

## ADMINISTRATIVE RULES Fiscal Estimate & Economic Impact Analysis

<b>1. Type of Estimate and Analysis</b> <input checked="" type="checkbox"/> Original <input type="checkbox"/> Updated <input type="checkbox"/> Corrected	<b>2. Date</b> 4/27/2021 - DRAFT
<b>3. Administrative Rule Chapter, Title and Number (and Clearinghouse Number if applicable)</b> NR 140 – Groundwater Quality	
<b>4. Subject</b> Amendments to ch. NR 140 to set numerical standards to minimize the concentration of polluting substances in groundwater. Board Order DG-15-19	
<b>5. Fund Sources Affected</b> <input checked="" type="checkbox"/> GPR <input type="checkbox"/> FED <input type="checkbox"/> PRO <input type="checkbox"/> PRS <input checked="" type="checkbox"/> SEG <input type="checkbox"/> SEG-S	<b>6. Chapter 20, Stats. Appropriations Affected</b> 20.370 (4)(ma) & 20.370 (4)(mq)
<b>7. Fiscal Effect of Implementing the Rule</b> <input type="checkbox"/> No Fiscal Effect <input type="checkbox"/> Increase Existing Revenues <input type="checkbox"/> Increase Costs <input type="checkbox"/> Decrease Costs <input type="checkbox"/> Indeterminate <input type="checkbox"/> Decrease Existing Revenues <input checked="" type="checkbox"/> Could Absorb Within Agency's Budget	
<b>8. The Rule Will Impact the Following (Check All That Apply)</b> <input type="checkbox"/> State's Economy <input checked="" type="checkbox"/> Specific Businesses/Sectors <input type="checkbox"/> Local Government Units <input type="checkbox"/> Public Utility Rate Payers <input checked="" type="checkbox"/> Small Businesses <b>(if checked, complete Attachment A)</b>	
<b>9. Estimate of Implementation and Compliance to Businesses, Local Governmental Units and Individuals, per s. 227.137(3)(b)(1).</b> Moderate cost: \$175,000 to less than \$5 million per year	

The department is seeking comments to more fully assess the economic impact of implementation and compliance of proposed revisions to ch. NR 140, Wis. Adm. Code, to add new and revised groundwater quality standards. The department's preliminary assessment suggests that the estimated cost is in the range of "moderate cost," \$175, 000 to less than \$5 million per year.

The costs of implementation and compliance with proposed new and revised groundwater quality standards would be highly dependent on site-specific conditions. Implementation and compliance with any new or revised groundwater standard would be accomplished through the rules and regulations of the agency regulating the facility, practice, or activity. Implementation and compliance costs could include additional monitoring and investigation costs associated with new or revised standards. In cases where a facility, practice or activity attains or exceeds new or revised standards, the agency regulating the facility, practice or activity would require response actions to address both source control and any necessary remediation of contaminated groundwater.

The quantifiable and defensible implementation and compliance cost associated with proposed new and revised groundwater quality standards is currently estimated to be approximately \$175,000, mainly from testing for PFAS. The department anticipates that the compliance cost of this rule may be higher than the known and defensible cost estimated (\$175,000), but any required compliance response action would be site-specific and highly variable. Site-specific information needed to make reasonable estimates is unknown at this time, and the department will reassess this preliminary assessment of the total cost in light of the comments that are received during the comment period.

The department anticipates that there will be few cases where the proposed standards will be exceeded where existing standards are not already being exceeded. As a result, the anticipated economic impact of this rule is at the lower end of the estimated range of impacts.

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10. Would Implementation and Compliance Costs Businesses, Local Governmental Units and Individuals Be \$10 Million or more Over Any 2-year Period, per s. 227.137(3)(b)(2)?

Yes  No

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11. Policy Problem Addressed by the Rule

The objective of the proposed rule is to set numerical standards for consistent use in state regulatory programs to minimize the concentration of polluting substances in groundwater [ss. 160.001 and 160.07(5), Stats.]. The standards apply to facilities and activities such as; spills and remediations sites, solid and hazardous waste management, land application of wastewater, mining operations, and pesticide applications. The standards also apply to water bottled in Wisconsin and the well compensation grant program.

Amendments are being proposed to ch. NR 140, Wis. Adm. Code, Groundwater Quality, to establish new state groundwater quality standards for substances presently without a numeric standard, having been detected in or having a reasonable probability of entering, the groundwater resources of the state. Proposed new groundwater quality standards are based on recommendations developed by the WI Department of Health Services (DHS).

Amendments are also being proposed to ch. NR 140, Wis. Adm. Code, to revise existing state groundwater quality standards in cases where established federal numbers or health based reference doses for substances have changed, or where significant technical information, not considered when federal numbers or reference doses were established, justifies revision. Proposed revisions to existing groundwater quality standards are based on recommendations developed by the DHS.

The proposed amendments to ch. NR 140, Wis. Adm. Code, add new or revised numeric groundwater quality standards for: hexavalent chromium, strontium, thiamethoxam, imidacloprid, clothianidin, isoxaflutole, isoxaflutole DKN degradate, isoxaflutole BA degradate, thiencazabone-methyl, Dacthal TPA and MTP degradates, glyphosate, glyphosate aminomethylphosphonic acid (AMPA) degradate, sulfentrazone, *Escherichia coli* (*E. coli*) bacteria, perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), trichloroethylene (TCE), tetrachloroethylene (PCE), 1,2,3-trichloropropane (1,2,3-TCP), aluminum, boron, molybdenum, cobalt, and 1,4-dioxane.

The enforcement standards and preventive action limits for substances in groundwater under this chapter provide guidelines and procedures for the exercise of regulatory authority, which is established elsewhere in the statutes and does not create independent regulatory authority. In order to comply with this chapter, a particular type of regulation is not required. Regulatory agencies are free to establish any type of regulation that assures that 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. For each substance for which the department adopts an enforcement standard or a preventive action limit, each regulatory agency shall promulgate rules which set forth the range of responses the regulatory agency may take or which it may require the person controlling a facility, activity or practice which is a source of the substance exceeding a standard in groundwater at a point of standards application to take.

Responses may vary depending on the type and age of the facility, the hydrogeological conditions of the site, and the cost-effectiveness of alternative responses that will achieve the same objectives under the conditions of the site. Responses shall take into account the background water quality at the site. For example, sites or facilities subject to ch. 292, Stats., are required to take a response action if the numeric groundwater enforcement standard is attained or exceeded at a point of standards application. However, s. NR 722.09, Wis. Adm. Code, also requires a responsible party to work with the department and DHS to develop a site-specific groundwater cleanup standard for a hazardous substance in the event that there is no promulgated NR 140 enforcement standard. Chapter 292, Stats., and chs. NR 700-799, Wis.

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Adm. Code, are the laws that compel the response action to address a hazardous substance discharge, with ch. NR 140, Wis. Adm. Code, providing further clarity on types of acceptable groundwater responses and numeric standards, if a standard exists.

Where the substances causing the groundwater contamination are regulated both under chs. NR 140 and chs. NR 700 to 799, these sites or facilities may receive case closure if the party can demonstrate that natural attenuation will bring the groundwater into compliance with ch. NR 140 groundwater quality standards within a reasonable period of time, considering the criteria in s. NR 722.07, Wis. Adm. Code. In essence, this means that the department may provide the responsible party regulatory closure under the spill law, even if the numeric groundwater enforcement standard is being attained or exceeded. Over 7,300 case closures have been approved by the department using natural attenuation (ch. NR 726, Wis. Adm. Code). Even if a ch. NR 140 standard is being attained or exceeded at the time of case closure, if a determination was made that groundwater would be restored within a reasonable period of time.

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12. Summary of the Businesses, Business Sectors, Associations Representing Business, Local Governmental Units, and Individuals that may be Affected by the Proposed Rule that were Contacted for Comments.

