The statement of scope for this rule, SS 090-19, was approved by the Governor on August 27, 2019, published in Register No. 765A1 on September 3, 2019, and approved by the Natural Resources Board on January 22, 2020. This rule was approved by the Governor on date.

ORDER OF THE STATE OF WISCONSIN NATURAL RESOURCES BOARD
AMENDING RULES

The Wisconsin Natural Resources Board proposes an order to **amend** NR 140.10 Table 1, 140.20 Table 3 and Appendix I to Table 1 relating to setting numerical standards to minimize the concentration of polluting substances in groundwater and affecting small business.

DG-15-19

Analysis Prepared by the Department of Natural Resources

1. Statute Interpreted:
Sections 160.07(5), 160.15(1), 160.19, 281.15, 281.19(1), and 299.11, Wis. Stats., authorize the department to modify and create rules relating to development of numerical groundwater quality standards.

2. Statutory Authority:
Sections 160.07(5), 160.15(1), 160.19, 281.15, 281.19(1), and 299.11, Wis. Stats.

3. Explanation of Agency Authority:
Chapter 160, Wis. Stats., establishes an administrative process for developing numerical state groundwater quality standards to be used as criteria for the protection of public health and welfare by all state groundwater regulatory programs. Chapter 160, Wis. Stats., directs the department to use this administrative process to establish numeric groundwater quality standards for substances of public health or welfare concern, found in, or having a reasonable probability of being detected in, the groundwater resources of the state. The department is required to engage in rulemaking for all substances of public health concern for which the Wisconsin Department of Health Services (DHS) develops enforcement standard recommendations. S. 160.07(5), Wis. Stat. The department is also required to establish by rule preventative action limits for all substances with enforcement standards. S. 160.15(1), Wis. Stat.

Section 281.15, Wis. Stat., states that the department shall promulgate rules setting standards of water quality, applicable to the waters of the state, that protect the public interest, including the protection of public health and welfare, and the present and prospective future use of such waters for public and private water systems. Section 281.19(1), Wis. Stat., grants the department the authority to issue general orders and adopt rules applicable throughout the state for the construction, installation, use and operation of practicable and available systems, methods and means for preventing and abating pollution of the waters of the state.

In accordance with ch. 160, Wis. Stat., the reliability of sampling data is to be considered when determining the range of responses that a regulatory agency may take, or require, to address attainment or exceedance of a state groundwater quality standard at an applicable "point of standards application." Section 299.11, Wis. Stat., authorizes the department, in conjunction with the Department of Agriculture Trade and Consumer Protection (DATCP), to establish uniform minimum criteria for laboratories certified to conduct water analysis testing, and to establish accepted methodologies to be followed in conducting tests and sampling protocols and documentation procedures to be followed when collecting water samples for testing.

4. Related Statutes or Rules:
Section 281.12(1), Wis. Stats., grants the department general authority to carry out planning, management and regulatory programs necessary to protect, maintain and improve the quality and management of the waters of the state, ground and surface, public and private.

Chapter 280, Wis. Stats., authorizes the department to prescribe, publish and enforce minimum standards and rules to be pursued in the obtaining of pure drinking water for human consumption. Chapter NR 809, Wis. Adm. Code, establishes minimum state drinking water standards for the protection of public health, safety and welfare. This administrative code contains numeric water quality protection standards applicable to public water supply systems in Wisconsin.

Wisconsin state drinking water standards, applicable to public drinking water systems, have not yet been established for: hexavalent chromium, strontium, thiamethoxam, imidacloprid, clothianidin, isoxaflutole, isoxaflutole DKN degradate, isoxaflutole BA degradate, thiencarbazone-methyl, Dacthal TPA and MTP degradates, glyphosate aminomethylphosphonic acid (AMPA) degradate, sulfentrazone, perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), 1,2,3-trichloropropane (1,2,3-TCP), 1,4-dioxane, boron, molybdenum or cobalt.

