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.

(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 chs. 85, 93, 94, 101, 145, 281, 283, 287, 289, 291, and 292, Stats., by the department of agriculture, trade and consumer protection, the department of safety and professional services, 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 (2) (b), Stats., and to determining eligibility for the well compensation program under s. 281.75, Stats. Subchapter III applies to all facilities, practices, and activities which may affect groundwater quality and which are regulated by the department under ch. 281, 283, 287, 289, 291, 292, 295, or 299, Stats. This chapter applies to ferrous metallic mining operations and mining sites, including mining waste sites, as defined in s. 295.41 (31), Stats., but only to the extent that it does not conflict with subch. III of ch. 295, Stats. Groundwater quality standards, consisting of enforcement standards and preventive action limits contained in ss. NR 140.10 and 140.12, and preventive action limits for indicator parameters identified under s. NR 140.20 (2), apply to ferrous metallic mining operations and mining sites, as defined in s. 295.41 (31), Stats., including mining waste sites, regulated under subch. III of ch. 295, Stats. This chapter does not apply to any facilities, practices, or activities on a nonferrous metallic mining prospecting site or mining site regulated under ch. 293, Stats., 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 ch. 293, 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, except as provided in s. 295.645 (9), Stats.

Note: The groundwater standards in this chapter do not replace the maximum contaminant levels applicable to public water systems contained in ch. NR 809. 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; am. Register, December, 1998, No. 516, eff. 1–1–99; correction made under s. 13.93 (2m) (b) 7.,

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Stats., Register, March, 2000, No. 531; correction made under s. 13.92 (4) (b) 6., Stats., Register January 2012 No. 673; **CR 13–057: am. Register July 2015 No. 715, eff. 8–1–15.**

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.

(1s) "Approval" means written acceptance by the department of a plan, report or other document that has been submitted to the department for review.

(1u) "Aquifer storage recovery" or "ASR" means placement of treated drinking water underground through a well for the purpose of storing and later recovering the water through the same well for potable use.

Note: Underground placement of water for the purpose of restoring an aquifer is not included in the definition of "aquifer storage recovery" or "ASR".

(1w) "ASR displacement zone" means the 3–dimensional subsurface region surrounding an aquifer storage recovery well into which treated drinking water is placed for storage and later recovery.

(1y) "ASR system" means all of the ASR wells, ASR monitoring wells and related appurtenances within a municipal well system and any interconnected public water system served by the municipal water system.

(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. 299.11 (7), Stats., or receives reciprocal recognition under s. 299.11 (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. 281.01 (18), 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.

(10e) "Infiltration" means the underground emplacement of substances or remedial material, or both, into an excavation that is wider than deep so as to percolate or move through unsaturated material to groundwater.

(10s) "Injection" means the underground emplacement of substances or remedial material, or both, into a borehole or other excavation that is deeper than wide so as to percolate or move through unsaturated material to groundwater or to enter groundwater directly.

(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 level that can be determined to be statistically different from a blank.

(13) "Limit of quantitation" means the level above which quantitative results may be obtained with a specified degree of confidence.

Note: The limit of quantitation is 10/3 or 3.333 times the limit of detection.

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

(14m) "Natural attenuation" means the reduction in the concentration and mass of a substance and its breakdown products in groundwater, due to naturally occurring physical, chemical, and biological processes without human intervention or enhancement. These processes include, but are not limited to, dispersion, diffusion, sorption and retardation, and degradation processes such as biodegradation, abiotic degradation and radioactive decay.

(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. 299.11 (8), Stats., or receives reciprocal recognition under s. 299.11 (5), Stats.

(20) "Regulatory agency" means the department of agriculture, trade and consumer protection, the department of safety and professional services, 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.

(20k) "Remedial material" means any solid, liquid, semi–solid or gaseous material, either naturally occurring or manmade, in its original form or as a metabolite or degradation product, or naturally occurring non–pathogenic biological organisms which have not undergone human induced genetic alteration, which enhances the restoration of soil or groundwater quality, or both.

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(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.

(20s) "Specified substance" means one of the following: chloroform, bromodichloromethane, dibromochloromethane or bromoform.

(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.

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(22) "Wastewater and sludge storage or treatment lagoon" means a natural or man−made containment structure, constructed primarily of 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; cr. (1s), (10e), (10s), (20k), r. and recr. (12), (13), Register, August, 1995, No. 476, eff. 9−1−95; cr. (14m), Register, October, 1996, No. 490, eff. 11−1−96; am. (20), Register, December, 1998, No. 516, eff. 1−1−99; correction in (9) made under s. 13.93 (2m) (b) 7., Stats., Register, April, 2001, No. 544; CR 02−134: cr. (1u), (1w), (1y) and (20s) Register June 2003 No. 570, eff. 7−1−03; correction in (20) made under s. 13.92 (4) (b) 6., Stats., Register January 2012 No. 673.

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 I as recommendations are developed pursuant to ss. 160.07, 160.13 and 160.15, Stats.

