industry, labor and human relations, the department of transportation, or the department of natural resources, as well as to facilities, practices and activities which may affect groundwater quality which are regulated by other regulatory agencies. Health-related enforcement standards adopted in s. NR 140.10 also apply to bottled drinking water manufactured, bottled, sold or distributed in this state as required by s. 97.34 (3) (b), Stats., and to determining eligibility for the well compensation program under s. 144.027, Stats. Subchapter III applies to all facilities, practices and activities which may affect groundwater quality and which are regulated by the department under ch. 144, 146 or 147, Stats. This chapter does not apply to any facilities, practices or activities on a prospecting site or a mining site because those facilities, practices and activities are subject to the groundwater quality requirements of chs. NR 131, 132 and 182. The department may promulgate new rules or amend rules governing facilities, practices or activities regulated under ss. 144.80 to 144.94, Stats., if the department determines that the amendment or promulgation of rules is necessary to protect public health, safety or welfare. The requirements of this chapter are in addition to the requirements of any other statutes and rules.

Note: This chapter does not apply to public water systems except for the purpose of determining eligibility for well compensation as stated above. Chapter NR 809 contains maximum contaminant levels applicable to public water systems. Drinking water maximum contaminant levels and health advisory levels may take into account such factors as treatment costs and feasibility for public water systems.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85.
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NR 140.05 Definitions. (1) "Accuracy" means the closeness of a measured value to its generally accepted value or its value based upon an accepted reference standard.

(1m) "Alternative concentration limit" means the concentration of a substance in groundwater established by the department for a site to replace a preventive action limit or enforcement standard or both, from Table 1 or 2, when an exemption is granted in accordance with s. NR 140.28.

(2) "Attain or exceed" means that the concentration of a substance is determined to be equal to or greater than the preventive action limit or enforcement standard for that substance.

(3) "Background water quality" or "background concentration" means groundwater quality at or near a facility, practice or activity which has not been affected by that facility, practice or activity.

(4) "Certified laboratory" means a laboratory which performs tests for hire in connection with a covered program and which receives certification under s. 144.95 (7), Stats., or receives reciprocal recognition under s. 144.95 (5), Stats.

(5) "Department" means the department of natural resources.

(6) "Design management zone" means a 3-dimensional boundary surrounding each regulated facility, practice or activity established under s. NR 140.22 (3).

(7) "Enforcement standard" means a numerical value expressing the concentration of a substance in groundwater which is adopted under s. 160.07, Stats., and s. NR 140.10 or s. 160.09, Stats., and s. NR 140.12.

(8) "Facility, practice or activity" means any source or potential source of a substance which is detected in or has a reasonable probability of entering the groundwater resources of the state.

(9) "Groundwater" means any of the waters of the state, as defined in s. 144.01 (19), Stats., occurring in a saturated subsurface geological formation of rock or soil.

(10) "Indicator parameter" means a substance for which a preventive action limit has been established under s. NR 140.20, which is used to indicate the potential for a preventive action limit established under s. NR 140.10 or 140.12 to be attained or exceeded and for which an enforcement standard has not been established under s. NR 140.10 or 140.12.

(11) "Land disposal system" means a facility for disposing of liquid wastes consisting of:

- (a) An absorption or seepage pond system,
- (b) A ridge and furrow system;
- (c) A spray irrigation system,
- (d) An overland flow system,
- (e) A subsurface field absorption system,
- (f) A land spreading system, or
- (g) Any other land area receiving liquid waste discharges.

(12) "Limit of detection" means the lowest concentration for an analytical test method and sample matrix at which the presence of a substance can be identified in an analytical sample, with a stated degree of confidence, regardless of whether the concentration of the substance in the sample can be quantified.

(13) "Limit of quantitation" means the lowest concentration for an analytical test method and sample matrix at which the quantity of a particular substance can be measured with a stated degree of confidence.

(14) "Monitoring" means all procedures used to collect data on groundwater, surface water or soils.

(15) "Point of standards application" means the specific location, depth or distance from a facility, activity or practice at which the concentration of a substance in groundwater is measured for purposes of determining whether a preventive action limit or an enforcement standard has been attained or exceeded.

(16) "Precision" means the closeness of repeated measurements of the same parameter within a sample.

(17) "Preventive action limit" means a numerical value expressing the concentration of a substance in groundwater which is adopted under s. 160.15, Stats., and s. NR 140.10, 140.12 or 140.20.

(18) "Property boundary" means the boundary of the total contiguous parcel of land owned or leased by a common owner or lessor, regardless of whether public or private roads run through the parcel.

(19) "Registered laboratory" means a laboratory which is registered under s. 144.95 (8), Stats., or receives reciprocal recognition under s. 144.95 (5), Stats.

(20) "Regulatory agency" means the department of agriculture, trade and consumer protection, the department of industry, labor and human relations, the department of transportation, the department of natural resources and other state agencies which regulate activities, facilities or practices which are related to substances which have been detected in or have reasonable probability of entering the groundwater resources of the state.

(20h) "Remedial action" means a response which is taken to achieve compliance with groundwater quality standards established under this chapter. This term includes, but is not limited to, actions designed to prevent or minimize the further discharge or release of substances to groundwater and actions designed to renovate or restore groundwater quality.

(20m) "Response" means any action taken to respond to an attainment or exceedance of a preventive action limit or enforcement standard as required by s. NR 140.24 or 140.26.