The department held five stakeholder meetings in 2020 on the rulemaking effort to establish new and revised groundwater quality standards in ch. NR 140, Wis. Adm. Code. These meetings provided an opportunity for stakeholders to submit comments and information relevant to the proposed rule and its potential economic impacts. A number of individuals and organizations were contacted and offered an opportunity to participate in the ch. NR 140 stakeholder meetings, and to provide comments and information relevant to the economic impacts associated with rule implementation. A listing of the individuals and organizations contacted is provided in Appendix A.

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13. Identify the Local Governmental Units that Participated in the Development of this EIA.

A number of local government units were contacted and offered an opportunity to submit comments and information relevant to the proposed rule and its potential economic impacts during the stakeholder meetings held in 2020. The local government units that were offered an opportunity to provide comments and information relevant to the economic impacts associated with implementation of the proposed revisions to ch. NR 140 are included in the Appendix A list. All local government units that may be affected will be given the opportunity to participate in the development of the EIA during the EIA comment solicitation period.

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14. Summary of Rule's Economic and Fiscal Impact on Specific Businesses, Business Sectors, Public Utility Rate Payers, Local Governmental Units and the State's Economy as a Whole (Include Implementation and Compliance Costs Expected to be Incurred)

The estimated cost of implementation and compliance of proposed revisions to ch. NR 140, Wis. Adm. Code, to add new and revised groundwater quality standards, is in the range of "moderate cost," \$175, 000 to less than \$5 million per year.

The groundwater quality standards in ch. NR 140 are intended to be used by state regulatory programs to minimize the concentration of polluting substances in groundwater. In exercising their regulatory authority, state agencies establish specific rules and regulations to ensure that regulated facilities, activities, and practices do not attain or exceed established groundwater standards at applicable points of standards application. In situations where standards are attained or exceeded, agencies, through their rules and regulations, require actions to address contaminant sources and, in some cases, actively remediate residual contamination in groundwater.

The costs of implementation and compliance with proposed new and revised groundwater quality standards would be

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highly dependent on site-specific conditions. Implementation and compliance with any new or revised groundwater standard would be accomplished through the rules and regulations of the agency regulating the facility, practice, or activity. Implementation and compliance costs could include additional monitoring and investigation costs associated with new or revised standards. In cases where new or revised standards are attained or exceeded at an applicable point of standards application, response actions, to address both source control and any necessary remediation of contaminated groundwater, would be required under the rules and regulations of the agency regulating the facility, practice, or activity.

Regulating agencies evaluate alternate responses, including consideration of the technical and economic feasibility of those alternate responses, in determining the appropriate action to be required at a site to control further releases of a contaminating substance, or to restore contaminated groundwater. The specific costs associated with response actions required by a regulating agency are highly site-specific and dependent on a number of factors including site hydrogeologic conditions. Because required response actions are highly site-specific and are implemented under the rules and regulations of the regulating agency, the department will reassess the preliminary cost estimates based on the comments received during the comment period.

Chapter NR 140, Wis. Adm. Code, currently contains groundwater standards for substances of public health concern, substances of public welfare concern, and indicator parameters. Proposed revisions to ch. NR 140 to add new and revised state groundwater quality standards would apply to all regulated facilities, practices and activities that may impact groundwater quality in Wisconsin. The department is soliciting additional input at this time from stakeholders potentially impacted by this rule to assist in determining the economic and fiscal impact.

The range of responses which the regulatory agencies and programs may take or which they may require the person controlling a facility, activity or practice which is a source of the substance attaining or exceeding a standard in ch. NR 140, Wis. Adm. Code at a point of standards application to take are found in the following codes:

#### **DNR ADMIN CODE**

##### **100 – 199 – General**

##### **NR 101 – Reports and fees for wastewater discharges**

##### **NR 110 – Sewerage Systems**

##### **NR 123 – Well compensation program**

##### **NR 135 – Nonmetallic mining reclamation**

##### **NR 151 – Runoff management**

##### **NR 167 – Land recycling loan program**

##### **NR 182 – Nonferrous metallic mineral mining wastes**

##### **200-299 – Wisconsin Pollutant Discharge Elimination System**

##### **NR 206 – Land disposal of municipal and domestic wastewater**

##### **NR 213 – Lining of industrial lagoons and design of storage structures**

##### **NR 214 – Land treatment of industrial liquid wastes, by-product solids and sludges**

##### **NR 243 – Animal feeding operations**

##### **500-599 – Solid Waste Management**

##### **NR 500 – General solid waste management requirements**

##### **NR 502 – Solid waste storage, transportation, transfer, incineration, air curtain destructors, processing, wood**

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**burning, composting and municipal solid waste combustors**

**NR 503 – One time disposal landfills, small size construction and demolition waste landfills, and intermediate size construction and demolition waste landfills**

**NR 504 – Landfill location, performance, design and construction criteria**

**NR 506 – Landfill operational criteria**

**NR 507 – Environmental monitoring for landfills**

**NR 508 – Responses when a groundwater standard is attained or exceeded**

**NR 512 – Feasibility reports for landfills**

**NR 518 – Landspreading of solid waste**

**NR 528 – Management of accumulated sediment from storm water management structures**

**NR 538 – Beneficial use of industrial byproducts**

**600-699 – Hazardous Waste Management**

**NR 664 – Hazardous Waste Treatment, Storage and Disposal Facility Standards**

**700-799 – Investigation and Remediation of Environmental Contamination**

**NR 700 – General Requirements**

**NR 706 – Hazardous Substance Discharge Notification and Source Confirmation Requirements**

**NR 708 – Immediate and Interim Actions**

**NR 716 – Site Investigations**

**NR 720 – Soil cleanup standards**

**NR 722 – Standards for selecting remedial actions**

**NR 724 – Remedial and interim action design, implementation, operation, maintenance and monitoring requirements**

**NR 725 – Notification requirements for residual contamination and continuing obligations**

**NR 726 – Case Closure**

**NR 727 – Continuing obligations requirements and reopening closed cases**

**NR 738 – Temporary emergency water supplies**

**NR 749 – Fees for providing assistance; remediation and redevelopment program**

**NR 800 – Water Supply**

**NR 811 – Requirements for the operation and design of community water systems**

**NR 812 – Well construction and pump installation**

**NR 815 – Injection wells**

**DOT ADMIN CODE**

**Trans 277 – Highway salt storage requirements**

**DSPS ADMIN CODE**

**SPS 383 – Private onsite wastewater treatment systems (POWTS)**

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#### **DATCP ADMIN CODE**

#### **ATCP 70 – Wholesale food manufacturing**

#### **ATCP 30 – Pesticide product restrictions**

The anticipated economic impact of this rule may range from moderate to significant impact (\$50,000 to greater than \$5 million), depending on the number of regulated entities that may be found to attain or exceed the proposed new or revised standards. It is anticipated that there will be few cases where the proposed new standards will be exceeded where existing standards are not already being exceeded. As a result, the anticipated economic impact of this rule is at the lower end of the estimated range of impacts and the workload of state regulatory agencies should not change substantially. The addition of new or revised ch. NR 140, Wis. Adm. Code, groundwater quality standards does not trigger additional monitoring at public water supply systems.

The enforcement of state groundwater quality standards is done by state regulatory agencies through their groundwater protection programs. In exercising their statutory powers and duties, state regulatory agencies establish groundwater protection regulations that assure that regulated facilities and activities will not cause state groundwater quality standards to be exceeded. A state regulatory agency may establish specific design and management criteria to ensure that regulated facilities and activities will not cause the concentration of a substance in groundwater, affected by the facilities or activities, to exceed state groundwater quality enforcement standards or preventive action limits at applicable "point of standards application" locations.

Regulated facilities, practices, and activities that are sources of the substances included in this proposed rule are likely sources of substances for which other groundwater standards already exist. Consequently, the department anticipates few cases where the proposed standards will be exceeded where existing standards are not currently being exceeded. In cases where proposed standards are exceeded, but where existing standards are not currently being exceeded, requirements for additional monitoring and remedial action may be imposed. While additional monitoring or remedial action costs may be imposed upon some regulated facilities, practices and activities, the extent of such monitoring or remedial actions, and any costs associated with them will be dependent on many site-specific conditions that are difficult to quantify and may be better assessed in light of comments received during the comment period.

