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Supporting community health and economic wellbeing
in Missouri through education and advocacy

TO: John Hoke, Susan Mills June 13, 2025
FROM: Moniteau County Neighbors Alliance

**RE: Comments on Draft Regulatory Impact Report 10 CSR 20-6.015 No-Discharge Operations and Land Application Requirement**

Moniteau County Neighbors Alliance (MCNA) submits these comments on the Missouri Department of Natural Resources' ("MDNR") recently issued Draft Regulatory Impact Report ("Draft RIR") pertaining to 10 CSR 20-6.015 No-Discharge Permits. MCNA is a non-profit organization formed to advocate for clean air, clean water, environmental and public health in Moniteau County, Missouri and the surrounding region. Members of MCNA live in Missouri, depend on Missouri's water resources, and advocate for the utmost protection for Missouri's natural resources and public health. MCNA is committed to protecting Moniteau County's citizens, Missourians and their environment, primarily through education and advocacy. Moniteau County itself has an agricultural-based economy and, as such, may be impacted by the application of wastes to its land.[1]

MCNA would like to thank MDNR for its hard work assessing the financial and other impacts of the proposed rule changes to 10 CSR 20-6.015. MCNA believes the Draft RIR straightforwardly shows how these rule changes will affect a variety of stakeholders, and that the Draft RIR clearly and transparently demonstrates its authors' methods and sources. The RIR is based on peer-reviewed literature, and on documents prepared by the University of Missouri's Agricultural Center, such as the Missouri Phosphorus Index. MCNA appreciates the transparency.

However, MCNA urges MDNR to make the following changes to the final RIR: (1) reinstate the PFAS thresholds and monitoring requirements from the September 2024 draft RIR and supporting documents. Missouri law, EPA guidance, and the best available science all support regulation, or at a

[1] See USDA 2022 Census of Agriculture for Moniteau County available at https://www.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Missouri/

minimum, monitoring so that Missourians can begin to understand the scope of potential PFAS contamination and work to eliminate it. (2) MDNR must also address several non-PFAS-related issues that will have relatively minor effects on the RIR and supporting documents.

## I. MDNR DID NOT JUSTIFY ITS REMOVAL OF PFAS IN THE CURRENT RIR AND SUPPORTING DOCUMENTS

Last fall, MDNR recognized that the threat to human health and the environment that PFAS poses and which is described above. It included soil screening levels in the Draft Industrial Nutrient Management Technical Standard (Draft INMTS) in keeping with the purpose and intent of the recently enacted changes to the Clean Water Law.[2] It noted the health benefits as well to Missourians that would result from the inclusion of PFAS monitoring in the proposed rule.[3]

The current version of the draft RIR now finds that the science of PFAS is "emerging," and recommends deferral of PFAS regulation "until the science and federal regulations are more thoroughly documented and established."[4] It does not provide any legal or financial support for this new contention, nor does it suggest when in the future it might be appropriate to begin regulation. As MDNR previously noted, and as MCNA notes above, PFAS contamination has already occurred and continues to occur right now. Inaction on MDNR's part will only assure that when the time for regulation comes around at last, the mess will be bigger.

## II. MDNR SHOULD INCLUDE PFAS MONITORING IN THE CURRENT RIR AND SUPPORTING DOCUMENTS

Unlike the draft RIR and supporting documents circulated last fall, the current Draft RIR discusses a draft rule that is missing a major component of land-application regulation: PFAS.[5] Eliminating PFAS from the proposed regulation will change the cost-benefit balance for the worse, as cleanup is significantly more costly than prevention. The draft RIR assesses the impact of land-applied process wastes for agricultural use. Any contaminants in those wastes – including PFAS – can escape

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[2] *See* House Bill 2134/1956 (2024) amendments of the Missouri Clean Water Law" (September 2024 Draft RIR, pg. 14).

[3] Draft RIR, at p.3 (September 24, 2024).

[4] (April 2025 Draft RIR, pg. 15).