Wisconsin state drinking water maximum contaminant levels (MCLs) have been established, in ch. NR 809, Wis. Adm. Code, for: glyphosate, at 700 micrograms per liter (ug/L), *Escherichia coli* (*E. coli*) bacteria, at 0 bacteria present in a drinking water sample, trichloroethylene (TCE), at 5 ug/L, and tetrachloroethylene (PCE), at 5 ug/L. Secondary Standards, established for aesthetic quality, have been promulgated in ch. NR 809, Wis. Adm. Code, for aluminum at 50 to 200 ug/L. Note that concentration in ug/L is equivalent to parts per billion (ppb).

5. Plain Language Analysis:
Chapter 160, Wis. Stat., is Wisconsin's Groundwater Standards Protection law. This chapter requires the department to develop numerical groundwater quality standards, consisting of enforcement standards and preventive action limits. Chapter NR 140, Wis. Adm. Code, establishes groundwater standards. These proposed amendments to ch. NR 140, Wis. Adm. Code, would add new state groundwater quality standards for 17 substances and revise existing standards for another 8 substances. In accordance with s. 160.07, Wis. Stat., amendments to ch. NR 140, Wis. Adm. Code, groundwater quality standards for substances of public health concern are based on recommendations from DHS. DHS's recommendations are available at: https://www.dhs.wisconsin.gov/water/gws-cycle10.htm. The technical analysis supporting each of the recommendations can be found by clicking on the substance.

The proposed rule for new and revised groundwater quality standards are grouped into five categories: Per- and Polyfluoroalkyl Substances (PFAS), Volatile Organic Compounds (VOCs), Metals/Metalloids, Agricultural Chemicals, and Bacteria. PFAS includes new public health related groundwater standards for perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). VOCs includes revised public health related groundwater standards for: trichloroethylene (TCE), tetrachloroethylene (PCE), 1,4-dioxane, and 1,2,3-trichloropropane (1,2,3-TCP). Metals/Metalloids includes new public health related groundwater standards for hexavalent chromium and strontium, and revised public health related groundwater standards for: aluminum, boron, molybdenum, and cobalt. Agricultural Chemicals includes new public health related groundwater standards for: thiamethoxam, imidacloprid, clothianidin, isoxaflutole plus isoxaflutole DKN degradate, isoxaflutole BA degradate, thiencarbazone-methyl, glyphosate, glyphosate aminomethylphosphonic acid (AMPA) degradate, and sulfentrazone, and revised public health related groundwater standards for Dacthal that would include the Dacthal Tetrachloroterephthalic Acid (TPA) and Monomethyl tetrachloroterephthalic acid (MTP) degradates. Bacteria includes new public health related groundwater standards for *Escherichia coli* (*E. coli*) bacteria.

Minor revisions, to clarify rule language and update rule reference information, are also proposed to ch. NR 140. These revisions include:

- Revising order of Antimony and Anthracene in s. NR 140.10, Table 1 to correct their alphabetical order in the table.
- Removing, in s. NR 140.20, Table 3, the indicator parameter for ammonia nitrogen. Health standards were established for ammonia (as N), in s. NR 140.10, Table 1, as part of the "Cycle 9" revisions to ch. NR 140.
- Making needed additions and revisions to ch. NR 140 Appendix I to Table 1 substance names, Chemical Abstracts Service (CAS) registry numbers, and common synonyms.

6. Summary of, and Comparison with, Existing or Proposed Federal Statutes and Regulations:
The U.S. Environmental Protection Agency (EPA) establishes health-based drinking water maximum contaminant levels (MCLs), cancer risk levels, and health advisories (HAs) that are used to assess the quality of groundwater drinking water supplies. Federal drinking water MCLs are established based on scientific risk assessments and, in some cases, economic and technological considerations. Cancer risk levels are established as the concentration of a chemical in drinking water that corresponds to a specific excess estimated lifetime cancer risk. Federal lifetime health advisories (LHAs) are developed based on an established health risk acceptable daily intake (ADI) level or reference dose (RfD). An ADI or RfD is the daily oral exposure to a chemical that is likely to be without an appreciable risk over a lifetime.