**Metals/Metalloids** Proposed amendments to ch. NR 140, Wis. Adm. Code, would add new groundwater quality standards for: hexavalent chromium and strontium, and revised groundwater quality standards for: aluminum, boron, molybdenum, and cobalt.

Ch. NR 140, Wis. Adm. Code, currently includes groundwater quality standards for total chromium (which includes both trivalent chromium and hexavalent chromium). In this rule, the department proposes new state groundwater quality standards for hexavalent chromium. Groundwater quality standards for hexavalent chromium may increase costs for investigation, pre-treatment, and cleanup at some regulated sites where chromium in groundwater is of concern. There are 84 open sites in the Bureau for Remediation and Redevelopment Tracking System (BRRTS) that have chromium indicated as a contaminant of concern. There may be other sites where chromium is present that are not indicated in BRRTS. Many of the sites in BRRTS may have chromium flagged because soil or groundwater samples were collected for Resource Conservation and Recovery Act (RCRA) required metals and low levels of chromium were detected. There is no easy way to confirm which Remediation and Redevelopment sites have hexavalent chromium in groundwater as hexavalent chromium is not tracked in BRRTS.

At sites where chromium is of concern, under the proposed ch. NR 140 revisions, the department will require more stringent hexavalent chromium standards. Compliance with the new proposed hexavalent chromium standards may require facilities to determine a more defined plume delineation beyond the edge of a defined total chromium compliance

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plume. This determination may require facilities to install additional monitoring points and may be associated with additional labor and analytical costs. Although revised ch. NR 140 would create both total chromium and hexavalent chromium groundwater standards, the department expects that once facilities establish that hexavalent chromium is the primary contaminate and define the plume, facilities will rely on total chromium sampling alone as a cost-saving measure. When a site is nearing closure, resampling for hexavalent chromium would likely be necessary.

Analysis for hexavalent chromium in groundwater requires analysis within 24 hours, which may increase expenses for sampling, transportation, and lab analysis. The department estimates that the cost for analysis of hexavalent chromium samples is, on average, about \$60 higher than for total chromium. The proposed hexavalent chromium standards may require additional monitoring at sites where hexavalent chromium is present in groundwater. The magnitude of additional monitoring costs will be dependent on many site-specific conditions, including the nature of the contaminant source, hydrogeologic conditions, and the size and location of the contaminant plume.

Conducting remediation to meet the new hexavalent chromium standard may result in increased remediation costs. The magnitude of any additional remediation costs would be dependent on many site-specific conditions and therefore no estimate on cost increase can reasonably be forecasted at this time. Since rules under ch. NR 700, Wis. Adm. Code, allow for site closure with residual contamination and continuing obligations as long as a contaminant plume is stable or decreasing, the new hexavalent chromium standards are unlikely to affect department site closure decisions.

Groundwater quality standards for hexavalent chromium may increase costs for investigation, pre-treatment, and cleanup at state-funded remediation sites where chromium in groundwater is of concern. Additional expenses are likely at state-funded remediation sites undergoing an investigation related to new hexavalent chromium standards as the new standards will likely require a more defined plume delineation beyond the edge of any defined total chromium compliance plume. This may include the need for installation of additional monitoring points and additional labor and analytical costs for more sampling to find the edge of the hexavalent chromium plume. Additional costs will likely increase the demand on the state environmental fund. There are currently 7 state-funded remediation sites where chromium is a concern; however, most of those sites are in the operation and maintenance phase (i.e., monitoring a cleanup action already taken), not the site investigation phase of the cleanup. These are primarily former electroplaters. Any cost increase per site is dependent on site-specific variables and therefore the cost increase estimate will be reassessed in light of the comments received during the comment period.

It is also possible that a small percentage of responsible parties (RPs) at RP-funded sites, where hexavalent chromium is of concern, will not be able to financially comply with the more stringent standard. Cleanup of these sites might then eventually become state-funded, creating an additional state expense and workload for the state. The rough estimate of the percentage of RPs at RP-funded sites that would be unable to fund the additional costs needed to incorporate the new hexavalent chromium standard is estimated to be low, likely less than 10%. Even without adequate funding, the responsibility for an RP to complete site investigation and remediation does not change. Many of these former electroplating sites were addressed using the federal Superfund program, and federal funds.

Review of existing groundwater standards for the metals/metalloids aluminum, boron, molybdenum, cobalt, and barium was requested because these inorganic substances are associated with coal combustion residuals (CCR). Revised groundwater quality standards were recommended by DHS for aluminum, boron, molybdenum, and cobalt. The department does not expect significant economic impact related to revised groundwater standards for these substances. Required sampling parameters and frequency under ch. NR 507, Wis. Adm. Code, for CCR landfills will not change as a result of revised groundwater standards for aluminum, boron, molybdenum, and cobalt as the department will not require additional sampling for these substances. The department does not expect required site remediation costs to change significantly, as remediation costs for sites are based on a number of factors in addition to groundwater quality standards.

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**Per- and Polyfluoroalkyl Substances (PFAS)** Proposed amendments to ch. NR 140, Wis. Adm. Code, would add new groundwater quality standards for two per- and polyfluoroalkyl substances (PFAS): perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS).

When discharged to the environment, PFAS compounds may meet the definitions of a discharge of hazardous substance and/or environmental pollution, under s. 292.01, Stats. Discharges of PFAS to the environment may be subject to regulation under ch. 292, Stats., and the requirements for immediate notification, investigation, and remediation in chs. NR 700 to 799, Wis. Adm. Code. The department's Remediation and Redevelopment (RR) Program regulates PFAS at environmental response and redevelopment cleanup sites, and requires notification, investigation, and remediation in accordance with ch. NR 700, Wis. Adm. Code. Under chs. NR 700 to 799, sites (including state-lead sites), are being sampled on a site-by-site basis for PFOA and PFOS, at a minimum.

Presently, the department is requesting that certain sites be sampled for 33 PFAS chemicals, including PFOA and PFOS, pursuant to chs. NR 700 to 799. As noted previously, the department has already utilized authority under ch. 292, Stats., to ask responsible parties to respond to discharge of hazardous substances to the air, land and waters of the state. Responsible parties are being asked to conduct investigation and monitoring for PFAS at sites that have possible PFAS contamination. The department expects an increase in monitoring or remediation costs as a result of the promulgation of this rule related PFOS and PFOA. At this time, the department is requesting further input from the public on this aspect of the EIA. The department has evidence of over 50 sites where PFAS has been found in the groundwater. In Minnesota, the state tested 101 landfills for PFAS; 98 landfills had detections of PFAS, with 59 of those exceeding the PFAS guidance values. Michigan has identified over 150 sites with PFAS contamination.

PFAS may be associated with the land application of waste. There is the possibility that PFAS compounds may be discharged to groundwater through a permitted waste land application outfall. A waste outfall is a permitted point of waste discharge. An estimated 334 permitted waste land application outfalls in the state potentially may have a PFAS discharge to groundwater. Approximately 1,039 groundwater monitoring wells are associated with these permitted waste land application outfall sites. Costs for PFAS sampling required under a permit are difficult to predict at this time and would be based on PFAS detection during an initial round of sample analysis. The estimated cost of one initial round of PFAS sample analysis for groundwater monitoring wells at the 334 permitted waste land application sites is \$173,250. This total cost estimate is based on the assumed cost for an initial round of monitoring well sample analysis of \$375 per sample.

**Agricultural Chemicals** Proposed amendments to ch. NR 140, Wis. Adm. Code, would add new groundwater quality standards for the agricultural pesticides and pesticide degradation products: thiamethoxam, imidacloprid, clothianidin, isoxaflutole, isoxaflutole DKN degradate, isoxaflutole BA degradate, thiencazabone-methyl, Dacthal TPA and MTP degradates, glyphosate, glyphosate aminomethylphosphonic acid (AMPA) degradate, and sulfentrazone.