[5] Per- and poly-fluoroalkyl substances (PFAS) are synthetic chemical compounds that were first produced in the 1940s and have been used to manufacture many consumer products. PFAS can be found nearly everywhere on earth, including people. *See* CDC, "Fast Facts: PFAS in the U.S. Population," Per- and Polyfluoroalkyl Substances (PFAS) and Your Health. https//www.atsdr.cdc.gov/pfas/data-research/facts-stats/index.html. PFAS pose serious threats to human health and the environment. *See* A.P. Bline et al., "Public Health Risks of PFAS-Related Immunotoxicity Are Real." https://doi.org/10.1007/s40572-024-00441-y.

into the environment contaminating cropland, and grazing acreage, as well as nearby rivers and streams. Studies have shown the following facts:

- The Environmental Working Group estimates that almost 20 million acres of U.S. farmland are fertilized with sewage sludge containing PFAS.[6]
- Researchers analyzed PFAS concentration in treated wastewater used to irrigate mixed-use areas, finding 10 types of PFAS at harmful concentrations. [7]
- Sewage sludge can have higher concentrations of PFAS than the wastewater itself.[8]
- Likewise, lettuce and tomato plants can accumulate PFAS when grown on soil mixed with contaminated biosolids.[9]
- Some farmers have been forced to euthanize livestock due to PFAS buildup attributed to contaminated feedstocks.[10]
- PFAS can also runoff from soils into surface water or seep into groundwater aquifers, eventually making their way into drinking water.[11]

With these facts in mind, it is very likely PFAS will be found in the process wastes that are applied to land in Missouri, and that PFAS from land applied process wastes can and will make their way into the food supply.

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[6] "EWG: 'Forever Chemicals' May Taint Nearly 20 Million Cropland Acres | Environmental Working Group." https://www.ewg.org/news-insights/news/2022/04/ewg-forever-chemicals-may-taint-nearly-20-million-cropland-acres.

[7] Olivia Mroczko et al., "Spatiotemporal Patterns of PFAS in Water and Crop Tissue at a Beneficial Wastewater Reuse Site in Central Pennsylvania." https://doi.org/10.1002/jeq2.20408.

[8] "Fact Sheet: Draft Sewage Sludge Risk Assessment for PFOA and PFOS" Unites States Environmental Protection Agency Office of Water. https://www.epa.gov/system/files/documents/2025-01/fact-sheet-draft-sewage-sludge-risk-assessment-pfoa-pfos.pdf.

[9] Andrea C. Blaine et al., "Uptake of Perfluoroalkyl Acids into Edible Crops via Land Applied Biosolids: Field and Greenhouse Studies." https://doi.org/10.1021/es403094q.

[10] "The Curious Case of Tainted Milk from a Maine Dairy Farm | Reuters" https://www.reuters.com/article/us-usa-dairy-chemicals/the-curious-case-of-tainted-milk-from-a-maine-dairy-farm-idUSKCN1R01AJ/.

[11] ORD US EPA, "Addressing Challenges of PFAS: Protecting Groundwater and Treating Contaminated Sources." https://www.epa.gov/sciencematters/addressing-challenges-pfas-protecting-groundwater-and-treating-contaminated-sources.

In addition, EPA has examined the risks of land application of sewage sludge containing either of two types of PFAS – PFOS or PFOA. [12] The risk assessment specifically focuses on owners of property where PFAS are spread and neighboring properties, but as indicated above, land-applied substances, including sewage sludge can easily scape containment and threaten the public at large through a variety of mechanisms, including groundwater, aquifers, and consumption of crops or livestock. EPA states that "land-applying or disposing of sewage sludge containing a detectable level (i.e., 1 ppb or more) of PFOA or PFOS could result in human health risks exceeding the agency's acceptable thresholds for cancer and non-cancer effects" under certain scenarios.[13] EPA also found that drinking contaminated groundwater sourced near surface disposal sites with just 1 ppb of PFOA or 4-5 ppb of PFOS disposed in an unlined or clay-lined surface disposal unit poses significant risks to human health.

Both scientists and regulators have a clear understanding of even small concentrations of common types of PFAS, even if additional research might refine the evidence. PFAS in land applied waste is a health risk now, and MDNR is obligated to consider PFAS as a process waste contaminant in this Draft RIR and supporting documents.