Table 1
Public Health Groundwater Quality Standards

Substance[1]	Enforcement Standard (micrograms per liter − except as noted)	Preventive Action Limit (micrograms per liter − except as noted)
Acetochlor	7	0.7
Acetochlor ethane sulfonic acid + oxanilic acid (Acetochlor − ESA + OXA)	230	46
Acetone	9 mg/l	1.8 mg/l
Alachlor	2	0.2
Alachlor ethane sulfonic acid (Alachlor − ESA)	20	4
Aldicarb	10	2
Aluminum	200	40
Ammonia (as N)	9.7 mg/l	0.97 mg/l
Antimony	6	1.2
Anthracene	3000	600
Arsenic	10	1
Asbestos	7 million fibers per liter (MFL)	0.7 MFL
Atrazine, total chlorinated residues	3[2]	0.3[2]
Bacteria, Total Coliform	0[3]	0[3]
Barium	2 milligrams/liter (mg/l)	0.4 mg/l
Bentazon	300	60
Benzene	5	0.5
Benzo(b)fluoranthene	0.2	0.02
Benzo(a)pyrene	0.2	0.02
Beryllium	4	0.4
Boron	1000	200
Bromodichloromethane	0.6	0.06
Bromoform	4.4	0.44
Bromomethane	10	1
Butylate	400	80
Cadmium	5	0.5
Carbaryl	40	4
Carbofuran	40	8
Carbon disulfide	1000	200
Carbon tetrachloride	5	0.5
Chloramben	150	30
Chlordane	2	0.2
Chlorodifluoromethane	7 mg/l	0.7 mg/l
Chloroethane	400	80
Chloroform	6	0.6
Chlorpyrifos	2	0.4
Chloromethane	30	3
Chromium (total)	100	10
Chrysene	0.2	0.02

Table 1 − Continued
Public Health Groundwater Quality Standards

Substance[1]	Enforcement Standard (micrograms per liter − except as noted)	Preventive Action Limit (micrograms per liter − except as noted)
Cobalt	40	8
Copper	1300	130
Cyanazine	1	0.1
Cyanide, free[4]	200	40
Dacthal	70	14
1,2−Dibromoethane (EDB)	0.05	0.005
Dibromochloromethane	60	6
1,2−Dibromo−3−chloropropane (DBCP)	0.2	0.02
Dibutyl phthalate	1000	100
Dicamba	300	60
1,2−Dichlorobenzene	600	60
1,3−Dichlorobenzene	600	120
1,4−Dichlorobenzene	75	15
Dichlorodifluoromethane	1000	200
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
1,3−Dichloropropene (cis/trans)	0.4	0.04
Di (2−ethylhexyl) phthalate	6	0.6
Dimethenamid/Dimethenamid−P	50	5
Dimethoate	2	0.4
2,4−Dinitrotoluene	0.05	0.005
2,6−Dinitrotoluene	0.05	0.005
Dinitrotoluene, Total Residues[5]	0.05	0.005
Dinoseb	7	1.4
1,4−Dioxane	3	0.3
Dioxin (2, 3, 7, 8−TCDD)	0.00003	0.000003
Endrin	2	0.4
EPTC	250	50
Ethylbenzene	700	140
Ethyl ether	1000	100
Ethylene glycol	14 mg/l	2.8 mg/l
Fluoranthene	400	80
Fluorene	400	80
Fluoride	4 mg/l	0.8 mg/l
Fluorotrichloromethane	3490	698
Formaldehyde	1000	100
Heptachlor	0.4	0.04
Heptachlor epoxide	0.2	0.02
Hexachlorobenzene	1	0.1
N−Hexane	600	120
Hydrogen sulfide	30	6
Lead	15	1.5
Lindane	0.2	0.02
Manganese	300	60
Mercury	2	0.2

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Table 1 − Continued
Public Health Groundwater Quality Standards

Substance[1]	Enforcement Standard (micrograms per liter − except as noted)	Preventive Action Limit (micrograms per liter − except as noted)
Methanol	5000	1000
Methoxychlor	40	4
Methylene chloride	5	0.5
Methyl ethyl ketone (MEK)	4 mg/l	0.8 mg/l
Methyl isobutyl ketone (MIBK)	500	50
Methyl tert−butyl ether (MTBE)	60	12
Metolachlor/s−Metolachlor	100	10
Metolachlor ethane sulfonic acid + oxanilic acid (Metolachlor − ESA + OXA)	1.3 mg/l	0.26 mg/l
Metribuzin	70	14
Molybdenum	40	8
Monochlorobenzene	100	20
Naphthalene	100	10
Nickel	100	20
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
N−Nitrosodiphenylamine	7	0.7
Pentachlorophenol (PCP)	1	0.1
Perchlorate	1	0.1
Phenol	2 mg/l	0.4 mg/l
Picloram	500	100
Polychlorinated biphenyls (PCBs)	0.03	0.003
Prometon	100	20
Propazine	10	2
Pyrene	250	50
Pyridine	10	2
Selenium	50	10
Silver	50	10
Simazine	4	0.4
Styrene	100	10
Tertiary Butyl Alcohol (TBA)	12	1.2
1,1,1,2−Tetrachloroethane	70	7
1,1,2,2−Tetrachloroethane	0.2	0.02
Tetrachloroethylene	5	0.5
Tetrahydrofuran	50	10
Thallium	2	0.4
Toluene	800	160
Toxaphene	3	0.3
1,2,4−Trichlorobenzene	70	14
1,1,1−Trichloroethane	200	40
1,1,2−Trichloroethane	5	0.5
Trichloroethylene (TCE)	5	0.5
2,4,5−Trichlorophenoxy−propionic acid (2,4,5−TP)	50	5
1,2,3−Trichloropropane	60	12
Trifluralin	7.5	0.75
Trimethylbenzenes (1,2,4− and 1,3,5− combined)	480	96
Vanadium	30	6