The creation of a groundwater standard under ch. NR 140, Wis. Adm. Code, does not compel any end user of a pesticide to change their existing use patterns or application rates. Based on this information, it is difficult for the department to determine the economic impact of these rule changes on agricultural and commercial/residential users of pesticides. Uses and application rates for pesticides are determined by the U.S. Environmental Protection Agency (EPA) and the pesticide registrant through the EPA's Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 3 labeling process. The creation of groundwater standards under ch. NR 140, Wis. Adm. Code, does not affect labels for any pesticides included in this proposed rule. Consequently, any changes in use patterns that might result from promulgation of the proposed groundwater standards would only occur through voluntary changes in use. It is difficult to estimate how many end users of these pesticides might change their use patterns, but it is likely that some end users may voluntarily do so

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out of concern for water quality.

The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) samples for agricultural pesticides in groundwater in field edge monitoring wells and in private water supply wells. DATCP has detected most of the agricultural chemicals for which new groundwater quality standards are proposed in field edge monitoring wells and, to a much lesser extent, in private water supply wells. Except for imidacloprid, all detected concentrations for the pesticide compounds in this rule have been less than their DHS recommended Preventive Action Limits (PALs).

DATCP sampling programs collect and analyze samples from private wells statewide on an annual basis to meet the requirements of ch. 160, Stats. DATCP anticipates an increase in the number of private drinking well samples it will collect in response to the proposed rule. Under its sampling programs, whenever a sample from a private well exceeds an Enforcement Standard (ES) for a pesticide, DATCP returns to collect a verification sample. Once the ES exceedance has been verified, DATCP collects additional samples from homes near the impacted well to assess the extent of the impact and to evaluate a response action and any administrative controls that may be necessary to regain compliance with the ES in the area effected. DATCP estimates collection and analyses of an additional 10 samples annually for the compound imidacloprid following promulgation of the proposed rule, at a cost to the state of \$2,660 per year. DATCP assumptions related to this cost estimate are: 2 hours of staff time per sample, at \$52 per hour labor with fringe (2h)(52)(10s/yr) = \$1,040/yr; travel and equipment expenses of \$12 per sample (\$12)(10s/y) = \$120/yr; DATCP Bureau of Laboratory Services (BLS) cost of \$150 per sample (\$150)(10s/y) = \$1,500/yr.

DATCP BLS currently analyzes water samples for the agricultural chemicals for which new groundwater quality standards are proposed and would not need to develop new test methods. BLS does not provide public testing services. DATCP intends to absorb the anticipated increase in cost within its existing segregated fund spending authority. This will be accomplished through a realignment of other sampling work.

**Volatile Organic Compounds (VOCs)** Proposed amendments to ch. NR 140, Wis. Adm. Code, would add revised groundwater quality standards for four VOCs: trichloroethylene (TCE), tetrachloroethylene (PCE), 1,2,3-trichloropropane (1,2,3-TCP) and 1,4-dioxane. Proposed revised groundwater quality standards for TCE, 1,2,3-TCP and 1,4-dioxane would be lower than existing standards. Proposed revised groundwater quality standards for PCE would be higher than existing standards.

#### **Increased Costs Related to Decreased TCE Standards**

There are about 750 open response action sites with TCE present as a constituent of concern. At some of these sites, the proposed decreased (lower) TCE standard will likely result in the need for completion of additional soil borings, installation of additional wells and collection of samples for laboratory analysis to define the extent of contamination with respect to the lower standard. This will result in an increase in investigation costs. The decreased standard may require remedial action at sites that either previously would have met standards but now require remediation, or at sites where additional remedial action will be required to meet the new lower standards.

In both instances, sites that may require additional investigation and/or sites that may need additional remediation, it is difficult to calculate what the increase in costs may be. It is difficult for the department to calculate the cost increase because the universe of sites needing more work is unknown, but also because, in many cases, this increased effort may often be comingled with ongoing work, making it challenging to separate TCE costs associated with new lower standards from other site investigation and/or remediation costs. The department anticipates that a number of private water supply wells may need to be replaced, or have a treatment system installed, as a result of the revised TCE standard. The department assumes that a lower TCE standard will require continued operation and maintenance of granulated activated carbon (GAC) treatment systems at some private water supply wells for a longer period of time than would be required

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under the current standard. As previously noted, TCE sites may be eligible for natural attenuation closure, which would allow the department to give final approval to the cleanup without achieving the TCE groundwater enforcement standards. Approximately 40% of sites in the last 5 years have been closed out using natural attenuation (over 7,300 sites).

#### **Cost Savings Related to Increased PCE Standards**

There are about 200 open response action sites where PCE is a known contaminant. More sites may be present, but as PCE is a relatively new addition in BRRTS, some sites may not be included in the 200-site estimate. PCE sites often have other contaminants of concern, very commonly TCE, and in many instances other contaminant compounds will be the trigger for assessment/remediation. Since many PCE sites also have TCE, cost saving related to a higher, increased PCE standard is probably minimal.

#### **Potential Costs related to 1,4-Dioxane**

The compound 1,4-dioxane (1,4-DCA) is not currently tracked in BRRTS and there is no estimate on the number of sites where this compound is a concern. 1,4-DCA preferentially remains in water, making the groundwater protective soil residual contaminant levels (RCLs), as determined in ch. NR 720, Wis. Adm. Code, a relevant standard for evaluation related to the proposed new lower groundwater standard. Currently laboratories certified in Wisconsin are not able to analyze 1,4-DCA in soil at an appropriate reporting limit to meet the current groundwater RCL, so with a new revised lower 1,4-DCA groundwater ES, there will be increased challenges in evaluating 1,4-DCA groundwater protective soil RCLs.

Currently, 1,4-DCA can be included in a standard VOC analysis, upon request to the laboratory. Water samples can be analyzed with reporting limits adequate to meet the current 1,4-DCA groundwater ES. With a new, lower ES, an alternate method (with an increase in cost) would be required to achieve adequate reporting limits to meet the lower standards.

**Bacteria** Proposed amendments to ch. NR 140, Wis. Adm. Code, add new groundwater quality standards for *Escherichia coli* (*E. coli*) bacteria. *E. coli* bacteria is a type of coliform bacteria used as an indicator of fecal contamination in groundwater. Groundwater quality standards currently exist in ch. NR 140 for total coliform bacteria. The department does not anticipate significant economic impacts related to establishing groundwater quality standards for *E. coli* bacteria. Any exceedance of standards for *E. coli* bacteria would already be an exceedance of existing total coliform bacteria standards.

#### **Fiscal Impact and Impact on State Economy**

The department does not anticipate that this rule will impact the state's economy adversely. The estimated fiscal impact of this rule (\$1,500) on the state is associated with DATCP agricultural chemical sampling. A detailed assessment of this fiscal impact is provided above in the agricultural chemical section. DATCP has indicated that they would be able to absorb this additional cost in the agency's current budget. Additional cost to the DNR in terms of staff time would be absorbed in the agency's current budget.

#### **Impacts on Local Governmental Units**

The department does not anticipate that this rule will impact local governmental units adversely. Local governmental units will be given the opportunity to participate in the final EIA.

#### **Impacts on Public Utility Rate Payers**

The department does not anticipate this rule to impact public utility rate payers adversely.

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### Impact on Small Businesses

While some section of this rule may impact small business, the department will assess the impact in light of the comments received during the comment period. Some compliance costs also depend on hypothetical scenarios and highly variable site-specific conditions.

The department anticipates that less than half, if not about a third, of the total compliance costs of this rule will impact small businesses.