Note: A response may include a remedial action.

(21) "Substance" means any solid, liquid, semisolid, dissolved solid or gaseous material, naturally occurring or man-made chemical, parameter for measurement of water quality or biological organism which, in its original form, or as a metabolite or a degradation or waste product, may decrease the quality of groundwater.

(22) "Wastewater and sludge storage or treatment lagoon" means a natural or man-made containment structure, constructed primarily of Register, March, 1994, No. 459

earthen materials for the treatment or storage of wastewater or sludge, which is not a land disposal system.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; cr. (1m), am. (7), (17) and (18), Register, October, 1988, No. 394, eff. 11-1-88; am. (6), cr. (20h) and (20m), Register, March, 1994, No. 459, eff. 4-1-94.

Subchapter II — Groundwater Quality Standards

NR 140.10 Public health related groundwater standards. The groundwater quality standards for substances of public health concern are listed in Table 1.

Note: For all substances that have carcinogenic, mutagenic or teratogenic properties or interactive effects, the preventive action limit is 10% of the enforcement standard. The preventive action limit is 20% of the enforcement standard for all other substances that are of public health concern. Enforcement standards and preventive action limits for additional substances will be added to Table 1 as recommendations are developed pursuant to ss. 160.07, 160.13 and 160.15, Stats.

**Table 1
Public Health Groundwater Quality Standards**

<i>Substance</i>	<i>Enforcement Standard (micrograms per liter - except as noted)</i>	<i>Preventive Action Limit (micrograms per liter - except as noted)</i>
Acetone	1000	200
Alachlor	2	0.2
Aldicarb	10	2
Arsenic	50	5
Asbestos	7 million fibers per liter (MFL)	0.7 MFL
Atrazine, total chlorinated residue	3'	.3'
Bacteria, Total Coliform	Less than one in 100 ml for membrane filter method or not present in any 10 ml portion by fermentation tube method for both preventive action limit and enforcement standard	
Barium	2 milligrams/liter (mg/l)	.4 mg/l
Benzene	5	0.5
Benzo (a) pyrene	0.003	0.0003
Bromodichloromethane	179	36
Bromoform	4.4	0.44
Butylate	67	6.7
Cadmium	5	0.5
Carbaryl	960	192
Carbofuran	40	8
Carbon Tetrachloride	5	.5
Chloramben	150	30
Chlordane	2	0.2
Chloroethane (Ethyl chloride)	400	80
Chloroform	6	.6
Chromium	100	10
Copper	1300	130
Cyanazine	12.5	1.25
Cyanide	200	40
Dibromochloromethane (Chlorodibromomethane)	215	43
1,2-Dibromoethane (EDB, ethylene dibromide, dibromoethane)	0.05	0.005
1,2-Dibromo-3-chloropropane (DBCP, dibromochloropropane)	0.2	0.02
Dicamba	300	60
Dichlorodifluoromethane (Freon 12)	1000	200
1,2-Dichlorobenzene (O-dichlorobenzene)	600	60
1,3-Dichlorobenzene (M-dichlorobenzene)	1250	125

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1,4-Dichlorobenzene	75	15
(p-Dichlorobenzene)		
1,1-Dichloroethane	850	85
1,2-Dichloroethane	5	0.5
1,1-Dichloroethylene	7	0.7
1,2-Dichloroethylene (cis)	70	7
1,2-Dichloroethylene (trans)	100	20
2,4-Dichlorophenoxyacetic Acid (2,4-D)	70	7
1,2-Dichloropropane	5	0.5
Di (2-ethylhexyl) phthalate (Bis(2-ethylhexyl) phthalate)	3	0.3
Dimethoate	2	.4
2,4-Dinitrotoluene	0.05	0.005
2,6-Dinitrotoluene	0.05	0.005
Dinoseb	13	2.6
Dioxin (2, 3, 7, 8-TCDD)	.00000022	.000000022
Endrin	.2	.02
EPYC (Eptam)	250	50
Ethylbenzene	700	140
Ethylene glycol	7 mg/l	0.7 mg/l
Fluoride	4 mg/l	0.8 mg/l
Fluorotrichloromethane (Freon-11, trichlorofluoromethane)	3490	698
Formaldehyde	1000	100
Heptachlor	0.4	0.04
Heptachlor epoxide	0.2	0.02
Lead	15	1.5
Lindane	0.2	0.02
Mercury	2	0.2
Methoxychlor	40	4
Methylene Chloride (Dichloromethane)	150	15
Methyl ethyl ketone (MEK)	460	90
Methyl isobutyl ketone (MIBK, 4- methyl-2-pentanone, isopropylacetone)	500	50
Methyl tert-butyl ether (MTBE, 2- methoxy-2-methylpropane)	60	12
Metolachlor	15	1.5
Metribuzin	250	50
Monochlorobenzene (Chlorobenzene)	100	20
Naphthalene	40	8
Nitrate (as N)	10 mg/l	2 mg/l
Nitrate + Nitrite (as N)	10 mg/l	2 mg/l
Nitrite (as N)	1 mg/l	0.2 mg/l
Pentachlorophenol (PCP)	1	0.1
Polychlorinated biphenyls (PCBs)	0.03	0.003
Phenol	6 mg/l	1.2 mg/l
Selenium	50	10
Silver	50	10
Simazine	1.7	0.17
Styrene (Ethenylbenzene)	100	10
Tetrachloroethylene (Perchloroethylene)	5	0.5
Tetrahydrofuran	50	10
Toluene	343	68.6
Toxaphene	3	0.3
1,1,1-Trichloroethane	200	40
1,1,2-Trichloroethane	.6	.06
Trichloroethylene (TCE)	5	0.5
2,4,5-Trichlorophenoxypropionic Acid (2,4,5-TP, silvex)	50	5
Trifluralin	7.5	.75
Vinyl Chloride	.2	0.02
Xylene	620	124