Table 1 – Continued
Public Health Groundwater Quality Standards

Substance[1]	Enforcement Standard (micrograms per liter – except as noted)	Preventive Action Limit (micrograms per liter – except as noted)
Vinyl chloride	0.2	0.02
Xylene[6]	2 mg/l	0.4 mg/l

[1] Appendix I contains Chemical Abstract Service (CAS) registry numbers, common synonyms and trade names for most substances listed in Table 1.

[2] Total chlorinated atrazine residues includes parent compound and the following metabolites of health concern: 2–chloro–4–amino–6–isopropylamino–s–triazine (formerly deethylatrazine), 2–chloro–4–amino–6–ethylamino–s–triazine (formerly deisopropylatrazine) and 2–chloro–4,6–diamino–s–triazine (formerly diaminoatrazine).

[3] Total coliform bacteria may not be present in any 100 ml sample using either the membrane filter (MF) technique, the presence–absence (P–A) coliform test, the minimal medium ONPG–MUG (MMO–MUG) test or not present in any 10 ml portion of the 10–tube multiple tube fermentation (MTF) technique.

[4] "Cyanide, free" refers to the simple cyanides (HCN, CN^-) and /or readily dissociable metal–cyanide complexes. Free cyanide is regulatorily equivalent to cyanide quantified by approved analytical methods for "amenable cyanide" or "available cyanide".

[5] Dinitrotoluene, Total Residues includes the dinitrotoluene (DNT) isomers: 2,3–DNT, 2,4–DNT, 2,5–DNT, 2,6–DNT, 3,4–DNT and 3,5–DNT.

[6] Xylene includes meta–, ortho–, and para–xylene combined.

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; am. Table 1, Register, August, 1995, No. 476, eff. 9–1–95; am. Table 1, Register, December, 1998, No. 516, eff. 1–1–99; am. Table 1, boron, Register, December, 1998, No. 516, eff. 12–31–99; am. Table 1, Register, March, 2000, No. 531, eff. 4–1–00; CR 03–063: am Table 1, Register February 2004 No. 578, eff. 3–1–04; CR 02–095: am. Table 1, Register November 2006 No. 611, eff. 12–1–06; reprinted to correct errors in Table 1, Register January 2007 No. 613; CR 07–034: am. Table 1 Register January 2008 No. 625, eff. 2–1–08; CR 09–102: am. Table 1 Register December 2010 No. 660, eff. 1–1–11.

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

Substance	Enforcement Standard (milligrams per liter – except as noted)	Preventive Action Limit (milligrams per liter – except as noted)
Chloride	250	125
Color	15 color units	7.5 color units
Foaming agents MBAS (Methylene–Blue Active Substances)	0.5	0.25
Iron	0.3	0.15
Manganese	0.05	0.025
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 equal to or less than the limit of quantitation:

(a) If a substance is not detected in a sample, the regulatory agency may not consider the preventive action limit or enforcement standard to have been attained or exceeded.

(b) If the preventive action limit or enforcement standard is less than the limit of detection, and the concentration of a substance is reported between the limit of detection and the limit of quantitation, the regulatory agency shall consider the preventive action limit or enforcement standard to be attained or exceeded only if:

1. The substance has been analytically confirmed to be present in the same sample using an equivalently sensitive analytical method or the same analytical method, and

2. The substance has been statistically confirmed to be present above the preventive action limit or enforcement standard, determined by an appropriate statistical test with sufficient samples at a significance level of 0.05.

(c) If the preventive action limit or enforcement standard is between the limit of detection and the limit of quantitation, the regulatory agency shall consider the preventive action limit or

enforcement standard to be attained or exceeded if the concentration of a substance is reported at or above the limit of quantitation.

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; r. and recr. (3) (intro.), (a), (b), renum. (3) (c) to be 140.16 (5) and am., Register, August, 1995, No. 476, eff. 9–1–95.

NR 140.16 Monitoring and laboratory data requirements. (1) (a) All groundwater quality samples collected to determine compliance with ch. 160, Stats., shall comply with this section except as noted.

(b) *Groundwater sampling requirements.* All groundwater quality samples shall be collected and handled in accordance with procedures specified by the applicable regulatory agency or, where no sampling procedures are specified by that agency, in accordance with the sampling procedures referenced in par. (c). The sampling procedures specified by a regulatory agency may include requirements for field filtration.

(c) *Department groundwater sampling procedures.* 1. If sampling procedures are not specified by the applicable regulatory agency pursuant to par. (b), all groundwater quality samples shall be collected and handled in accordance with the sampling procedures contained in the following publications:

a. Groundwater Sampling Desk Reference. Wisconsin Department of Natural Resources, PUBL–DG–037–96, September, 1996.

b. Groundwater Sampling Field Manual. Wisconsin Department of Natural Resources, PUBL–DG–038–96, September, 1996.