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### 15. Benefits of Implementing the Rule and Alternative(s) to Implementing the Rule

The benefits of establishing new and revised groundwater quality standards in ch. NR 140, Wis. Adm. Code, include:

1. Providing clarity to regulated entities and property redevelopers on how to address these compounds if they are detected at sites, with the ability to determine costs to case closure and redevelopment.
2. Providing clarity on the appropriate concentrations that would be considered by the state for a drinking water advisory and provision of temporary, emergency water.
3. Providing human health protection, as the standards protect groundwater from substances that pose a hazard to human health. For instance, the substance may increase the risk of illness, disease, or death or may increase the risk or severity of a long-term disease.
4. Allowing state regulatory agencies to establish rules that define specific design and management criteria to reduce concentrations of a substance in groundwater, if concentrations are found to exceed established NR 140 groundwater standards.
5. Providing state regulatory agencies the ability to manage, close and redevelop spill/release sites where substances in groundwater exceed established NR 140 groundwater standards, where natural attenuation is effectively addressing the contamination.
6. Providing standards for bottled water providers.
7. Setting health-based levels for substances in water supplies that would allow homeowners to evaluate the safety of their home well water supply.
8. Allowing homeowners to apply for well compensation well replacement funds in cases where sampling shows their home well water exceeds established NR 140 ES groundwater quality standards.

Chapter 160, Stats., directs the department to propose rules establishing DHS recommendations as ES groundwater quality standards in ch. NR 140, Wis. Adm. Code. Chapter 160, Stats. does not include an alternative to the department proposing DHS recommendations as NR 140 groundwater quality standards.

**Metals/Metalloids** Proposed amendments to ch. NR 140, Wis. Adm. Code, would add new groundwater quality standards for hexavalent chromium. Chapter NR 140 currently includes groundwater quality standards for total chromium, which includes both trivalent chromium and hexavalent chromium. The specific regulation of hexavalent chromium at spill/release sites might lead to generation of additional funds for the department from increased fee-based submittals under ch. NR 749, Wis. Adm. Code, if financially viable RPs and consultants request additional assistance with compliance with NR 140 requirements. Consulting firms and sub-contractors, including laboratories, will likely benefit financially from new hexavalent chromium groundwater standards.

Human health impacts potentially avoided include:

- **Hexavalent Chromium**; Hexavalent chromium has no known biological role and can cause toxicity. We know a lot about how hexavalent chromium affects the body if it is inhaled from studies among workers. However, information on how chromium affects the body if it is swallowed (oral exposure) is more limited. Most of what

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we know about oral exposure comes from studies in animals. Animals that were exposed to large amounts of chromium had problems with their stomach and small intestines. Chromium also caused damage to sperm in male animals. Recent studies have shown that exposure to large amounts of hexavalent chromium for a long time can cause cancer in research animals. Previous studies have also shown that hexavalent chromium can cause teratogenic effects and may cause mutagenic effects. New studies have shown that hexavalent chromium may cause interactive effects with other substances such as benzo(a)pyrene and arsenic.

- **Strontium:** Because strontium is chemically similar to calcium, it can be deposited in the skeleton after exposure to high levels. Studies in people and animals have shown that strontium can interfere with bone mineralization in the developing skeleton. Strontium can also compete with calcium in bones and suppress vitamin D metabolism and intestinal calcium absorption. Some studies have shown that strontium can cause teratogenic effects.
- **Boron:** Recent studies in people suggest that small amounts of boron in the diet have beneficial effects. In fact, the World Health Organization (WHO) has added boron to the possible essential elements category for nutritional purposes. On the other hand, eating or drinking large amounts of boron can impact human health. Some people who ate large amounts of boron have experienced effects on the stomach, intestines, liver, kidney, and brain and some have died. Male animals that ate large amounts of boron had damage to their reproductive organs. Boron has also been shown to decrease the weight of newborn animals if given to the mothers when pregnant.
- **Molybdenum:** Low levels of molybdenum are essential for good health. The Institute of Medicine's Food and Nutrition Board has recommended dietary molybdenum levels of 45 micrograms per day for adults. However, high levels of molybdenum can be harmful. Studies in animals suggested that ingesting very large amounts of molybdenum might damage the male and female reproductive system and might cause kidney and liver damage. Studies indicate that the copper content in the body can affect the toxicity of molybdenum. Molybdenum has shown to have interactive effects with copper in the body and cause teratogenic effects.
- **Aluminum:** While most people do not experience health effects from exposure to aluminum, some groups are at higher risk for aluminum toxicity. Most cases of human aluminum toxicity have involved patients with impaired kidney function or patients who were exposed to high levels of aluminum from contaminated water used in medical fluids. Premature babies are at risk for aluminum toxicity because of their immature kidney function. Full-term infants with normal kidney function may also be at risk because they have lower kidney excretion rates than adults which affect their ability to excrete aluminum. Studies with laboratory animals have shown that exposure to high levels of aluminum over a long period of time can affect testosterone levels, body weight, memory, and sperm.
- **Cobalt:** Exposure to high levels of cobalt can result in lung and heart effects and dermatitis. Liver and kidney effects have also been observed in animals exposed to high levels of cobalt. Birth defects have been observed in animals exposed to high levels of nonradioactive cobalt. A recent study has shown that cobalt can cause teratogenic effects in mice and rats.

**Per- and Polyfluoroalkyl Substances (PFAS)** Proposed amendments to ch. NR 140, Wis. Adm. Code, would add new groundwater quality standards for two per- and polyfluoroalkyl substances (PFAS): perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS).

Human health impacts potentially avoided include:

- **Perfluorooctanoic acid (PFOA):** Studies in workers and people living in areas with high levels of PFOA show that PFOA may increase cholesterol, damage the liver, cause pregnancy-induced hypertension, increase the risk for thyroid disease, decrease antibody response to vaccines, decrease fertility, and cause small decreases in birth weight. Studies in research animals have found that PFOA can cause damage to the liver and the immune system, birth defects, delayed development, and newborn deaths in lab animals. The International Agency for Research on Cancer (IARC) classifies PFOA as possibly carcinogenic to humans and the EPA states there is

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suggestive evidence of carcinogenic potential for PFOA. PFOA has been shown to be genotoxic in some tests but has not been shown to be mutagenic. Both PFOA and PFOS have been shown to cause the same or similar effects on the immune system, development, and reproduction in people and research animals indicating that PFOA can cause interactive effects.

- **Perfluorooctane sulfonate (PFOS);** Studies in workers and people living in areas with high levels of PFOS in drinking water show that PFOS may increase cholesterol, damage the liver, cause pregnancy-induced hypertension, increase the risk for thyroid disease, decrease antibody response to vaccines, decrease fertility, and cause small decreases in birth weight. Studies in research animals have found that PFOS can cause damage to the liver and the immune system. PFOS has also been shown to cause birth defects, delayed development, and newborn deaths in animals, indicating that PFOS can cause teratogenic effects. The EPA has classified PFOS as having suggestive evidence of carcinogenic potential. PFOS has not been shown to have mutagenic effects. Both PFOA and PFOS have been shown to cause the same or similar effects on the immune system, development, and reproduction in people and research animals indicating that PFOS can cause interactive effects.

**Agricultural Chemicals** There are positive long-range implications to establishing new groundwater quality standards for agricultural pesticides and pesticide degradation products. When a pesticide that has an established ES or PAL is detected in a drinking water well, the standards allow state and local health officials to more quickly communicate health-related concerns and any protective measures that should be taken by the homeowner and users of the water. Having ES and PAL standards allows faster decision-making about resampling efforts and helps provide clear criteria for well and/or water supply replacement. It also provides legal criteria for the department to determine if well compensation funding or other financial support could be provided to an affected homeowner.

One of the best reasons for having health-based groundwater quality standards is that they allow environmental engineers and other professionals to rapidly determine soil and groundwater cleanup goals in situations where a spill of an agricultural chemical occurs. DATCP responds to about 40 agricultural chemical spills annually in the state (<https://datcp.wi.gov/Documents2/ACMAnnualReport2019.pdf>). But, there are tangible benefits of having established ESs and PALs for individuals like growers who use pesticides in agriculture. DATCP provides communication and outreach about pesticides that are detected in groundwater to other state agencies, local governments, University and Extension professionals, and to growers through presentations at industry association meetings and in pesticide training materials and seminars. Where DATCP data shows a particular pesticide is entering groundwater in an area, growers often quickly learn of the concern. Such outreach informs and educates the pesticide user and can have a significant effect on a grower's pesticide selection in an area, particularly if the groundwater test results approach the established standards. If DATCP observes impacts in areas prone to groundwater contamination, growers may choose to use other pesticides that are safer for human health and the environment. For example, if DATCP finds a highly soluble insecticide in the groundwater, any reduced use of that insecticide could potentially benefit non-target insects in the area, like bees or other pollinators, that could be unintentionally exposed to the insecticide through contaminated irrigation water. This potential exists for highly soluble neonicotinoid insecticides like imidacloprid, clothianidin and thiamethoxam. These compounds have been used on crops widely across irrigated sandy vegetable growing areas of Wisconsin where they have been detected in numerous private wells, monitoring wells and irrigation wells (NeonicotinoidReport.pdf (wi.gov)). DATCP reports suggest that growers who choose to use other insecticides in these sensitive areas could reduce impacts to groundwater and surface waters, and thereby reduce the potential for unintended impacts to invertebrates and non-target organisms on the land, and in streams and other surface waters.