The proposed amendments to ch. NR 140, Wis. Adm. Code, adds new or revised state numeric groundwater quality standards for: PFAS including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA); VOCs including trichloroethylene (TCE), tetrachloroethylene (PCE), 1,4-dioxane, and 1,2,3-trichloropropane (1,2,3-TCP); metals/metalloids including hexavalent chromium, strontium, aluminum, boron, molybdenum, and cobalt; agricultural chemicals including thiamethoxam, imidacloprid, clothianidin, isoxaflutole plus isoxaflutole DKN degradate, isoxaflutole BA degradate, thiencarbazone-methyl, glyphosate, glyphosate aminomethylphosphonic acid (AMPA) degradate, sulfentrazone, Dacthal including the Dacthal Tetrachloroterephthalic Acid (TPA) and Monomethyl tetrachloroterephthalic acid (MTP) degradates; and bacteria including *Escherichia coli* (*E. coli*) bacteria.

Federal drinking water MCLs have been established for: glyphosate (700 ug/L), *Escherichia coli* (*E. coli*) bacteria (0 bacteria present), trichloroethylene (TCE) (5 ug/L) and tetrachloroethylene (PCE) (5 ug/L). EPA cancer slope factors have been established that can be used to determine 1 in 1,000,000 drinking water cancer risk levels. EPA cancer slope factors have been established for: hexavalent chromium [EPA OPP = 0.791 (mg/kg-day)-1, EPA IRIS draft = 0.5 (mg/kg-day)-1], isoxaflutole [0.0114 (mg/kg-day)-1], 1,2,3-trichloropropane (1,2,3-TCP) [30 (mg/kg-d)-1] and 1,4-dioxane [0.01 (mg/kg-d)-1]. EPA LHAs have been established for: strontium (4,000 ug/L), the sum of Dacthal and its degradates (MTP and TPA) (70 ug/L), perfluorooctanoic acid (PFOA) (70 ng/L), perfluorooctane sulfonate (PFOS) (70 ng/L), boron (6,000 ug/L), molybdenum (40 ug/L) and 1,4-dioxane (200 ug/L).

RfDs have been established by EPA for: hexavalent chromium (0.003 mg/kg/day), thiamethoxam (0.012 mg/kg/day), imidacloprid (0.057 mg/kg/day), clothianidin (0.098 mg/kg/day), isoxaflutole (0.02 mg/kg/day), thiencarbazone-methyl (1.17 mg/kg/day), sulfentrazone (0.14 mg/kg/day), 1,2,3-trichloropropane (1,2,3-TCP) (0.004 mg/kg/day) and 1,4-dioxane (0.03 mg/kg/day).

In October 2021, EPA issued a strategic roadmap for PFAS. EPA describes PFAS as an urgent public health and environmental issue that requires increased and sustained action by every level of government – federal, Tribal, state, and local. EPA's roadmap describes actions EPA plans to take to reduce PFAS in the environment. However, these actions do not include establishing numeric standards for PFAS in groundwater, which is exclusively a state responsibility in Wisconsin.

7. If Held, Summary of Comments Received During Preliminary Comment Period and at Public Hearing on the Statement of Scope:

A preliminary public hearing on Statement of Scope SS 090-19, related to revisions to ch. NR 140, was held on Nov. 12, 2019. Comments on the proposed scope were accepted through Nov. 19, 2019. A significant number of comments were received in support of the proposed scope for ch. NR 140 rulemaking. Comments were also received expressing concerns that the proposed scope did not list the specific substances that would be included in the proposed ch. NR 140 rulemaking effort and was therefore too broad. Those comments suggested that the list of the specific substances for which DHS provided groundwater standard recommendations should be added to the rulemaking scope.