¹Total chlorinated atrazine residue includes parent compound and the following metabolites of health concern: deethylatrazine, deisopropylatrazine and diaminoatrazine.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. table 1, Register, October, 1988, No. 394, eff. 11-1-88; am. table 1, Register, September, 1990, No. 417, eff. 10-1-90; am. Register, January, 1992, No. 433, eff. 2-1-92; am. Table 1, Register, March, 1994, No. 459, eff. 4-1-94.

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NR 140.12 Public welfare related groundwater standards. The groundwater quality standards for substances of public welfare concern are listed in Table 2.

Note: For each substance of public welfare concern, the preventive action limit is 50% of the established enforcement standard.

Table 2
Public Welfare Groundwater Quality Standards

<i>Substance</i>	<i>Enforcement Standard (milligrams per liter - except as noted)</i>	<i>Preventive Action Limit (milligrams per liter - except as noted)</i>
Chloride	250	125
Color	15 color units	7.5 color units
Foaming agents MBAS (Methylene-Blue Active Substances)	.5	.25
Iron	.3	.15
Manganese	.05	.025
Odor	3 (Threshold Odor No.)	1.5 (Threshold Odor No.)
Sulfate	250	125
Zinc	5	2.5

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. table 2, Register, October, 1990, No. 418, eff. 11-1-90; am. Table 2, Register, March, 1994, No. 459, eff. 4-1-94.

NR 140.14 Statistical procedures. (1) If a preventive action limit or an enforcement standard for a substance listed in Table 1 or 2, an alternative concentration limit issued in accordance with s. NR 140.28 or a preventive action limit for an indicator parameter established according to s. NR 140.20 (2) is attained or exceeded at a point of standards application:

(a) The owner or operator of the facility, practice or activity at which a standard is attained or exceeded shall notify the appropriate regulatory agency that a standard has been attained or exceeded; and

(b) The regulatory agency shall require a response in accordance with the rules promulgated under s. 160.21, Stats. No response shall be required if it is demonstrated to the satisfaction of the appropriate regulatory agency that a scientifically valid determination cannot be made that the preventive action limit or enforcement standard for a substance in Table 1 or 2 has been attained or exceeded based on consideration of sampling procedures or laboratory precision and accuracy, at a significance level of 0.05.

(2) The regulatory agency shall use one or more valid statistical procedures to determine if a change in the concentration of a substance has occurred. A significance level of 0.05 shall be used for all tests.

(3) In addition to sub. (2), the following applies when a preventive action limit or enforcement standard is below the limit of quantitation:

(a) If a substance is not detected in a sample and the limit of detection is higher than the preventive action limit or enforcement standard for that substance, the preventive action limit or enforcement standard shall be considered not to have been attained or exceeded.

(b) If a substance is reported to be present in a sample above the limit of detection but below the limit of quantitation, and if the preventive action limit or enforcement standard for that substance is below the limit of detection, the preventive action limit or enforcement standard shall be

considered to have been attained or exceeded only if the presence of that substance has been confirmed by the use of an appropriate statistical test at a significance level of 0.05.

(c) The owner or operator of the facility, practice or activity shall report the limit of detection and the limit of quantitation with the sample results when requested by the regulatory agency.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (1) (intro.) and (b), r. and recr. (2), Register, October, 1988, No. 394, eff. 11-1-88; am. (1) (b), (2) and (3) (b), Register, September, 1990, No. 417, eff. 10-1-90; am. (1) (b), Register, March, 1994, No. 459, eff. 4-1-94.

NR 140.16 Monitoring and laboratory data requirements. (1) All water quality samples collected to determine compliance with ch. 160, Stats., except samples collected for total coliform bacteria analysis and field analyses for pH, specific conductance, and temperature, shall be analyzed by a laboratory certified or registered under ch. NR 149. Samples for total coliform bacteria analysis shall be analyzed by the state laboratory of hygiene or at a laboratory approved or certified by the department of health and social services. The results of the analysis shall be submitted to the department and the appropriate regulatory agency. Except as provided in s. NR 205.07 (3) (c) for wastewater permittees, this subsection does not require the submission of groundwater monitoring data which is collected voluntarily and which is not being collected to determine compliance with this chapter or other laws. The samples shall be collected in accordance with procedures specified by the department or, where no procedures are specified, in accordance with published sampling procedures. The specified sampling procedures may include requirements for field filtration.

Note: Published sampling procedures include those contained in the following sources. Other published sampling procedures are also acceptable.