Note: Copies of these publications may be purchased from:
Wisconsin Department of Administration
Document Sales Unit
4622 University Avenue
Madison, WI 53705–2156
These publications are available for inspection at the offices of the department, the secretary of state and the legislative reference bureau.

2. Where no procedure for collecting a particular groundwater quality sample is specified by the appropriate regulatory agency or in the publications referenced in subd. 1., other published scientifically valid groundwater sampling procedures may be used.

(d) *Laboratory requirements.* All groundwater quality samples, except samples collected for total coliform bacteria analysis and field analyses for pH, specific conductance and temperature, shall be analyzed in accordance with provisions of ch. NR 149 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 agriculture, trade and consumer protection.

Note: Refer to s. NR 149.46 for sample preservation procedures and holding times.

(e) *Data submittal.* The results of the analysis of groundwater quality samples shall be submitted to the department and any applicable regulatory agency. Except as provided in s. NR 205.07 (3) (c) for wastewater permittees, this section does not require the submission of groundwater monitoring data which is collected voluntarily and is not required to be collected to determine compliance with this chapter or another rule or statute.

(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

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.

(4) The department may reject groundwater quality data that does not meet the requirements of the approved or designated analytical methods.

(5) 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. If a substance is detected below the limit of quantitation, the owner or operator shall report the detected value with the appropriate qualifier to the regulatory agency.

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; (5) renum. from NR 140.14 (3) (c), cr. (4), Register, August, 1995, No. 476, eff. 9–1–95; r. and recr. (1), Register, December, 1998, No. 516, eff. 1–1–99.

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.

Table 3
Methodology for Establishing Preventive Action Limit for Indicator Parameters

Parameter	*Minimum Increase (mg/l)*
Alkalinity	100
Biochemical oxygen demand (BOD_5)	25
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 microSiemens/cm
Total dissolved solids (TDS)	200
Total hardness	100
Total organic carbon (TOC)	1
Total organic halogen (TOX)	0.25

History: Cr. Register, September, 1985, No. 357, eff. 10–1–85; am. table 3, Register, October, 1990, No. 418, eff. 11–1–90; am. Table 3, Register, December, 1998, No. 516, eff. 1–1–99; CR 09–102: am. Table 3 Register December 2010 No. 660, eff. 1–1–11.

NR 140.22 Point of standards application for design and compliance. (1) DESIGN. Except as specified in sub. (1m), 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).

(1m) DESIGN OF ASR SYSTEMS; SPECIFIED SUBSTANCES. The point of standards application to determine if the design of an aquifer storage recovery system, regulated under ch. 280 or 281, Stats., complies with the preventive action limits for a specified substance is 1,200 feet from an aquifer storage and recovery well and at any other well that is not part of the ASR system and that is within 1,200 feet of an aquifer storage recovery well.

(2) COMPLIANCE. (a) Except as specified in par. (d), 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) Except as specified in par. (d), 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.

(c) For discharges, releases, sites or facilities regulated under s. 292.11, 291.29 or 291.37, 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.

Note: Section NR 600.07 no longer exists.

(d) The point of standards application to determine if a preventive action limit or enforcement standard for a specified substance has been attained or exceeded at an aquifer storage recovery well, regulated under ch. 280 or 281, Stats., is 1,200 feet from the aquifer storage and recovery well and at any other well that is not part of the ASR system and that is within 1,200 feet of the aquifer storage recovery well.

(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 or ASR displacement zone 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 ch. 291, 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

Type of Facility, Practice or Activity	*Horizontal Distances for the Design Management Zone*
Land disposal systems regulated under ch. 283, Stats.	250 feet
Wastewater and sludge storage or treatment lagoons regulated under ch. 281 or 283, Stats.	100 feet
Solid waste disposal facilities regulated under ch. 289, Stats., which have feasibility reports approved after October 1, 1985.	150 feet
All other solid waste disposal facilities regulated under ch. 289, Stats.	300 feet
Hazardous waste disposal facilities, waste piles, landfills and surface impoundments subject to regulation under ss. NR 665.0090 to 665.0094	300 feet
Hazardous waste disposal facilities, waste piles, landfills and surface impoundments subject to regulation under ss. NR 664.0090 to 664.0100.	0 feet
Aquifer storage recovery systems regulated under ch. 280 or 281, Stats.	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; CR 02–134: am. (1) (intro.), (2) (a), (b) (intro.), (3) (a) and Table 4, cr. (1m) and (2) (d) Register June 2003 No. 570, eff. 7–1–03; correction in Table 4 made under s. 13.93 (2m) (b) 7., Stats., Register November 2006 No. 611.

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. When the results of any private well sampling attain or exceed a preventive action limit, the owner or operator of the facility, practice or activity shall notify the department within 10 days after the results are received. The notification shall provide a preliminary analysis of the cause and significance of the concentration.

Note: Section 292.11 (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 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 nature, thickness and permeability of the unconsolidated materials; the nature and permeability of bedrock; the depth

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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, considering the criteria specified in s. NR 722.07. Both the source control and the groundwater restoration components of the response shall be designed and implemented 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 the owner or operator of a facility, practice or activity to take 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 taken or required by the department.