The compound imidacloprid is the only agricultural chemical on the proposed list that DATCP has detected in groundwater at concentrations exceeding its proposed PAL. Imidacloprid is a low-cost systemic insecticide that is water soluble and is taken up by and travels throughout the plant to control biting and sucking pests. It is labeled for use on a wide variety of Wisconsin crops including but not limited to corn, soybeans, beans, peas, and a host of fruits and

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vegetables. It is often applied at planting time as a coating on seed, but it may also be used in-furrow or as a soil drench (i.e., for potatoes), or can be mixed into spray formulations for foliar applications on established plants like vines, trees, shrubs and other plants. Evaluating costs for alternatives to imidacloprid is complicated and can be speculative. For foliar applications potential alternatives include a variety of insecticide options including pyrethroid, carbamate, organophosphate, and diamide insecticide products, as well as insecticides like sulfoxaflor and flupyradifurone and some others. Some alternatives for imidacloprid as a seed treatment include the insecticides clothianidin and thiamethoxam, both of which are also highly water soluble neonicotinoid-class insecticides, like imidacloprid. Both are comparably priced to imidacloprid, and which have new standards proposed in this rule due to similar groundwater contamination findings ([NeonicotinoidReport.pdf \(wi.gov\)](#)). As far as options for imidacloprid as a seed treatment goes, the decision to select an alternative insecticide for delivery on seed is complicated by the extent to which a grower can choose a particular coating on the seed they purchase to plant. Often, seed treatments come as a proprietary blend of crop protectants applied to a seed-line that has a unique set of genetic traits to address anticipated growing conditions and pest pressures. For a grower to switch seed treatments, they may also need to switch seed-lines or brands. Switching seed brands can have a larger and more complicated economic impact, which is difficult to measure.

Human health impacts potentially avoided include:

- Thiamethoxam; What we know about the health effects of thiamethoxam comes from studies with laboratory animals. Animals that ate large amounts of thiamethoxam for long periods of time had problems with their liver, adrenal glands, and blood. Male animals had problems with their reproductive system. Thiamethoxam has been shown to cause teratogenic effects (skeletal abnormalities) in several animal studies.
- Imidacloprid; What we know about the health effects of imidacloprid comes from studies with laboratory animals. Animals that swallowed large amounts of imidacloprid for long periods of time had thyroid, neurological, reproductive, and glucose regulation problems. Some studies have shown that imidacloprid can cause teratogenic effects in animals. Recent studies have shown that high levels of imidacloprid can cause mutagenic effects in mice and can have interactive effects with arsenic in rats.
- Clothianidin; What we know about the health effects of clothianidin comes from studies with laboratory animals. Animals that ate large amounts of clothianidin for long periods of time experienced liver, blood, and kidney problems.
- Isoxaflutole; Rats that ate large amounts of isoxaflutole for two years experienced liver, thyroid, eye, nerve, and muscle problems. Some rats also had tumors in their liver after eating isoxaflutole for several months to years. In these studies, scientists were not able to determine whether the effects were caused by isoxaflutole or isoxaflutole diketone nitrile due to the fast conversion from isoxaflutole to isoxaflutole diketone nitrile in the body. The EPA has classified isoxaflutole as a likely human carcinogen.
- Isoxaflutole Benzoic Acid; Compared to experiments with isoxaflutole, isoxaflutole benzoic acid has been shown to be much less toxic. High levels of isoxaflutole benzoic acid caused decreased weight gain and food consumption, increased salivation, and changes in clinical chemistry markers in rats.
- Thiencarbazone-methyl; What we know about the health effects of thiencarbazone-methyl comes from studies with laboratory animals. Animals that ate large amounts of thiencarbazone-methyl for long periods of time experienced problems with their kidney, bladder, and urinary tract.
- Dacthal Monomethyl tetrachloroterephthalic acid (MTP) degradate; In the body, Dacthal can turn into MTP and then TPA. While the studies on MTP are limited, Dacthal has been studied more extensively. Animals that ate large amounts of Dacthal for long periods of time experienced liver, lung, kidney, and thyroid problems. Some studies have shown that Dacthal can cause carcinogenic effects in animals and the EPA considers Dacthal a possible human carcinogen.
- Dacthal Tetrachloroterephthalic acid (TPA) degradate; In the body, Dacthal can turn into MTP and then TPA. While the studies on TPA are limited, Dacthal has been studied more extensively. Animals that ate large amounts of Dacthal for long periods of time experienced liver, lung, kidney, and thyroid problems. Some studies

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have shown that Dacthal can cause carcinogenic effects in animals and the EPA considers Dacthal a possible human carcinogen.

- **Glyphosate**; Studies in animals have shown that glyphosate can cause gastrointestinal effects and developmental effects. Ingestion of a large amount of glyphosate also caused inflammation in the gastrointestinal system in animal studies. High levels of glyphosate have also been shown to cause unossified breastbone (teratogenic effects) in offspring of pregnant animals given large amounts of glyphosate orally. The carcinogenic potential of glyphosate has been intensively discussed by multiple federal and international agencies. While the International Agency for Research on Cancer (IARC) classified glyphosate as “probably carcinogenic to humans” in 2015, the EPA has recently affirmed their position that glyphosate is not likely to be carcinogenic to humans. Some studies have shown that glyphosate can have mutagenic effects.
- **Glyphosate Aminomethylphosphonic acid (AMPA) degradate**; What we know about the health effects of AMPA comes from studies with laboratory animals. Studies have shown that AMPA can affect the gastrointestinal tract and the urinary tract, including bladder, and cause liver injury in animals given very large amounts of AMPA. Decreased fetal body weight was also observed in animals given larger amounts of AMPA during gestation.
- **Sulfentrazone**; What we know about the health effects of sulfentrazone comes from studies with laboratory animals. Animals that ate large amounts of sulfentrazone for long periods of time experienced developmental and reproductive toxicity. When pregnant animals were fed sulfentrazone for a long period of time, decrease in body weight and disruption in male reproductive system happened to the fetuses (unborn babies) at levels that did not cause effects in the mother. In some studies, similar reproductive toxic effects were mainly observed in the second-generation pups of the sulfentrazone-fed animals. In developmental studies in rats, increased number of stillborn fetuses and delayed bone formation was observed in pups (teratogenic effects).

**Volatile Organic Compounds (VOCs)** Proposed amendments to ch. NR 140, Wis. Adm. Code, would add revised groundwater quality standards for four VOCs: trichloroethylene (TCE), tetrachloroethylene (PCE), 1,2,3-trichloropropane (1,2,3-TCP) and 1,4-dioxane. Proposed revised groundwater quality standards for TCE, 1,2,3-TCP and 1,4-dioxane would be lower than existing standards. Proposed revised groundwater quality standards for PCE would be higher than existing standards.