1. "Groundwater Sampling Procedures Guidelines." Wisconsin Department of Natural Resources, PUBL-WR-153, February 1987.
2. "Groundwater Sampling Procedures Field Manual." Wisconsin Department of Natural Resources, PUBL-WR-168, September 1987.
3. "Procedures Manual for Ground Water Monitoring at Solid Waste Disposal Sites." EPA SW-611, Office of Water and Waste Management, U.S. Environmental Protection Agency, Dec. 1980, Washington, D.C.
4. "Techniques of Water Resources Investigations of the United States Geological Survey, Guidelines for Collection and Field Analysis of Ground Water Samples for Selected Unstable Constituents," Book I, Chapter D2, U.S. Geological Survey, Washington, D.C.
5. "Procedures for the Collection of Representative Water Quality Data from Monitoring Wells," Cooperative Groundwater Report 7, Illinois State Water Survey, 1981, Champaign, Illinois.
6. "Manual of Ground Water Sampling Procedures," NWWA/EPA Series, Robert S. Kerr, Environmental Research Laboratory, 1981, Ada, Oklahoma.

(2) The laboratory shall select the analytical methodology which:

- (a) Is specified in rules or approved by the regulatory agency, and
- (b) Is appropriate for the concentration of the sample, and
- (c) Is one of the following:

1. Has a limit of detection and limit of quantitation below the preventive action limit, or

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2. Produces the lowest available limit of detection and limit of quantitation if the limit of detection and limit of quantitation are above the preventive action limit.

(3) If the owner or operator of a facility, practice or activity believes that a sample result does not represent groundwater quality in the vicinity of the facility, practice or activity, the owner or operator shall resample the appropriate well or wells to obtain a representative sample at the earliest possible time. All sample results shall be submitted to the department and the appropriate regulatory agency with an explanation of why the owner or operator believes that all or some of the results are invalid.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (1), Register, September, 1990, No. 417, eff. 10-1-90; am. (1), r. and recr. (2), Register, March, 1994, No. 459, eff. 4-1-94.

Subchapter III — Evaluation and Response Procedures

NR 140.20 Indicator parameter groundwater standards. (1) ESTABLISHING BACKGROUND WATER QUALITY. Background water quality at a facility, practice or activity at which monitoring is required shall be established by sampling one or more monitoring points at locations and depths sufficient to yield groundwater samples that are representative of background water quality at or near the facility, practice or activity. Background water quality shall be determined for indicator parameters specified by the department. Background water quality for indicator parameters shall be established by averaging a minimum of 8 sample results from each well. The department may exclude any sample result which is nonrepresentative of background water quality. In making the calculations required in this section, the department may use as many representative sample points as are available.

(2) ESTABLISHING PREVENTIVE ACTION LIMITS FOR INDICATOR PARAMETERS. For each indicator parameter for which groundwater monitoring is required by the department, the preventive action limit shall be established based upon a change of water quality with respect to background water quality according to the methodology specified in pars. (a) to (c) and in Table 3.

(a) For field pH, the preventive action limit shall be one pH unit above or below the pH of the background water quality.

(b) For field temperature, the preventive action limit shall be 3 standard deviations or 10°F (5.6°C), whichever is greater, above or below the temperature of the background water quality.

(c) For all other indicator parameters, the preventive action limit shall be the background water quality for that parameter plus 3 standard deviations or the background water quality plus the increase of that parameter listed in Table 3, whichever is greater.

Note: The standard deviation for a group of samples is equal to the square root of: the value of the sum of the squares of the difference between each sample in the sample group and the mean for that sample group divided by the number of samples in the sample group where the sample group has 30 or more samples and by one less than the number of samples in the sample group where the sample group has less than 30 samples.

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Table 3
Methodology for Establishing Preventive Action Limit for Indicator Parameters

Parameter	Minimum Increase (mg/l)
Alkalinity	100
Biochemical oxygen demand (BOD ₅)	25
Boron	2
Calcium	25
Chemical oxygen demand (COD)	25
Magnesium	25
Nitrogen series	
---Ammonia nitrogen	2
---Organic nitrogen	2
---Total nitrogen	5
Potassium	5
Sodium	10
Field specific conductance	200 micromhos/cm
Total dissolved solids (TDS)	200
Total hardness	100
Total organic carbon (TOC)	1
Total organic halogen (TOX)	.25

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. table 3, Register, October, 1990, No. 418, eff. 11-1-90.

NR 140.22 Point of standards application for design and compliance. (1) DESIGN. Facilities, practices or activities regulated by the department, including remedial actions, shall be designed to minimize the level of substances in groundwater and to comply with the preventive action limits to the extent technically and economically feasible at all the following locations:

- (a) Any point of present groundwater use.
- (b) Any point beyond the boundary of the property on which the facility, practice or activity is located.
- (c) Any point within the property boundaries beyond the 3-dimensional design management zone if one is established by the department at each facility, practice or activity under sub. (3).
- (d) Every point at which groundwater is monitored to determine if a preventive action limit or enforcement standard has been attained or exceeded for sites identified under s. NR 140.22 (2) (c).

(2) COMPLIANCE. (a) The point of standards application to determine if a preventive action limit has been attained or exceeded is any point at which groundwater is monitored.

(b) The point of standards application to determine whether an enforcement standard has been attained or exceeded shall be the following locations:

1. Any point of present groundwater use;
2. Any point beyond the boundary of the property on which the facility, practice or activity is located;
3. Any point within the property boundaries beyond the 3 dimensional design management zone if one is established by the department at each facility, practice or activity under sub. (3).

Note: The boundary beyond which the enforcement standards apply is the closer of the property boundary or the design management zone boundary to the waste boundary for the facility, practice or activity.