Comments received in support of the proposed scope statement for ch. NR 140 rulemaking primarily focused on potential state groundwater quality standards for PFAS. Comments noted that there are health effects associated with exposure to PFAS compounds and that rules and standards were needed to protect Wisconsin water resources and drinking water supplies. Comments suggested that established groundwater standards for PFAS would provide regulatory certainty to responsible parties for cleanup and remediation at contamination sites. Comments were also received suggesting that, as PFAS are often detected in the environment as a complex mixture of different PFAS compounds, they should be regulated as a "class," or group of chemicals with a similar chemical composition and mechanism of toxicity.

The department provided the DHS with a list of substances, designated the "Cycle 10" list, and requested that DHS review toxicologic information on these substances and, if appropriate, provide recommendations for health-based groundwater quality standards for the substances. Comments on the scope pointed out that the specific substances on the "Cycle 10" list, that DHS provided groundwater standard recommendations for, including two PFAS compounds, were not listed in the scope statement. Comments suggested that this lack of specificity and detail made the scope too broad and potentially noncompliant with state law, and that therefore, the scope should be rejected by the Natural Resources Board and sent back to the department to have the list of the specific substances, for which DHS provided recommendations, added to it. Comments were also received related to the specific scientific studies and methods used by DHS to develop their health-based groundwater standard recommendations.

8. Comparison with Similar Rules in Adjacent States:

The states adjacent to Wisconsin – Minnesota, Michigan, Illinois and Iowa – use groundwater protection values/levels/standards in their regulation of practices and activities that might impact the quality of groundwater. Minnesota, Michigan, and Illinois have promulgated individual state groundwater protection standards. Iowa uses established federal standards (federal drinking water MCLs, LHAs and established cancer risk levels) as its state groundwater protection standards.

Groundwater protection quality values/levels/standards are usually developed based on health risk assessments. States are often required to follow state-specific health risk assessment methodology when establishing groundwater protection quality standards. States may use state-specific health risk assessments, factors and methodology in calculating and developing their groundwater protection standards. This use of different health risk assessment factors and methodologies has led to the establishment of different state groundwater protection values/levels/standards for the same substance. For example, the health-based groundwater protection level for strontium used by the states surrounding Wisconsin varies by state. The level established in Minnesota is 3,000 micrograms per liter (ug/L), the level established in Michigan is 4,600 ug/L, Illinois has not established a strontium groundwater protection level, and Iowa uses the federal lifetime health advisory level of 4,000 ug/L as its strontium groundwater protection level.

The state of Minnesota has established state groundwater protection "Health Risk Limits" (HRLs) under Minnesota Statutes Section 103H.201. The state of Minnesota has established HRLs for: hexavalent

chromium (100 ug/L), thiamethoxam (200 ug/L), clothianidin (200 ug/L), PFOA (35 nanograms per liter or ng/L), TCE (0.4 ug/L), PCE (5 ug/L), 1,2,3-TCP (7 ug/L) and 1,4-dioxane (100 ug/L). The Minnesota Department of Health has also calculated "Health Based Values" (HBVs) for some groundwater contaminants. Minnesota HBVs are not standards that have been promulgated by rule but are calculated concentrations that may be used as advisory levels by Minnesota state groundwater and environmental protection programs. Minnesota has established HBVs for: imidacloprid (3 ug/L), glyphosate (500 ug/L), glyphosate AMPA (1,000 ug/L) degradate and PFOS (20 ng/L). The Minnesota Department of Health also issues Risk Assessment Advice (RAA) levels for some groundwater contaminants. Minnesota Department of Health RAAs are advisory concentrations developed to assist Minnesota agencies in evaluating potential health risks to humans from exposures to a chemical. Generally, RAAs contain greater uncertainty than HRLs and HBVs because the information available to develop them is more limited. The state of Minnesota has established RAAs for: strontium (3,000 ug/L) and boron (500 ug/L).

The state of Michigan has established state groundwater protection quality standards. Michigan "Drinking Water Criteria and Risk Based Screening Levels" (RBSLs) are Michigan state groundwater protection standards authorized in accordance with Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451 (NREPA). Michigan has established a Drinking Water Criteria/RBSL for: hexavalent chromium (100 ug/L), strontium (4,600 ug/L), glyphosate (700 ug/L), PFOA + PFOS (70 ng/L), TCE (5 ug/L), PCE (5 ug/L), 1,2,3-TCP (42 ug/L) and 1,4-dioxane (7.2 ug/L).