Human health impacts potentially avoided include:

- **Trichloroethylene (TCE)**; Known health effects from TCE come from animal studies and from studies of people who have come into contact with TCE in their environments. High levels of TCE in drinking water may cause nausea, convulsions, liver and kidney damage, impaired heart function, coma, or even death. There is strong evidence that TCE can cause kidney cancer in people and some evidence that it can cause liver cancer and malignant lymphoma. Lifetime exposure to TCE resulted in increased liver cancer in mice and increased kidney cancer and testicular cancer in rats. Additional animal studies indicate there may be an association between maternal exposure to TCE and specific heart defects in offspring. There is some evidence that human exposure to TCE while pregnant may be associated with similar effects. The EPA and the International Agency for Research on Cancer (IARC) have classified trichloroethylene as a human carcinogen by all routes of exposure. TCE has been shown to cause carcinogenic, mutagenic, and teratogenic effects.
- **Tetrachloroethylene (PCE)**; Current knowledge about the health effects of PCE comes from studies in laboratory animals, workers, poisoning exposure reports, and epidemiological studies involving exposed communities, such as contaminated military bases. Short-term effects of PCE exposure in both humans and animals include liver and kidney damage and central nervous system effects. Longer-term PCE exposure causes changes in mood, memory, attention, reaction time, or vision. Long-term PCE exposure animal studies have also shown liver and kidney effects, as well as changes in brain chemistry. PCE may also have adverse effects on pregnancy and fetal development; problems such as miscarriage, birth defects, and slowed fetal growth have been observed in animal studies. The EPA has classified PCE as a likely human carcinogen. PCE has been shown not to be teratogenic,

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but it has been shown to have mutagenic effects and interactive effects with mixtures of trichloroethylene (TCE) and methylchloroform.

- 1,2,3-Trichloropropane; The known health information on 1,2,3-trichloropropane comes from studies with laboratory animals. Rats and mice exposed to large amounts of 1,2,3-trichloropropane for a long time developed tumors in the liver, digestive system, Harderian gland, and uterus. The EPA determined that 1,2,3-trichloropropane is likely to be carcinogenic to humans. Recent studies have shown that 1,2,3-trichloropropane can cause gene mutations and, therefore, is likely mutagenic.
- 1,1-Dichloroethane; What we know about the health effects of 1,1-dichloroethane comes from studies of humans and laboratory animals. In humans, breathing high levels of 1,1-dichloroethane for a short amount of time can cause central nervous system depression and an irregular heartbeat. In animals, 1,1-dichloroethane has been shown to cause kidney and liver damage, affect weight gain in pregnant animals, delay bone development of offspring, and death at very high levels. A study by the National Toxicology Program found that high levels of 1,1-dichloroethane cause tumors in mice after oral exposure. The United States Environmental Protection Agency (EPA) has classified 1,1-dichloroethane as a possible human carcinogen by oral exposure.
- 1,4-Dioxane; At high levels or long-term exposure, 1,4-dioxane can cause severe kidney and liver effects. Animals that drank water with high levels of 1,4-dioxane for a long time developed cancer in the liver and nasal passages. Because of these effects, EPA has classified 1,4-dioxane as a likely human carcinogen. Recent studies have shown that 1,4-dioxane may be mutagenic. Limited data in animals suggest that 1,4-dioxane may be teratogenic.

**Bacteria** Proposed amendments to ch. NR 140, Wis. Adm. Code, add new groundwater quality standards for *Escherichia coli* (*E. coli*) bacteria. *E. coli* bacteria is a type of coliform bacteria used as an indicator of fecal contamination in groundwater. Groundwater quality standards currently exist in ch. NR 140 for total coliform bacteria. The department does not anticipate significant economic impacts related to establishing groundwater quality standards for *E. coli* bacteria. Any exceedance of standards for *E. coli* bacteria would already be an exceedance of existing total coliform bacteria standards.

Human health impacts potentially avoided include:

- Bacteria (*E. coli*); *E. coli* bacteria is a type of coliform bacteria used to evaluate the potential for microbial pathogens, associated with fecal contamination, to be present in groundwater. Microbial pathogens in water can cause a variety of illnesses. Most common illnesses are acute (short-term) gastrointestinal illnesses causing diarrhea, abdominal discomfort, nausea, and vomiting. Less common illnesses are chronic (long-term) and include kidney failure, hepatitis, and bloody diarrhea. Infants and young children, the elderly, and people with compromised immune systems are at the highest risk for illness from pathogens in water.

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### 16. Long Range Implications of Implementing the Rule

The department does not expect that there will be significant long-range state fiscal impacts associated with establishing new and revised groundwater quality standards in ch. NR 140, Wis. Adm. Code. While there may be additional costs, there will also be savings as well for existing standards that may become less stringent. In addition, the Remediation and Redevelopment program can approve natural attenuation closures even if ch. NR 140 ES standards are being attained or exceeded. This regulatory option allows the department to make site-specific decisions to allow case closure, thus saving regulated entities and developers money. New and revised groundwater quality standards would apply to all regulated facilities, practices and activities, which may impact groundwater quality in Wisconsin.

Regulated facilities, practices, and activities that are sources of the new and revised proposed groundwater standards are likely sources of substances for which other groundwater standards already exist. Consequently, the department

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anticipates limited cases where proposed standards will be exceeded where existing standards are not currently being exceeded, that require changes in remedies. However, it may be necessary for state regulatory agencies to conduct future rulemaking to establish specific design and management criteria to ensure that regulated facilities and activities will not cause the concentration of a substance in groundwater, affected by the facilities or activities, to exceed new or revised state groundwater quality standards. Economic and fiscal impacts associated with any future design and management criteria rules, promulgated by state regulatory agencies to ensure that regulated facilities, practices, and activities comply with new or revised groundwater standards, would be evaluated at the time of that future rulemaking.

#### **Agricultural Chemicals**

In accordance with ch. 160, Stats., DATCP conducts annual sampling for 150 to 500 private wells statewide for pesticides. In the event that groundwater standards are exceeded at private wells, DATCP conducts a groundwater investigation to evaluate pesticide use and impacts to other nearby private wells and to determine the source of the impacts. Where a spill is reported and/or a DATCP investigation finds that a spill or other point source is the reason for a pesticide impact at a private well, DATCP may require the RP to perform a cleanup response under ch. 292, Stats., and chs. ATCP 35 and NR 700, Wis. Adm. Code. Where a DATCP investigation finds that a pesticide impact to a private well is the result of normal agricultural use or other non-point use of a pesticide, the DATCP response actions are limited under chs. ATCP 30 and 31, Wis. Adm. Code.

Where a groundwater investigation identifies that normal agricultural use has caused an ES exceedance for a pesticide in a private drinking water well, DATCP is compelled by rule to take action. Outreach to educate growers about a groundwater concern would be the foremost approach and could result in voluntary changes in use practices and improvements in an area. Under ch. ATCP 31, Wis. Adm. Code - Groundwater Protection Program, DATCP can set pesticide use restrictions on a regional or statewide basis through the use of special orders (requires consent) or by changing administrative rules (likely ch. ATCP 30, Wis. Adm. Code). In practice, the agency has utilized special orders on a short-term basis until an administrative rule can be developed and promulgated as a long-term control measure.

Once the department promulgates the current ch. NR 140 proposed rule revisions, DATCP might begin control measures to minimize the concentration of pesticides and pesticide degradation products detected above groundwater quality standards. DATCP could begin rulemaking to propose administrative controls on the use of any pesticide that is found to exceed its ES at a point of standards application. On the list of agricultural chemicals for which new groundwater quality standards are proposed, the insecticide imidacloprid is the only chemical that has been detected in groundwater and is likely to require some form of short-term or long-term control measure.

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#### 17. Compare With Approaches Being Used by Federal Government

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, would add new or revised state numeric groundwater quality standards for: hexavalent chromium, strontium, thiamethoxam, imidacloprid, clothianidin, isoxaflutole, isoxaflutole DKN degradate, isoxaflutole BA degradate, thien carbazon-methyl, Dacthal TPA and MTP degradates, glyphosate, glyphosate aminomethylphosphonic acid (AMPA) degradate, sulfentrazone, *Escherichia coli* (*E. coli*)

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bacteria, perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), trichloroethylene (TCE), tetrachloroethylene (PCE), 1,2,3-trichloropropane (1,2,3-TCP), aluminum, boron, molybdenum, cobalt, and 1,4-dioxane.