Table 5

Range of Responses for Exceedances 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. Require the installation and sampling of groundwater monitoring 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.
12. Require the collection and evaluation of data to determine whether natural attenuation can be effective to restore groundwater quality within a reasonable period of time, considering applicable criteria specified in ss. NR 140.24, 722.07 and 722.09 or 722.11, and require monitoring to determine whether or not natural attenuation is occurring in compliance with the response objectives in s. NR 140.24 (2).

(5) NO ACTION RESPONSE CRITERIA. For facilities, practices and activities with a design management zone specified in s. NR 140.22 (3) Table 4, the department may determine that no response is necessary and that an exemption under s. NR 140.28 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; am. (1) (a), (5) (intro.), Register, August, 1995, No. 476, eff. 9–1–95; am. (2) (intro.), (4) and Table 5, Register, October, 1996, No. 490, eff. 11–1–96; am. (1) (a), Register, December, 1998, No. 516, eff. 1–1–99.

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. When the results of any private well sampling attain or exceed an enforcement standard or preventive action limit, the owner or operator of the facility, practice or activity shall notify the department within 10 days after the results are received. The notification shall provide a preliminary analysis of the cause and significance of the concentration.

Note: Section 292.11 (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. (4).

(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. (4). 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. 283, Stats., ch. 289 or 291, 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, considering the criteria specified in s. NR 722.07. Both the source control and the groundwater restoration components of 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 may require the owner or operator of a facility, practice or activity to take 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 listed in Table 6 may be required by the department. In addition, the department may take or may require the owner or operator of a facility, practice or activity to take one or more responses from Table 5, except response 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.
8. Require the collection and evaluation of data to determine whether natural attenuation can be effective to restore groundwater quality within a reasonable period of time, considering applicable criteria specified in ss. NR 140.24, 722.07 and 722.09 or 722.11, and require monitoring to determine whether or not natural attenuation is occurring in compliance with the requirements of s. NR 140.26 (2) (a).

(b) If an activity or practice is not subject to regulation under subch. IV of ch. 283, Stats., ch. 289 or 291, 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. 459, eff. 4–1–94; am. (1) (a), Register, August, 1995, No. 476, eff. 9–1–95; correction in (1) (b) and (c) made under s. 13.93 (2m) (b) 7., Stats., Register, August, 1995, No. 476; am. (2) (a) and Table 6, Register, October, 1996, No. 490, eff. 11–1–96; am. (1) (a), Register, December, 1998, No. 516, eff. 1–1–99.

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) APPLICABILITY. (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.

(c) For an existing facility, practice or activity that has taken or is taking a response under s. NR 140.24 (2) or 140.26 (2), a continued response is required unless a substance no longer attains or exceeds a preventive action limit or an exemption has been granted under this section.

(d) If a substance or remedial material is to be infiltrated or injected into groundwater at a concentration which attains or exceeds a preventive action limit, or at any concentration for a substance or remedial material for which a groundwater quality standard has not been established under this chapter, a temporary exemption is required under sub. (5).

(2) CRITERIA FOR GRANTING EXEMPTIONS WHERE THE BACKGROUND CONCENTRATION IS BELOW THE 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 is below the preventive action limit if the facility, practice or activity is designed and implemented 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 that 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, is below the preventive action limit for that substance if all of the following occur:

1. The measured or anticipated increase in the concentration of the substance will be minimized to the extent technically and economically feasible.

2. Compliance with the preventive action limit is either not technically or economically feasible.

3. The enforcement standard for that substance will not be attained or exceeded at the point of standards application.

4. 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.

Note: An exemption may be considered under this subsection even if monitoring data indicates no detectable background concentration of the substance.

(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

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) CRITERIA FOR GRANTING A TEMPORARY EXEMPTION WHERE INFILTRATION OR INJECTION IS UTILIZED FOR A REMEDIAL ACTION. (a) *General.* In lieu of an exemption granted in compliance with the criteria in subs. (2) to (4), the department may grant a temporary exemption if the criteria in this subsection are complied with. This exemption applies to the owner or operator of a facility, practice or activity that is undertaking a remedial action that: includes the infiltration or injection of contaminated groundwater or remedial material, has been approved by the department, and will comply with the applicable response objectives under s. NR 140.24 or 140.26 within a reasonable period of time. The owner or operator of the facility, practice or activity may submit a temporary exemption request to the department at the same time or after the department has approved the remedial action.

(b) *Exemption request.* The owner or operator of the facility, practice or activity shall submit a request for a temporary exemption to the department. As part of the request, the applicant shall indicate how the exemption prerequisites under par. (c) and appli-

cable remedial design, operational and monitoring criteria under par. (d) will be met.

Note: For most remedial actions, a microcosm or treatability study, or other bench scale or pilot scale study will be required by the department prior to consideration of an exemption for the full–scale remedial action under this section. If a pilot scale study is deemed necessary before an exemption for a full–scale remedial action can be granted, a separate temporary exemption issued under this section is required before the pilot scale study can begin.