The state of Illinois has established state groundwater quality standards for "potable resource groundwater." Illinois Groundwater Quality Standards are state groundwater protection standards promulgated in 35 Ill. Adm. Code 620, environmental protection regulations. Illinois state "Groundwater Quality Standards for Class I: Potable Resource Groundwater" have been established for: TCE (5 ug/L), PCE (5 ug/L), boron (2,000 ug/L) and 1,4-dioxane (7.7 ug/L).

The state of Iowa has not established specific state groundwater protection standards. In accordance with Iowa Environmental Protection Regulations 567 IAC Chapter 133, Iowa uses established federal EPA lifetime health advisory levels, "negligible risk levels" (NRLs) for carcinogens, the estimate of one additional cancer case per million people over a lifetime of exposure, and federal drinking water maximum contaminant levels (MCLs) as "Action Levels" in their regulation of practices and activities that may adversely impact groundwater quality. Federal lifetime health advisory levels have been established for: strontium (4,000 ug/L), the sum of Dacthal and its degradates (MTP and TPA) (70 ug/L), perfluorooctanoic acid (PFOA) (70 ng/L), perfluorooctane sulfonate (PFOS) (70 ng/L), boron (6,000 ug/L), molybdenum (40 ug/L) and 1,4-dioxane (200 ug/L). EPA cancer slope factors have been established that can be used to determine NRLs for carcinogens. EPA cancer slope factors have been established for: hexavalent chromium [EPA OPP = 0.791 (mg/kg-day)-1, EPA IRIS draft = 0.5 (mg/kg-day)-1], isoxaflutole [0.0114 (mg/kg-day)-1], 1,2,3-trichloropropane (1,2,3-TCP) [30 (mg/kg-d)-1] and 1,4-dioxane [0.01 (mg/kg-d)-1]. Federal drinking water MCLs have been established for: glyphosate (700 ug/L), *Escherichia coli* (*E. coli*) bacteria (0 bacteria present), trichloroethylene (TCE) (5 ug/L) and tetrachloroethylene (PCE) (5 ug/L).

9. Summary of Factual Data and Analytical Methodologies Used and How Any Related Findings Support the Regulatory Approach Chosen:

In accordance with s. 160.07, Wis. Stat., the department is required, for substances of public health concern, to propose rules establishing recommendations from DHS as state groundwater quality enforcement standards. In accordance with s. 160.15, Wis. Stat., the department is required to establish by rule a preventive action limit for each substance for which an enforcement standard is established.

To develop proposed groundwater standards, DHS follows the process described in ss. 160.09 to 160.17, Wis. Stat. This includes a review of federal numbers, state drinking water standards, and acceptable daily

intake values from the EPA, research studies and a search of peer-reviewed scientific research. DHS then develops a scientific support document describing the findings of their review and basis for the recommended proposed groundwater standards. At the conclusion of its review, DHS provided the department, in a document titled, Recommended Public Health Groundwater Quality Standards, Scientific Support Documents for "Cycle 10" Substances, June 2019, its recommendations for groundwater quality standards for the protection of public health.

DHS recommended new standards for 17 substances: perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), hexavalent chromium, strontium, thiamethoxam, imidacloprid, clothianidin, isoxaflutole, isoxaflutole DKN degradate, isoxaflutole BA degradate, thiencarbazone-methyl, Dacthal TPA and MTP degradates, glyphosate, glyphosate aminomethylphosphonic acid (AMPA) degradate, sulfentrazone, and *Escherichia coli* (*E. coli*) bacteria.

DHS also provided recommendations for revisions to existing public health related state groundwater quality standards for 8 additional substances: trichloroethylene (TCE), tetrachloroethylene (PCE), 1,2,3-trichloropropane (1,2,3-TCP), 1,4-dioxane, aluminum, boron, molybdenum and cobalt.