**A. MDNR should prohibit excessive concentrations of PFAS pollution from process wastes applied to land or at the very least, monitor PFAS in process wastes applied to land.**

Missouri's Clean Water Law makes it unlawful for any person "to cause pollution of any waters of the state or to place or cause or permit to be placed any water contaminant in a location where it causes pollution of any waters of the state.[14] PFAS is a "water contaminant" that causes "pollution" in the waters of the state. A "water contaminant" is any substance that enters into waters of the state which causes or would cause pollution, or which enters into waters of the state in excess of federal water pollution regulations.[15] PFAS meets both parts of the definition.

EPA has recognized two types of PFAS as "hazardous substances" under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA),[16] and has established Maximum

[12] "Draft Sewage Sludge Risk Assessment for Perfluorooctanoic Acid (PFOA) CASRN 335-67-1 and Perfluorooctane Sulfonic Acid (PFOS) CASRN 1763-23-1." United States Environmental Protection Agency Office of Water.
https://www.epa.gov/system/files/documents/2025-01/draft-sewage-sludge-risk-assessment-pfoa-pfos.pdf.

[13] *Id.*

[14] RSMo 644.051.

[15] RSMo 644.016(29).

[16] OA US EPA, "Biden-Harris Administration Finalizes Critical Rule to Clean up PFAS Contamination to Protect Public Health."
https://www.epa.gov/newsreleases/biden-harris-administration-finalizes-critical-rule-clean-pfas-contamination-protect.

Contaminant Levels for six types of PFAS in drinking water.[17] MCLs are legally enforceable standards enacted as federal water pollution regulations." At least as far as those six PFAS types are concerned, the definition of water contaminant is satisfied.

PFAS also causes pollution. According to the Clean Water Law, "Pollution" is the discharge of a substance which will "render such waters harmful … injurious to public health … or to any … beneficial uses … or to animals, birds, fish, or other aquatic life."[18] As noted above, the scientific literature establishes PFAS as a threat to human, plant, animal, and environmental welfare, and thus a water contaminant by the other part of the definition as well. MDNR can and should regulate PFAS by prohibiting excess PFAS from being land applied, or, at a minimum, by monitoring the presence in process wastes applied to land.

**B. PFAS are a risk to human health and the environment and should be dealt with now to avoid even higher costs later on.**

PFAS are a problem *right now.* If MDNR delays regulating PFAS in land-applied process wastes, it must take account of the costs of inaction in the RIR. The damages from inaction are likely to be serious, especially where Missouri's farmers are concerned. Consider what has happened in other states:

- At the end of 2020, the owners of Songbird Farm, Adam Nordell and Johanna Davis, learned that their land was contaminated with 400 times the acceptable level of PFAS. The Maine Department of Environmental Protection traced the PFAS to contaminated biosolids that were land applied on Songbird Farm's soils. In 2022, Nordell and Davis were forced to shut down.[19]

- PFAS contaminated biosolids distributed by Synagro are alleged to have led to the death of fish, cows, and horses in Johnson County, Texas. The biosolids have also been alleged to cause health issues among farmers including high blood pressure, respiratory problems, skin irritation, generalized pain, and cardiac symptoms.[20]

- Owner Jason Grostic, owner of Grostic Cattle Company in southeast Michigan though he was implementing a cost-effective, EPA-approved fertilizer when he agreed to land-apply biosolids. In January 2022, the Michigan health and

[17] OW US EPA, "Per- and Polyfluoroalkyl Substances (PFAS)." https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas.

[18] RSMo 644.016(21).

[19] Kirsten Lie-Nielsen, "PFAS Shut Maine Farms Down. Now, Some Are Rebounding." https://civileats.com/2023/10/02/pfas-shut-maine-farms-down-now-some-are-rebounding/.

[20] Tom Perkins, "Texas Farmers Claim Company Sold Them PFAS-Contaminated Sludge That Killed Livestock," *The Guardian*. https://www.theguardian.com/environment/2024/mar/01/texas-farmers-pfas-killed-livestock.