(c) *Exemption prerequisites.* As part of the temporary exemption request, the owner or operator shall demonstrate to the satisfaction of the department that all of the following requirements will be met:

1. The remedial action for restoring contaminated soil or groundwater, and any infiltrated or injected contaminated water and remedial material, shall achieve the applicable response objectives required by s. NR 140.24 (2) or 140.26 (2) within a reasonable period of time.

2. The type, concentration and volume of substances or remedial material to be infiltrated or injected shall be minimized to the extent that is necessary for restoration of the contaminated soil or groundwater and be approved by the department prior to use.

3. Any infiltration or injection of contaminated water or remedial material into soil or groundwater will not significantly increase the threat to public health or welfare.

4. No uncontaminated or contaminated water, substance or remedial material will be infiltrated or injected into an area where a floating non–aqueous phase liquid is present in the contaminated soil or groundwater.

5. There will be no expansion of soil or groundwater contamination, or migration of any infiltrated or injected contaminated water or remedial material, beyond the edges of previously contaminated areas, except that infiltration or injection into previously uncontaminated areas may be allowed if the department determines that expansion into adjacent, previously uncontaminated areas is necessary for the restoration of the contaminated soil or groundwater, and the requirements of subd. 1. will be met.

6. All necessary federal, state and local licenses, permits and other approvals are obtained and all applicable environmental protection requirements will be complied with.

Note: The issuance of a wastewater discharge permit by the department is required prior to the infiltration or injection of substances or remedial material into unsaturated soil or groundwater for discharges, as defined by s. 283.01 (4), Stats. A wastewater discharge permit establishes the effluent or injection limits for substances or remedial material which may be infiltrated or injected into unsaturated soil or groundwater. A temporary exemption granted under this subsection applies to substances or remedial material which may enter groundwater or may be detected at a point of standards applications; it does not apply to substances or remedial material infiltrated or injected into unsaturated soil.

(d) *Remedial action design, operation and monitoring criteria.* In addition to providing information on how the requirements under par. (c) will be met, the application shall specify the following information where applicable.

1. The remedial action design, operation and soil and groundwater monitoring procedures to insure compliance with the requirements under par. (c) and applicable criteria under this paragraph.

2. The level of pre–treatment for contaminated groundwater prior to reinfiltration or reinjection.

3. The types and concentrations of substances or remedial material being proposed for infiltration or injection.

4. The volume and rate of infiltration or injection of contaminated groundwater or remedial material.

5. The location where the contaminated groundwater or remedial material will be infiltrated or injected.

(e) *Granting an exemption.* The department may only grant a temporary exemption under this subsection at the same time or after the department has approved the remedial action. When the department grants an exemption under this subsection, it shall follow the exemption procedures included in sub. (6) and shall require the owner or operator of the facility, practice or activity to comply with the requirements and criteria in pars. (c) and (d). The temporary exemption shall also include:

1. The expiration date of the temporary exemption. The expiration date shall be selected to achieve the applicable response objectives required by s. NR 140.24 (2) or 140.26 (2) within a reasonable period of time, not to exceed 5 years from the effective date of the exemption. The temporary exemption may be reissued following a department review of information documenting the performance of the remedial action and a successful demonstration that reissuance of the exemption is necessary to achieve the response objectives required by s. NR 140.24 (2) or 140.26 (2).necessary relating to the temporary exemption.

(f) *Responses to exemption violations.* If the department determines that the conditions or requirements specified in the temporary exemption are not being met, the department may:

1. Require that the owner or operator of the facility, practice or activity revise the remedial action design, operation or monitoring procedures in accordance with par. (d). All revisions shall comply with the requirements established under pars. (c) and (e) and may require approval from the department prior to implementation.

2. Revoke the exemption and require implementation of an alternate remedial action to restore soil or groundwater quality.

(6) EXEMPTION PROCEDURES. If the department grants an exemption under this section for a substance or a remedial material, it shall specify:

(a) The substance or remedial material 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 or remedial material; 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; renum. (5) to be (6), cr. (5), Register, August, 1995, No. 476, eff. 9–1–95; cr. (1) (c), (d), am. (2) (intro.), (5) (a), (6) (intro.), (a) and (b), Register, December, 1998, No. 516, eff. 1–1–99; r. and recr. (2), Register, March, 2000, No. 531, eff. 4–1–00.