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(c) For discharges, releases, sites or facilities regulated under s. 144.76, 144.442, 144.64(2m) or 144.735, Stats., or s. NR 600.07, for which a design management zone has not been established in sub. (3), Table 4, the point of standards application shall be every point at which groundwater is monitored to determine if a preventive action limit or enforcement standard has been attained or exceeded.

(3) DESIGN MANAGEMENT ZONE. (a) The design management zone for facilities, practices or activities subject to regulation by the department shall be an area enclosed by vertical boundaries which extend from the land surface downward through all saturated geological formations. The design management zone shall extend horizontally beyond the waste boundary to the distance indicated in Table 4 for the specific type of facility, practice or activity. The waste boundary shall be the outermost limit at which waste from a facility, practice or activity has been stored, applied or disposed of, or permitted or approved for storage, application or disposal. For hazardous waste facilities regulated under ss. 144.60 to 144.74, Stats., the waste boundary shall include the horizontal space taken up by any liner, dike or other barrier to contain waste.

(b) In issuing or reissuing a permit, license or approval, the department may consider an expansion or reduction of the design management zone at a regulated or proposed facility, practice or activity by a horizontal distance not to exceed 50% of the distance listed in Table 4.

(c) The department shall consider the following factors in determining whether to expand or reduce the design management zone:

1. Nature, thickness and permeability of unconsolidated materials, including topography;
2. Nature and permeability of bedrock;
3. Groundwater depth, flow direction and velocity;
4. Waste volume, waste type and characteristics, including waste loading;
5. Contaminant mobility;
6. Distances to property boundary and surface waters;
7. Engineering design of the facility, practice or activity;
8. Life span of the facility, practice or activity;
9. Present and anticipated uses of land and groundwater; and
10. Potential abatement options if an enforcement standard is exceeded.

(d) The design management zone may not be expanded or reduced unless it has been demonstrated to the satisfaction of the department that the preventive action limits and enforcement standards will be met at the adjusted design management zone. The design management zone may not be expanded unless it has been demonstrated to the satisfaction of the department that the preventive action limits and enforcement standards cannot be met at the design management zone specified in Table 4.

Table 4

<i>Type of Facility, Practice or Activity</i>	<i>Horizontal Distances for the Design Management Zone</i>
Land disposal systems regulated under ch. 144 or 147, Stats.	250 feet
Wastewater and sludge storage or treatment lagoons regulated under ch. 144 or 147, Stats.	100 feet
Solid waste disposal facilities regulated under ss. 144.43 to 144.47, Stats., which have feasibility reports approved after October 1, 1985.	150 feet
All other solid waste disposal facilities regulated under ss. 144.43 to 144.47, Stats.	300 feet
Hazardous waste disposal facilities, waste piles, landfills and surface impoundments subject to regulation under s. NR 635.16	300 feet
Hazardous waste disposal facilities, waste piles, landfills and surface impoundments subject to regulation under ss. NR 635.05 to 635.15.	0 feet

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (1) (b), Register, October, 1988, No. 394, eff. 11-1-88; am. (4) and table 4, Register, January, 1992, No. 433, eff. 2-1-92; am. (1), cr. (1) (d), renum. (2) to (5) to be (2) (a), (b), (c) and (3) and am. (2) (b) 3., Register, March, 1994, No. 459, eff. 4-1-94.

NR 140.24 Responses when a preventive action limit is attained or exceeded. (1) NOTIFICATION AND ASSESSMENT. If the concentration of a substance, including indicator parameters, in groundwater attains or exceeds a preventive action limit at a point of standards application as described in s. NR 140.22 (2):

(a) The owner or operator of the facility, practice or activity shall notify the department in writing when monitoring data is submitted that a preventive action limit has been attained or exceeded in accordance with any deadlines in applicable statutes, rules, permits or plan approvals. Where no deadlines are imposed, the owner or operator shall notify the department as soon as practical after the results are received. The notification shall provide a preliminary analysis of the cause and significance of the concentration.

Note: Section 144.76 (2) (a), Stats., requires that the department be notified immediately of hazardous substance discharges.

Note: See s. NR 140.27.

(b) Upon receipt of the notice under par. (a), the department shall evaluate the information and, if further information is required to make the assessment under par. (c), direct the owner or operator to prepare and submit a report by a specified deadline. The report shall assess the cause and significance of the increased concentration based on a consideration of the factors identified in par. (c) and shall propose a response to meet the objectives of sub. (2).

(c) The department shall assess the cause and significance of the concentration of the substance in determining the appropriate response to meet the objectives of sub. (2). In addition to all other relevant information, the department shall consider the information submitted under par. (b) and the following factors where applicable:

1. Background water quality. a. The department shall compare background water quality data and monitoring data from wells downgradient of the facility, practice or activity to determine if downgradient water

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quality is adversely affected. If the background water quality at a facility, practice or activity is not known or is inadequately defined, the department may require additional sampling of existing wells, or installation and sampling of additional wells, or both.

b. Except for substances which are carcinogenic, teratogenic or mutagenic in humans, before requiring a response at a site where the background concentration of a substance is determined to be equal to or greater than the preventive action limit, the department shall determine that the proposed remedial action will protect or substantially improve groundwater quality notwithstanding the background concentrations of naturally occurring substances.

2. Reliability of sampling data. As part of its review of the quality of the sampling data, the department shall evaluate the sampling procedures, precision and accuracy of the analytical test, size of the data set, and the quality control and quality assurance procedures used. If there is insufficient information to evaluate the reliability of the sampling data, the department may require additional samples or other changes in the monitoring program at the facility, practice or activity.