The department is proposing rules establishing the DHS enforcement standard recommendations as ch. NR 140, Wis. Adm. Code, state groundwater quality enforcement standards. The department is also proposing rules establishing ch. NR 140, Wis. Adm. Code, state groundwater quality preventive action limits in accordance with s. 160.15(1), Wis. Stat.

10. Analysis and Supporting Documents Used to Determine the Effect on Small Business or in Preparation of an Economic Impact Report:

Chapter 160, Wis. Stat., and ch. NR 140, Wis. Adm. Code, do not create independent regulatory authority. The enforcement of state groundwater quality standards is done by state regulatory agencies through regulatory programs that incorporate groundwater protection. State regulatory agencies, in exercising their statutory authority and duties that are established elsewhere in the statutes and administrative rules, establish regulations that assure that regulated facilities and activities will not cause state groundwater quality standards to be exceeded.

After the department establishes groundwater standards in ch. NR 140, Wis. Adm. Code, each state regulatory agency is required to review its administrative rules and amend or create rules necessary to ensure that the activities, practices, and facilities regulated by the regulatory agency complies with the new standards. S. 160.19, Wis. Stat.

The department anticipates that rulemaking activity in other regulatory programs may significantly decrease the cost of this groundwater standards rule. The department is in the process of promulgating a permanent rule adding numeric thresholds for PFOS and PFOA to the surface water quality standards. The surface water quality standards proposed rule includes WPDES permit implementation procedures for source reduction and treatment of PFOS and PFOA in wastewater discharges. Many of the industries and facilities governed by surface water quality standards would also be subject to the changes in this groundwater proposed rule. If the surface water quality rule is promulgated, the department anticipates the implementation and compliance cost of the proposed groundwater rule will substantially decrease. The WPDES permit program may also propose rules amending how the WPDES permit program regulates the land application of biosolids that contain PFOA and PFOS.

Any reasonable estimate of the implementation and compliance costs of this rule will be altered by the statutorily require review and ongoing promulgation of regulatory program rules outside the scope and authority of this rule. To comply with the directive in s. 227.137, Wis. Stat., the department analyzed and is providing a detailed quantification of the economic impact of the proposed rule, including the

implementation and compliance costs that are reasonably expected to be incurred by or passed along to the businesses, local governmental units, and individuals that may be affected by the proposed rule, based on the current administrative and statutory authority in the regulatory programs that rely on groundwater standards.

To the extent possible, the department estimates average annual costs incurred by other regulatory programs and rules is $3,284,171 in any year over a 5-year permitting cycle and $9,537,243 maximum over any two-year period. The table below summarizes the categories of costs incurred for compliance and implementation. The department does not anticipate costs to regulated entities from the addition of standards for metals/metaloids, agricultural chemicals, and bacteria (see sections 3, 4, and 5 of Attachment C to the EIA). A detailed assessment of the estimated compliance cost associated with this rule can be found in the EIA narrative document (Attachment C).

Estimated Average Compliance Cost Per Year

Categories	Average Annual Cost
PFAS	
Industrial and Municipals Wastewater and Industrial solids	$ 1,009,278
Municipal Biosolids	$ 1,577,533
VOC's	
TCE	$ 560,080
1,4 dioxane	$ 137,280
Total Annual cost (In Any Year Average Cost)	**$ 3,284,171**

11. Effect on Small Business (initial regulatory flexibility analysis):
The regulatory programs in state regulatory agencies that use ch. NR 140 groundwater standards may impact small business, particularly groundwater quality standards for VOCs including TCE and PCE. Revisions to these standards may impact small businesses such as dry cleaners whose properties are the sites of spills or releases of these substances and have contaminated groundwater. Revised standards may necessitate additional site monitoring and investigation, and potentially additional compliance response actions. It should be noted that while the proposed standards for TCE are lower than current standards, the proposed PCE standards are higher than the current standards. Therefore, while site investigation and compliance action costs may increase in some cases, they may decrease in others, depending on the contaminant of concern at a specific regulated site. The department estimates $556,008 per year of compliance costs to small businesses.