> agriculture departments issued a joint advisory warning against the consumption of beef from Grostic Cattle Co., as its soil had been contaminated by PFAS.[21]. LiGrostic fell victim to PFAS-contaminated biosolids.[22]

Stories like this are becoming more common as everyone reckons with PFAS contamination. Farmers are understandably concerned, especially when faced with the prospect that their livelihood will be upended if PFAS contaminates their farmland. In fact, many farmers "have admitted to hiding PFAS contamination because they fear economic ruin."[23] The stories above suggest that those fears are not unfounded. According to EPA, current technologies for destroying or removing PFAS – particularly from soils – fall short in terms of their effectiveness, cost, and ease of operation.[24] A 2023 report by the Minnesota Pollution Control Agency found that removing and destroying PFAS from water and biosolids would cost between $14 and $18 billion USD over 20 years. [25] The same study found that small wastewater treatment facilities would face 6-fold higher costs than large facilities due to economies of scale. [26]

According to the EPA's Draft Risk Assessment, "current science indicates that lower levels of PFAS exposure present less risk, so these efforts to identify and reduce PFOA and PFOS in sewage sludge help protect public health."[27] Minnesota has likewise noted, **"**pollution prevention" is the "most effective way to protect health and the environment,"[28] and has begun prohibiting the sale of products

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[21] "Advisory Warns of PFAS in Beef from Michigan Cattle Farm - Mlive.Com." https://www.mlive.com/public-interest/2022/01/advisory-warns-of-pfas-in-beef-from-michigan-cattle-farm.html.

[22] Teresa Homsi | Harvest Public Media, "This Farmer's Livelihood Was Ruined by PFAS-Contaminated Fertilizer That Few Midwest States Test For," Nebraska Public Media. https://nebraskapublicmedia.org/en/news/news-articles/this-farmers-livelihood-was-ruined-by-pfas-contaminated-fertilizer-that-few-midwest-states-test-for/. Grostic Cattle Co. is now listed as "permanently closed" on Google.

[23] Tom Perkins, "'I Don't Know How We'll Survive': The Farmers Facing Ruin in America's 'Forever Chemicals' Crisis," *The Guardian.* https://www.theguardian.com/environment/2022/mar/22/i-dont-know-how-well-survive-the-farmers-facing-ruin-in-americas-forever-chemicals-crisis.

[24] "2019 Remediation Market Study" (Unites States Environmental Protection Agency, January 14, 2020), https://www.regulations.gov/document/EPA-HQ-OLEM-2019-0341-0201.

[25] "Groundbreaking Study Shows Unaffordable Costs of PFAS Cleanup from Wastewater | Minnesota Pollution Control Agency." https://www.pca.state.mn.us/news-and-stories/groundbreaking-study-shows-unaffordable-costs-of-pfas-cleanup-from-wastewater.

[26] *Id.*

[27] "Fact Sheet: Draft Sewage Sludge Risk Assessment for PFOA and PFOS."

[28] *Id.*

containing intentionally added PFAS.[29] Inaction, on the other hand, merely ensures that when the PFAS bill inevitably comes due, it will be significantly larger and more painful to pay.

**C. MDNR should restore the PFAS-related standards of the September 2024 draft RIR, or at a minimum, restore biannual testing of process wastes.**

MCNA asks MDNR to take the following steps when it issues the final RIR: First, MDNR should r**es**tore the enforceable thresholds for 4 PFAS compounds found in section 7a of the and the language in sections 2 and 3 of the September 2024 draft RIR. The thresholds were based on the EPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites. If MDNR believes that the RSLs are inappropriately applied, then MDNR should conduct a thorough examination of the literature and analogous statutes from other states to determine proper thresholds.[30] The material in sections 2 and 3 provides a basis for this action. However, MDNR could also draw on EPA's draft Risk Assessment for additional information.