3. Public health, welfare and environmental effects of the substance. The department shall consider the public health, welfare and environmental effects of the substance, including but not limited to its mobility in the subsurface, environmental fate, the risks considered when the standard was adopted and whether it is carcinogenic, mutagenic, teratogenic or has interactive effects with other substances.

4. Probability that a preventive action limit or an enforcement standard may be attained or exceeded outside the design management zone. In evaluating the probability that a preventive action limit or an enforcement standard may be attained or exceeded outside the design management zone, the department shall consider, at a minimum, geologic conditions, groundwater flow rate and direction, contaminant mobility in the subsurface and environmental fate.

5. Performance of the facility, practice or activity. The department shall consider whether the facility, practice or activity is performing as designed in accordance with the design requirements in s. NR 140.22 (1). The department shall consider the type, age and size of the facility, practice or activity; the type of design, if applicable; the operational history; and other factors related to performance of the facility, practice or activity as appropriate.

6. Location of the monitoring point. The department shall consider the location of the monitoring point in relation to the facility, practice or activity and the design management zone in assessing the appropriate response.

7. Other known or suspected sources of the substance in the area. If other known or suspected sources are present in the vicinity of a facility, practice or activity of concern, the department shall evaluate the probability of contributions from other sources of the substance. The department shall consider, at a minimum, the number, size, type and age of nearby sources; the groundwater flow patterns; and the substances involved.

8. Hydrogeologic conditions. The department shall consider the geologic and groundwater conditions, including but not limited to the na-

ture, thickness and permeability of the unconsolidated materials; the nature and permeability of bedrock; the depth to the water table; groundwater flow gradients, both vertical and horizontal; the position of the facility, practice or activity within the groundwater flow system; and the present and potential groundwater use in the vicinity of the facility, practice or activity at which an exceedance occurs. If there is insufficient hydrogeologic information, the department may require additional information.

9. Extent of groundwater contamination. The department shall consider the current and anticipated future extent of groundwater contamination in 3 dimensions. If water supplies are affected or threatened, the department shall evaluate the existing effects and potential risks of the substance on the potable water supplies. If the extent of contamination is not known, the department may require further documentation of the extent of contamination.

10. Alternate responses. The department shall evaluate alternate responses, including consideration of the technical and economic feasibility of alternate responses from Table 5 or 6 or both, the practicality of stopping the further release of the substance and the risks and benefits of continued operation of the facility, practice or activity and the ability of a response to meet other applicable environmental protection laws.

(2) RESPONSE OBJECTIVES. Based on its evaluation of the report required under sub. (1), and the assessment criteria of sub. (1) (c), the department shall specify the responses to be implemented by the owner or operator of the facility, practice or activity designed to the extent technically and economically feasible to prevent any new releases of the substance from traveling beyond the design management zone or other applicable points of standards application described in s. NR 140.22 and restore contaminated groundwater within a reasonable period of time. Both the source control and the groundwater restoration components of the response shall be designed to:

(a) Minimize the concentration of the substance in groundwater at the point of standards application where technically and economically feasible;

(b) Regain and maintain compliance with the preventive action limit. If the department determines that compliance with the preventive action limit is either not technically or economically feasible, the owner or operator shall achieve compliance with the lowest possible concentration which is technically and economically feasible; and

(c) Ensure that the enforcement standard is not attained or exceeded at the point of standards application.

(3) RANGE OF RESPONSES FOR INDICATOR PARAMETERS. Except as otherwise provided in this subsection, the range of responses which the department may take or may require if a preventive action limit for an indicator parameter identified in Table 3 has been attained or exceeded, is one or more of the responses in items 1 to 4 in Table 5. The range of responses is one or more of the responses in items 1 to 6 of Table 5 in the event the department determines that:

(a) There is a threat to public health or welfare as a result of a preventive action limit for an indicator parameter being attained or exceeded; or

(b) The results demonstrate a significant design flaw or failure of the facility to contain substances, such that the facility can be expected to emit one or more of the substances on Table 1 or 2 in excess of a preventive action limit at a point of standards application.

(4) RANGE OF RESPONSES FOR SUBSTANCES OF PUBLIC HEALTH OR WELFARE CONCERN. The range of responses which the department may take or may require if a preventive action limit for a substance of health or welfare concern has been attained or exceeded are listed in Table 5. More than one response may be required by the department.

Table 5

Range of Responses for Exceedance of a Preventive Action Limit for Indicator Parameters and Substances of Health or Welfare Concern

1. No action pursuant to s. NR 140.24 (5) and consistent with s. 160.23, Stats.
2. Sample wells or require sampling of wells.
3. Require a change in the monitoring program, including increased monitoring.
4. Require an investigation of the extent of groundwater contamination.
5. Require a revision of the operational procedures at the facility, practice or activity.
6. Require a change in the design or construction of the facility, practice or activity.
7. Require an alternate method of waste treatment or disposal.
8. Require prohibition or closure and abandonment of a facility, practice or activity in accordance with sub. (6).
9. Require remedial action to renovate or restore groundwater quality.
10. Require remedial action to prevent or minimize the further discharge or release of the substance to groundwater.
11. Revise rules or criteria on facility design, location or management practices.