12. Agency Contact Person:
Darsi Foss, Department of Natural Resources, 101 S. Webster Street, PO Box 7921, Madison, WI 53707; darsi.foss@wisconsin.gov; (608) 267-6713

13. Place where comments are to be submitted and deadline for submission:
Written comments may be submitted at the public hearings, by regular mail, or email to:

Darsi Foss
Department of Natural Resources
101 S. Webster Street
PO Box 7921
Madison, WI 53707

DNR140GroundwaterQualityStandards@wisconsin.gov

Comments may be submitted to the department contact person listed above or to DNRAdministrativeRulesComments@wisconsin.gov until the deadline given in the upcoming notice of public hearing. The notice of public hearing and deadline for submitting comments will be published in the Wisconsin Administrative Register and on the department's website, at https://dnr.wi.gov/calendar/hearings/. Comments may also be submitted through the Wisconsin Administrative Rules Website at https://docs.legis.wisconsin.gov/code/chr/active.

RULE TEXT

SECTION 1. NR 140.10 Table 1 is amended to read:

NR 140.10 Table 1

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 milligrams/liter (mg/l)	1.8 mg/l
Alachlor	2	0.2
Alachlor ethane sulfonic acid (Alachlor - ESA)	20	4
Aldicarb	10	2
Aluminum	200	~~40~~ 20
Ammonia (as N)	9.7 mg/l	0.97 mg/l
~~Antimony~~	~~6~~	~~1.2~~
Anthracene	3000	600
Antimony	6	1.2
Arsenic	10	1
Asbestos	7 million fibers per liter (MFL)	0.7 MFL
Atrazine, total chlorinated residues	3[2]	0.3[2]
Bacteria, *E. coli*	0	0
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~~ 2000	~~200~~ 400
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, Hexavalent	70 nanograms/liter (ng/l)	7 ng/l
Chromium (total)	100	10
Chrysene	0.2	0.02
Clothiandin	1000	200
Cobalt	40	~~8~~ 4
Copper	1300	130
Cyanazine	1	0.1
Cyanide, free[4]	200	40
Dacthal + MTP and TPA degradates[5]	70	~~14~~ 7
1,2-Dibromoethane (EDB)	0.05	0.005
Dibromochloromethane	60	6
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.02
Dibutylphthalate	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] [6]	0.05	0.005
Dinoseb	7	1.4
1,4-Dioxane	~~3~~ 0.35	~~0.3~~ 0.035
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
Glyphosate	10 mg/l	1 mg/l
Glyphosate aminomethylphosphonic acid (AMPA) degradate	10 mg/l	2 mg/l
Heptachlor	0.4	0.04
Heptachlor epoxide	0.2	0.02
Hexachlorobenzene	1	0.1
N-Hexane	600	120
Hydrogen sulfide	30	6
Imidacloprid	0.2	0.02
Isoxaflutole + Isoxaflutole Diketonitrile (DKN) degradate	3	0.3
Isoxaflutole Benzoic Acid (BA) degradate	800	160
Lead	15	1.5
Lindane	0.2	0.02
Manganese	300	60
Mercury	2	0.2
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~~ 4
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
Perfluorooctanoic acid (PFOA) + Perfluorooctane sulfonate (PFOS)	20 ng/l	2 ng/l
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
Strontium	1500	150
Styrene	100	10
Sulfentrazone	1000	100
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~~ 20	~~0.5~~ 2
Tetrahydrofuran	50	10
Thallium	2	0.4
Thiamethoxam	100	10
Thiencarbazone-methyl	10 mg/l	2 mg/l
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	~~0.5~~ 0.05
2,4,5-Trichlorophenoxy-propionic acid (2,4,5-TP)	50	5
1,2,3-Trichloropropane	~~60~~ 0.3 ng/l	~~12~~ 0.03 ng/l
Trifluralin	7.5	0.75
Trimethylbenzenes (1,2,4- and 1,3,5- combined)	480	96
Vanadium	30	6
Vinyl chloride	0.2	0.02
Xylene[6 7]	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] Dacthal + MTP and TPA degradates includes Dacthal + the monomethyl tetrachloroterephthalic acid (MTP) breakdown product (degradate) + the tetrachloroterephthalic acid (TPA) breakdown product (degradate).