CHAPTER NR 140
APPENDIX I TO TABLE 1
PUBLIC HEALTH GROUNDWATER QUALITY STANDARDS

Substance	CAS RN[1]	Common synonyms/*Tradename*[2]
Acetochlor	34256−82−1	*Cadence, Degree, Harness, Keystone, Overtime, Volley*
Acetochlor ethane sulfonic acid + oxanilic acid	187022−11−3 (ESA) 184992−44−4 (OXA)	Acetochlor − ESA + OXA
Acetone	67−64−1	*Propanone*
Alachlor	15972−60−8	*Lasso*
Alachlor ethane sulfonic acid	142363−53−9	Alachlor−ESA, Alachlor Ethane Sulfonate, MON 5775
Aldicarb	116−06−3	*Temik*
Aluminum	7429−90−5	
Ammonia	7664−41−7	
Anthracene	120−12−7	Para−naphthalene
Asbestos	1332−21−4	
Bentazon	25057−89−0	*Basagran*
Benzene	71−43−2	
Benzo(b)fluoranthene	205−99−2	B(b)F,3,4−Benzofluoranthene
Benzo(a)pyrene	50−32−8	BaP, B(a)P
Boron	7440−42−8	
Bromodichloromethane	75−27−4	Dichlorobromomethane, BDCM
Bromoform	75−25−2	Tribromomethane
Bromomethane	74−83−9	Methyl bromide
Butylate	2008−41−5	S−ethyl di−isobutylthiocarbamate, *Sutan+*
Carbaryl	63−25−2	*Sevin*
Carbofuran	1563−66−2	*Furadan*
Carbon disulfide	75−15−0	Carbon bisulfide
Carbon tetrachloride	56−23−5	Tetrachloromethane, Perchloroethane
Chloramben	133−90−4	
Chlordane	57−74−9	
Chlorodifluoromethane	75−45−6	HCFC−22, Freon 22
Chloroethane	75−00−3	Ethyl chloride, Monochloroethane
Chloroform	67−66−3	Trichloromethane
Chlorpyrifos	2921−88−2	*Dursban, Lorsban, Warhawk, Hatchet, Yuma, Whirlwind, Eraser*
Chloromethane	74−87−3	Methyl chloride
Chromium (total)	7440−47−3	
Chrysene	218−01−9	1,2−Benzphenanthrene
Cobalt	7440−48−4	
Cyanazine	21725−46−2	*Bladex* , 2−chloro−4−ethylamino−6−nitriloisopropylamino−s−triazine
Cyanide, free	57−12−5	
Dacthal	1861−32−1	DPCA, Chlorothal, *Dacthalor*, 1,4−benzenedicarboxylic acid
Dibromochloromethane	124−48−1	Chlorodibromomethane, DBCM
1,2−Dibromo−3−chloropropane	96−12−8	DBCP, Dibromochloropropane
1,2−Dibromoethane	106−93−4	EDB, Ethylene dibromide, Dibromoethane
Dibutyl phthalate	84−74−2	DP, Di−*n*−butyl phthalate, *n*−Butyl phthalate
Dicamba	1918−00−9	*Banvel*
1,2−Dichlorobenzene	95−50−1	o−Dichlorobenzene, o−DCB
1,3−Dichlorobenzene	541−73−1	m−Dichlorobenzene, m−DCB
1,4−Dichlorobenzene	106−46−7	p−Dichlorobenzene, p−DCB
Dichlorodifluoromethane	75−71−8	*Freon 12*
1,1,−Dichloroethane	75−34−3	Ethylidine chloride
1,2−Dichloroethane	107−06−2	1,2−DCA, Ethylene dichloride

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Substance	CAS RN[1]	Common synonyms/*Tradename*[2]
1,1–Dichloroethylene	75–35–4	1,1–DCE, 1,1–Dichloroethene, Vinylidene chloride
1,2–Dichloroethylene (cis)	156–59–2	cis–Dichloroethylene, 1,2–Dichloroethene (cis)
1,2–Dichloroethylene (trans)	156–60–5	trans–1,2–Dichloroethylene
2,4–Dichlorophenoxyacetic acid	94–75–7	2,4–D
1,2–Dichloropropane	78–87–5	Propylene dichloride
1,3–Dichloropropene (cis/trans)[3]	542–75–6	*Telone,* DCP, Dichloropropylene
Di(2–ethylhexyl) phthalate	117–81–7	DEHP, Bis(2–ethylhexyl) phthalate, 1,2–Benzenedicarboxylic acid, Bis (2–ethylhexyl)ester
Dimethenamid/Dimethinamid–P	87674–68–8 163515–14–8 (–P)	*Frontier, Outlook, Propel, Establish, Sortie, Tower*
Dimethoate	60–51–5	
2,4–Dinitrotoluene	121–14–2	2,4–DNT, 1–methyl–2,4–dinitrobenzene
2,6–Dinitrotoluene	606–20–2	2,6–DNT, 2–methyl–1,3–dinitrobenzene
Dinitrotoluene, Total Residues	25321–14–6	Dinitrotoluene, DNT
Dinoseb	88–85–7	2–(1–methylpropyl)–4,6–dinitrophenol
1,4–Dioxane	123–91–1	*p*–Dioxane
Dioxin	1746–01–6	2,3,7,8–TCDD,2,3,7,8–Tetrachlorodibenzo–p–dioxin
Endrin	72–20–8	
EPTC	759–94–4	*Eptam, Eradicane*
Ethylbenzene	100–41–4	Phenylethane, EB
Ethyl ether	60–29–7	Diethyl Ether
Ethylene glycol	107–21–1	
Fluoranthene	206–44–0	Benzo(jk)fluorene
Fluorene	86–73–7	2,3–Benzidine, Diphenylenemethane
Fluoride	7681–49–4	
Fluorotrichloromethane	75–69–4	*Freon11*, Trichlorofluoromethane
Formaldehyde	50–00–0	
Heptachlor	76–44–8	*Velsicol*
Heptachlor epoxide	1024–57–3	
Hexachlorobenzene	118–74–1	Perchlorobenzene, *Granox*
N–Hexane	110–54–3	Hexane, Skellysolve B
Hydrogen sulfide	7783–06–4	Dihydrogen sulfide
Lindane	58–89–9	
Manganese	7439–96–5	
Mercury	7439–97–6	
Methanol	67–56–1	Methyl alcohol, Wood alcohol
Methoxychlor	72–43–5	
Methylene chloride	75–09–2	Dichloromethane, Methylene dichloride
Methyl ethyl ketone	78–93–3	MEK, 2–Butanone
Methyl isobutyl ketone	108–10–1	MIBK, 4–Methyl–2–pentanone, Isopropylacetone, *Hexone*
Methyl tert–butyl ether	1634–04–4	MTBE, 2–Methoxy–2–methyl–propane, tert–Butyl methyl ether
Metolachlor/s–Metolachlor	51218–45–2 87392–12–9 (s–)	*Dual, Bicep, Milocep, Stalwart, Parallel, Prefix, Charger, Brawl, Cinch, Dual Magnum, Boundary*
Metolachlor ethane sulfonic acid + oxanilic acid	171118–09–5 (ESA) 152019–73–3 (OXA)	Metolachlor – ESA + OXA
Metribuzin	21087–64–9	Sencor, Lexone
Molybdenum	7439–98–7	
Monochlorobenzene	108–90–7	Chlorobenzene
Naphthalene	91–20–3	