(5) NO ACTION RESPONSE CRITERIA. The department may determine that no response is necessary and that an exemption under s. NR 140.23 is not required when either of the following conditions is met:

(a) The concentration of a substance within a design management zone is detected above the preventive action limit, the enforcement standard has not been attained or exceeded within the design management zone, and the department determines that there is no indication that the preventive action limit will be attained or exceeded at any point outside the design management zone, or

(b) The background concentration of a substance is greater than the preventive action limit, the anticipated or detected incremental increase in the concentration of a substance which results from a specific facility, practice or activity is not greater than the preventive action limit, and the anticipated or detected concentration is not greater than the enforcement standard either within or outside of the design management zone.

(6) PROHIBITION AND CLOSURE CRITERIA. The department may not impose a prohibition on a practice or activity or require closure of a facility which produces the substance unless the department:

- (a) Bases its decision upon reliable test data;

(b) Determines, to a reasonable certainty, by the greater weight of the credible evidence, that no other remedial action would prevent the violation of the enforcement standard at the point of standards application;

(c) Establishes the basis for the boundary and duration of the prohibition; and

(d) Ensures that any prohibition imposed shall be reasonably related in time and scope to maintaining compliance with the enforcement standard at the point of standards application.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (5) (intro.) and (6) (intro.), Register, October, 1988, No. 394, eff. 11-1-88; am. (1) (intro.), (a), (b), (c) (intro.), 5. and 10., (2) (intro.), and (5) (intro.), renum. (7) to be NR 104.02 (4), Register, January, 1992, No. 433, eff. 2-1-92; am. (1) (intro.), (c) (intro.), (3) (intro.) and Table 5, Register, March, 1994, No. 459, eff. 4-1-94.

NR 140.26 Responses when an enforcement standard is attained or exceeded. (1) NOTIFICATION AND ASSESSMENT. If the concentration of a substance in groundwater attains or exceeds an enforcement standard at a point of standards application as described in s. NR 140.22 (2):

(a) The owner or operator of the facility, practice or activity shall notify the department in writing when monitoring data is submitted that an enforcement standard has been attained or exceeded in accordance with any deadlines in applicable statutes, rules, permits or plan approvals. Where no deadlines are imposed, the owner or operator shall notify the department as soon as practical after the results are received. The notification shall provide a preliminary analysis of the cause and significance of the concentration.

Note: Section 144.76 (2) (a), Stats., requires that the department be notified immediately of hazardous substance discharges.

Note: See s. NR 140.27.

(b) Upon receipt of the notice under par. (a), the department shall evaluate the information and, if further information is required to make the assessment under par. (c), direct the owner or operator to prepare and submit a report by a specified deadline. The report shall assess the cause and significance of the increased concentration based on a consideration of the factors identified in s. NR 140.24 (1) (c) and shall propose a response to achieve compliance with the enforcement standard at the point of standards application and to comply with sub. (5).

(c) The department shall assess the cause and significance of the concentration of the substance in determining the appropriate response measures to achieve compliance with the enforcement standard at the point of standards application and to comply with sub. (5). In addition to all other relevant information, the department shall consider the information submitted under sub. (1) and the factors listed in s. NR 140.24 (1) (c), where applicable.

(2) **REGULATORY RESPONSES.** (a) If a facility, activity or practice is regulated under subch. IV of ch. 144 or 147, Stats., the department shall require responses as necessary, based on the evaluation of the increased concentration as outlined in sub. (1), to prevent any new releases of the substance from traveling beyond the design management zone or other applicable point of standards application described in s. NR 140.22 and restore contaminated groundwater within a reasonable period of time. Both the source control and the groundwater restoration components of

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the response shall be designed to achieve compliance with the enforcement standard at the point of standards application and to achieve compliance with the preventive action limit at the point of standards application unless compliance with the preventive action limit is not technically and economically feasible. The range of responses which the department may take or require if an enforcement standard for a substance of public health or welfare concern has been attained or exceeded at a point of standards application is listed in Table 6. More than one response may be required by the department. In addition, the department may require one or more responses from Table 5, except number one.

Table 6

Range of Responses for Exceedance of Enforcement Standards for Substances of Health or Welfare Concern

1. Require a revision of the operational procedures at a facility, practice or activity.
2. Require a change in the design or construction of the facility, practice or activity.
3. Require an alternate method of waste treatment or disposal.
4. Require prohibition or closure and abandonment of a facility, practice or activity.
5. Require remedial action to renovate or restore groundwater quality.
6. Require remedial action to prevent or minimize the further release of the substance to groundwater.
7. Revise rules or criteria on facility design, location or management practices.

(b) If an activity or practice is not subject to regulation under subch. IV of ch. 144 or 147, Stats., and if the concentration of a substance in groundwater attains or exceeds an enforcement standard at a point of standards application, the department shall take the following responses unless it can be shown to the department that, to a reasonable certainty, by the greater weight of the credible evidence, an alternative response will achieve compliance with the enforcement standard at the point of standards application:

1. Prohibit the activity or practice which uses or produces the substance; and
2. Require remedial actions with respect to the specific site in accordance with this chapter.

(3) **RESPONSES FOR NITRATE AND SUBSTANCES OF PUBLIC WELFARE CONCERN.** If nitrates or any substance of welfare concern only attains or exceeds an enforcement standard, the department is not required to impose a prohibition or close a facility if it determines that:

(a) The enforcement standard was attained or exceeded, in whole or in part, because of high background concentrations of the substance; and

(b) The additional concentration does not represent a public welfare concern.