[~~5~~ 6] 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 7] Xylene includes meta-, ortho-, and para-xylene combined.

SECTION 2. NR 140.20 Table 3 is amended to read:

NR 140.20 Table 3

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

SECTION 3. NR 140 Appendix I to Table 1 is amended to read:

NR 140 Appendix I to Table 1

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, Over-time, 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	Methylbromide
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, Hexavalent	18540-29-9	Hexavalent chromium, Chromium 6+, Chromium (VI), Chromium hexavalent ion, Cr6+
Chromium (total)	7440−47−3	
Chrysene	218−01−9	1,2−Benzphenanthrene
Clothianidin	210880-92-5	
Cobalt	7440−48−4	
Cyanazine	21725−46−2	~~*Bladex ,*~~ 2−chloro−4−ethylamino−6−nitriloisopropylamino−s−triazine
Cyanide, free	57−12−5	
Dacthal + MTP and TPA degradates	1861−32−1 887-54-7 (MTP) 2136-79-0 (TPA)	DPCA, Chlorothal, ~~*Dacthalor,*~~ 1,4−benzene-dicarboxylic acid, monomethyl tetrachloroterephthalate acid (MTP), tetrachloroterephthalic acid (TPA)
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
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−ethyl-hexyl)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	
Glyphosate	1071-83-6	
Glyphosate aminomethyl-phosphonic acid (AMPA) degradate	1066-51-9	aminomethyl-phosphonic acid (AMPA)
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
Imidacloprid	138261-41-3	
Isoxaflutole + Isoxaflutole Diketonitrile (DKN) degradate	141112-29-0 143701-75-1 (DKN)	
Isoxaflutole Benzoic Acid (BA) degradate	142994-06-7	
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	
N−Nitrosodiphenylamine	86−30−6	NDPA
Pentachlorophenol	87−86−5	PCP, Pentachlorohydroxybenzene
Perchlorate	14797−73−0	Perchlorate and perchlorate salts, Perchlorate ion
Perfluorooctanoic acid (PFOA) + Perfluorooctane sulfonate (PFOS)	335-67-1 (PFOA) 1763−23−1 (PFOS)	perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS)
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−tri- azine
Strontium	7440-24-6	elemental strontium, Sr
Styrene	100−42−5	Ethenylbenzene, Vinylbenzene
Sulfentrazone	122836-35-5	
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
Thiamethoxam	153719-23-4	
Thiencarbazone-methyl	317815-83-1	
Toluene	108−88−3	Methylbenzene
Toxaphene	8001−35−2	
1,2,4−Trichlorobenzene	120−82−1	
1,1,1−Trichloroethane	71−55−6	Methylchloroform, 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. Table 1 contains groundwater quality standards for pesticide active ingredients and their degradation breakdown products. Active ingredients are the chemicals in a pesticide product that kill, control, or repel pests. Pesticide products are given proprietary "trade names" by the pesticide product manufacturer. A database of pesticide products approved for use in Wisconsin is accessible through the Department of Agriculture, Trade and Consumer Protection (DATCP) home web page (search for "pesticide database"). The U.S. Environmental Protection Agency (EPA) also maintains a database of registered pesticide products, called the Pesticide Product and Label System (PPLS), on its website. These pesticide product databases can be searched by active ingredient to find the pesticide products, and their trade names, that contain a specific pesticide active ingredient.

[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)

SECTION 4. EFFECTIVE DATE. This rule takes effect on the first day of the month following publication in the Wisconsin Register, as provided in s. 227.22 (2) (intro.), Wis. Stat.

SECTION 5. BOARD ADOPTION. This rule was approved and adopted by the State of Wisconsin Natural Resources