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Substance	CAS RN[1]	Common synonyms/*Tradename*[2]
N–Nitrosodiphenylamine	86–30–6	NDPA
Pentachlorophenol	87–86–5	PCP, Pentachlorohydroxybenzene
Perchlorate	14797–73–0	Perchlorate and perchlorate salts, Perchlorate ion
Phenol	108–95–2	
Picloram	1918–02–1	*Tordon*, 4–amino–3,5,6–trichloropicolinic acid
Polychlorinated biphenyls[4]		PCBs
Prometon	1610–18–0	*Pramitol, Prometone*
Pyrene	129–00–0	Benzo(def)phenanthrene
Pyridine	110–86–1	Azabenzene
Simazine	122–34–9	*Princep,* 2–chloro–4,6–diethylamino–s–triazine
Styrene	100–42–5	Ethenylbenzene, Vinylbenzene
Tertiary Butyl Alcohol	75–65–0	TBA
1,1,1,2–Tetrachlorethane	630–20–6	1,1,1,2–TCA, 1,1,1,2–PCA
1,1,2,2,–Tetrachloroethane	79–34–5	1,1,2,2–TCA, 1,1,2,2–PCA
Tetrachloroethylene	127–18–4	Perchloroethylene, PERC, Tetrachloroethene
Tetrahydrofuran	109–99–9	THF
Toluene	108–88–3	Methylbenzene
Toxaphene	8001–35–2	
1,2,4–Trichlorobenzene	120–82–1	
1,1,1–Trichloroethane	71–55–6	Methyl chloroform, 1,1,1–TCA
1,1,2–Trichloroethane	79–00–5	1,1,2–TCA, Vinyl trichloride
Trichloroethylene	79–01–6	TCE, Chloroethene
2,4,5–Trichlorophenoxy–propionic acid	93–72–1	2,4,5–TP,*Silvex*
1,2,3–Trichloropropane	96–18–4	1,2,3–TCP, Glycerol trichlorohyrin
Trifluralin	1582–09–8	*Treflan*
1,2,4–Trimethylbenzene	95–63–6	
1,3,5–Trimethylbenzene	108–67–8	
Vanadium	7440–62–2	
Vinyl chloride	75–01–4	VC, Chloroethene
Xylene[5]		

[1]Chemical Abstracts Service (CAS) registry numbers are unique numbers assigned to a chemical substance. The CAS registry numbers were published by the U.S. Environmental Protection Agency in 40 CFR Part 264, Appendix IV

[2]Common synonyms include those widely used in government regulations, scientific publications, commerce and the general public. A trade name, also known as the proprietary name, is the specific, registered name given by a manufacturer to a product. Trade names are listed in *italics*. Common synonyms and trade names should be cross–referenced with CAS registry number to ensure the correct substance is identified.

[3]This is a combined chemical substance which includes cis 1,3–Dichloropropene (CAS RN 10061–01–5) and trans 1,3–Dichloropropene (CAS RN 10061–02–6).

[4]Polychlorinated biphenyls (CAS RN 1336–36–3); this category contains congener chemicals (same molecular composition, different molecular structure and formula), including constituents of Aroclor–1016 (CAS RN12674–11–2), Aroclor–1221 (CAS RN 11104–28–2), Aroclor–1232 (CAS RN 11141–16–5), Aroclor–1242 (CAS RN 53469–21–9), Aroclor–1248 (CAS RN 12672–29–6), Aroclor–1254 (CAS RN 11097–69–1), and Aroclor–1260 (CAS RN 11096–82–5).

[5]Xylene (CAS RN 1330–20–7) refers to a mixture of three isomers, meta–xylene (CAS RN 108–38–3), ortho–xylene (CAS RN 95–47–6), and para–xylene (CAS RN 106–42–3)