(4) **COMPLIANCE WITH PREVENTIVE ACTION LIMITS.** When compliance with the enforcement standard is achieved at the point of standards application, s. NR 140.24 applies.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (1) (intro.), (a), (b), (2), r. (6), Register, January, 1992, No. 433, eff. 2-1-92; am. (1) (intro.) and Table 6, renum. (2) to (5) to be (2) (a), (b), (3) and (4), Register, March, 1994, No. 453, eff. 4-1-94.

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NR 140.27 Responses when an enforcement standard is attained or exceeded at a location other than a point of standards application. If the concentration of a substance in groundwater attains or exceeds an enforcement standard at a location other than a point of standards application for an enforcement standard, s. NR 140.24 shall apply.

History: Cr. Register, October, 1988, No. 394, eff. 11-1-88.

NR 140.28 Exemptions. (1) EXEMPTIONS REQUIRED. (a) The department may not approve a proposed facility, practice or activity at a location where a preventive action limit or enforcement standard adopted under s. NR 140.10 or 140.12 has been attained or exceeded unless an exemption has been granted under this section.

(b) For an existing facility, practice or activity, a response is required under s. NR 140.24 (2) or 140.26 (2) when a preventive action limit or an enforcement standard has been attained or exceeded at a point of standards application unless an exemption has been granted under this section or the criteria of s. NR 140.24 (5) (a) or (b) are met.

(2) CRITERIA FOR GRANTING EXEMPTIONS WHERE THE BACKGROUND CONCENTRATION IS BELOW THE PREVENTIVE ACTION LIMIT. The department may grant an exemption under this section when a preventive action limit is attained or exceeded if it determines that:

(a) The measured or anticipated increase in the concentration of the substance will be minimized to the extent technically and economically feasible;

(b) Compliance with the preventive action limit is either not technically or economically feasible;

(c) The enforcement standard for that substance will not be attained or exceeded at the point of standards application; and

(d) Any existing or projected increase in the concentration of the substance above the background concentration does not present a threat to public health or welfare.

(3) CRITERIA FOR GRANTING EXEMPTIONS WHERE THE BACKGROUND CONCENTRATION IS ABOVE A PREVENTIVE ACTION LIMIT. (a) The department may grant an exemption under this section to a facility, practice or activity which is regulated by the department in an area where the background concentration of nitrate or a substance of public welfare concern attains or exceeds the preventive action limit if the facility, practice or activity is designed to achieve the lowest possible concentration for that substance which is technically and economically feasible and the existing or anticipated increase in the concentration of the substance does not present a threat to public health or welfare.

(b) The department may grant an exemption under this section to a facility, practice or activity which is regulated by the department in an area where the background concentration of a substance of public health concern, other than nitrate, attains or exceeds a preventive action limit for that substance:

1. If the facility, practice or activity has not caused and will not cause the further release of that substance into the environment; or

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2. If the background concentration of the substance does not exceed the enforcement standard for that substance, the facility, practice or activity has not caused and will not cause the concentration of the substance to exceed the enforcement standard for that substance at a point of standards application and the facility, practice or activity is designed to achieve the lowest possible concentration of that substance which is technically and economically feasible.

(4) CRITERIA FOR GRANTING EXEMPTIONS WHERE THE BACKGROUND CONCENTRATION IS ABOVE AN ENFORCEMENT STANDARD. (a) The department may grant an exemption under this section to a facility, practice or activity which is regulated by the department in an area where the background concentration of nitrate or a substance of public welfare concern attains or exceeds an enforcement standard if the facility, practice or activity is designed to achieve the lowest possible concentration for that substance which is technically and economically feasible and the existing or anticipated increase in the concentration of the substance does not present a threat to public health or welfare.

(b) The department may grant an exemption under this section to a facility, practice or activity which is regulated by the department in an area where the background concentration of a substance of public health concern, other than nitrate, attains or exceeds the enforcement standard for that substance if:

1. The facility has not caused and will not cause the further release of that substance into the environment; or

2. a. The facility is designed to achieve the lowest possible concentration of that substance which is technically and economically feasible; and

b. The existing or anticipated increase in the concentration of the substance has not caused or will not cause an increased threat to public health or welfare; and

c. The existing or anticipated incremental increase in the concentration of the substance by itself, has not exceeded or will not exceed the preventive action limit.

(c) The department shall take action under s. NR 140.26 if it determines that the increase in the concentration of the substance causes an increased threat to public health or welfare or it determines that the incremental increase in the concentration of the substance, by itself, exceeds the preventive action limit.

(5) EXEMPTION PROCEDURES. If the department grants an exemption for a substance it shall specify:

(a) The substance to which the exemption applies;

(b) The terms and conditions of the exemption, which may include an alternative concentration limit, under which the department may seek a response under s. NR 140.24 or 140.26 relating to the substance; and

(c) Any other conditions relating to the exemption.

History: Cr. Register, September, 1985, No. 357, eff. 10-1-85; am. (1) (a) and (b), (3) (a), (b) (intro.) and 2., (4) (a) and (b) 1. and (5) (b), Register, October, 1988, No. 394, eff. 11-1-88; am. (1) (b), Register, January, 1992, No. 433, eff. 2-1-92; correction in (4) (b) made under s. 13.93 (2m) (b) 1, Stats., Register, January, 1992, No. 433; am. (1) (b) and (5) (b), Register, March, 1994, No. 459, eff. 4-1-94.