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 =  $0.791 \text{ (mg/kg-day)}^{-1}$ , EPA IRIS draft =  $0.5 \text{ (mg/kg-day)}^{-1}$ ], isoxaflutole [ $0.0114 \text{ (mg/kg-day)}^{-1}$ ], 1,2,3-trichloropropane (1,2,3-TCP) [ $30 \text{ (mg/kg-d)}^{-1}$ ] and 1,4-dioxane [ $0.01 \text{ (mg/kg-d)}^{-1}$ ]. US 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 nanograms per liter or 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), thiencazone-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).

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#### 18. Compare With Approaches Being Used by Neighboring States (Illinois, Iowa, Michigan and Minnesota)

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.

**Minnesota** 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 degradate (1,000 ug/L) 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).

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**Michigan** 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).

**Illinois** 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).

**Iowa** 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 LHAs, "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 MCLs as "Action Levels" in their regulation of practices and activities that may adversely impact groundwater quality. As noted in section 17 above, federal 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). 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)<sup>-1</sup>, EPA IRIS draft = 0.5 (mg/kg-day)<sup>-1</sup>], isoxaflutole [0.0114 (mg/kg-day)<sup>-1</sup>], 1,2,3-trichloropropane (1,2,3-TCP) [30 (mg/kg-d)<sup>-1</sup>], and 1,4-dioxane [0.01 (mg/kg-d)<sup>-1</sup>]. 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).

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19. Contact Name

Bruce Rheineck

20. Contact Phone Number

(608) 266-2104

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This document can be made available in alternate formats to individuals with disabilities upon request.

## ADMINISTRATIVE RULES Fiscal Estimate & Economic Impact Analysis

### ATTACHMENT A

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1. Summary of Rule's Economic and Fiscal Impact on Small Businesses (Separately for each Small Business Sector, Include Implementation and Compliance Costs Expected to be Incurred)

While some sections of this rule may impact small business, the department will assess the impact in light of the comments received during the comment period. Some compliance costs also depend on hypothetical scenarios and variable changes.

Sections of this rule that may impact small business include the proposed revised groundwater quality standards for the VOCs, TCE, and PCE. Revisions to these standards may impact small businesses such as dry cleaners, at sites where spills or releases of these substances 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. 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 anticipates that less than half, if not about a third, of the total compliance cost of this rule will impact small businesses. A detailed assessment of potential compliance cost and benefits are presented in question #14 and #15 of the DOA 2049 form attached.

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2. Summary of the data sources used to measure the Rule's impact on Small Businesses

In its determination of the effect of this proposed rule on small businesses, the department used analysis and supporting information from the DNR Remediation and Redevelopment Program.

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3. Did the agency consider the following methods to reduce the impact of the Rule on Small Businesses?

- Less Stringent Compliance or Reporting Requirements
- Less Stringent Schedules or Deadlines for Compliance or Reporting
- Consolidation or Simplification of Reporting Requirements
- Establishment of performance standards in lieu of Design or Operational Standards
- Exemption of Small Businesses from some or all requirements
- Other, describe:

This rule revision proposes new and revised state groundwater quality standards. The state regulatory agencies enforce groundwater quality standards through their groundwater protection programs. In exercising their statutory powers and duties, state regulatory agencies establish groundwater protection rules and regulations that assure that regulated facilities and activities will not cause state groundwater quality standards to be exceeded. State statutes require that groundwater quality standards apply to all regulated facilities, practices, and activities that may impact groundwater quality. State statutes do not allow the department to establish different groundwater quality standards based on the size of a business. Groundwater quality standards apply to all regulated businesses regardless of size.

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4. Describe the methods incorporated into the Rule that will reduce its impact on Small Businesses

## **ADMINISTRATIVE RULES**

### **Fiscal Estimate & Economic Impact Analysis**

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State statutes do not allow the department to establish different groundwater quality standards based on the size of a business. Groundwater quality standards apply to all regulated businesses regardless of size.

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#### 5. Describe the Rule's Enforcement Provisions

State regulatory agencies enforce groundwater quality standards through their groundwater protection programs. In exercising their statutory powers and duties, state regulatory agencies establish groundwater protection rules and regulations that assure that regulated facilities and activities will not cause state groundwater quality standards to be exceeded. A state regulatory agency may establish specific design and management criteria to ensure that regulated facilities and activities will not cause the concentration of a substance in groundwater, affected by the facilities or activities, to exceed state groundwater quality standards at an applicable "point of standards application" location.

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#### 6. Did the Agency prepare a Cost Benefit Analysis (if Yes, attach to form)

Yes  No

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## **ADMINISTRATIVE RULES**

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#### Appendix A: List of Stakeholders Contacted

##### Businesses

Toymotive LLC

##### Consultants

AECom

Anchor QEA

Antea Group

Barr Engineering

Benchmark Environmental Services

Brice Engineering

Brown and Caldwell

Burns and McDonnell

Cardno

Davy Inc

Deigan and Associates

EA engineering

Eaton company

Emerson

Environmental Audits

Environmental solutions and innovation Inc.

Environmental, Energy and Industrial Services

Essity

Eurofin USA

Fehr Graham

GAI consultants

Gannett Fleming

General Engineering

Geosyntec - consultants

Giles Engineering

GLEC Wastewater

GZA

Ingrahm Technical Services

Integral corporation

Kapur Inc - consultant

Martenson and Eisele

Mead and Hunt

MSA

NextEra Energy

RA Smith

Ramaker Associates

Ramboll

## **ADMINISTRATIVE RULES**

### **Fiscal Estimate & Economic Impact Analysis**

Robert E Lee Associates  
RPS Group  
Ruekert - Mielke  
SCS Engineers  
SEH  
Shannon and Wilson  
Sigma Group  
SolvePFAS  
Stantec  
Strand Associate  
Styberg Engineering  
Terracon  
The OS Group LLC  
The Sigma Group  
Xcelenergy

#### Government

City of Appleton  
City of Brown Deer  
City of Elkhorn  
City of Fond du Lac  
City of Green Bay  
City of Janesville  
City of Juneau  
City of Madison  
City of Menasha  
City of Milwaukee  
City of Pleasant Prairie  
City of Sheboygan  
City of Two Rivers  
Columbia County  
Dane County  
US EPA  
Forest County  
LaCrosse County  
Milwaukee County  
Outagamie County  
Public Health Madison and Dane County  
Rock County  
WI State Lab of Hygiene

#### Healthcare

## **ADMINISTRATIVE RULES**

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Augusta Health and Rehab - healthcare

#### Laboratory Services

WI State Lab of Hygiene  
Northern Lakes Service

Pace Labs

Stresau Laboratory, Inc.

Test America

Tetrattech

#### Law Firms

Axley-Brynelson

Boardman Clark

Crowell and Moring LLC

Environmental Law and Policy center

Foley Lardner

Foth and Van Dyke

Mayer Brown

Murphy-Desmond

Winthrop and Weinstine

#### Legislator

State Senator Rob Cowles

#### Lobbying Firms

Capitol Strategies

Enhesa

Hamilton

#### Manufacturers

A.P. Nonweiler

Bayer Crop Science

Cedar Corp

Georgia Pacific

Headwaters

John Deere

Perimeter Solutions

Regalware

Regenesis Bioremediation Inc

Signicast Corp

Yamaha -Motor

#### Mining

Badger Mining Corp

#### Journalists

Wispolitics

## **ADMINISTRATIVE RULES**

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#### Nonprofits

American Chemistry Council  
Bay-Lake Regional Planning commission  
Clean Wisconsin  
Cooperative Network  
CouleeCap  
Crossroads at Big Creek - nature center Heckrodt  
Wetland Preserve  
International Society of Arboriculture  
League of Women Voters  
Midwest Environmental Advocates  
Minnesota Brownfields  
Wisconsin Manufacturing and Commerce  
Wisconsin Rural Water Resources  
Wisconsin Wetlands  
Environmental Law and Policy center

#### Recyclers

Dynamic Lifecycle Innovations  
Lamp Recycling

#### Utilities

Alliant Energy  
Dairyland Power  
MGE  
WeEnergies  
Wood PLC