Second MDNR should take steps to ensure that the risks of land application are included in the analysis**.** In the Draft RIR from September 2024, MDNR described the persons affected by the rule as "those who wish to land apply industrial wastewater" and "the general public." MCNA proposes a third category: those who live on or near land on which PFAS have been applied. Adding this category will allow MDNR to provide a more detailed risk assessment based on individual's proximity to the impacted soils and/or waters.

Third, at a minimum, MDNR should reinstate the biannual monitoring for PFAS in land-applied process waste as found in the September 2024 Draft RIR at page 7 section 3.a.2. The only way to determine if areas engaging in (or adjacent to) land application of process wastes constitute PFAS "hot spots" is to test and monitor them. Today, no one knows the extent of PFAS contamination from the application of process wastes. Without monitoring data, Missourians cannot make informed decisions about the risks posed by land application.

**III. MDNR SHOULD MAKE THE FOLLOWING NON-PFAS-RELATED CHANGES TO THE RIR AND SUPPORTING DOCUMENTS.**

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[29] Minn. Stat. § 116.943. "2025 PFAS Prohibitions | Minnesota Pollution Control Agency." https://www.pca.state.mn.us/air-water-land-climate/2025-pfas-prohibitions.

[30] . For example, the EPA Draft Risk Assessment shows that PFOA and PFOS levels of 1 – 5 ppb pose a threat to human health.

**A. In the RIR and supporting documents, the requirement for annual soil sampling should be changed to a maximum of one composite sample per 20 acres.**

Soil sampling is a critical component of an environmentally protective land management plan. Composite soil samples are necessary to determine existing soil conditions and to develop appropriate land application rates for wastewater, wastewater treatment residuals and other wastes. Because Missouri has a variety of soil types, soil conditions and topography, composite soil samples must minimize variability and represent consistent conditions so as not to mask areas of fields with higher levels of nutrients such as nitrogen and phosphorus.

In the Draft Rule text that accompanies the draft RIR, MDNR requires each permit for land application to include a Land Application Management Plan (LAMP)[31,] which must in turn follow the requirements of the INMTS.[32] The INMTS states that the average field size should be approximately 20 acres and no larger than 80 acres. However, 20 acres is the maximum size recommended by the University of Missouri Extension. In fact, MCNA has been unable to find any support for the 80-acre maximum.[33] Similarly,

The Illinois Agronomy Handbook suggests one composite soil sample from each 2.5-acre field area where fertilizer will be applied uniformly across the field.[34] The United States Department of Agriculture in Illinois recommends that composite samples should not represent more than 20 acres under uniform field conditions and not more than 10 acres when conditions are non-uniform.[35] Iowa State University Extension and Outreach recommends a maximum field size of 10 acres unless data indicates that a large field size have little variation in soil types.[36] Similarly, the University of Georgia Cooperative Extension provides research for nutrient management in this area as well. In one study UGA notes that although sampling grid size can vary from 1 to 5 acres, a grid size of 2.5 acres or less is

[31] Draft rule amendment to 10 CSR 20-6.015 (4)(A)1.E This subparagraph requires a land application management plan (LAMP) as part of a application for an operating permit.

[32] Draft rule amendment to 10 CSR 20-6.015 (4)(A)1.E. Each LAMP must follow the requirements in the INMTS.
[33] University of Missouri Extension states "A composite sample should not represent more than 20 acres." See https://extension.missouri.edu/programs/soil-and-plant-testing-laboratory/spl-soil-analysis/spl-field-crops-soil-test .

[34] Illinois Agronomy Handbook at 92.

[35] https://www.nrcs.usda.gov/sites/default/files/2022-12/Soil-Sampling-Testing.pdf

[36] Soil Fertility: Getting Ready for Fall Fertilization, Iowa State University Extension and Outreach, August 23, 2009. Available at https://www.agronext.iastate.edu/soilfertility/currenttopics/FallFertilization_8-23-09.pdf

"recommended to capture the spatial nutrient variability within fields."[37] In fact, finer grid sizes for sampling may reduce overall costs since the smaller grids may identify areas that need less fertilizer land applied, thus reducing input costs.[38] Further, in its Soil Test Handbook for Georgia, UGA Cooperative Extension recommends field size for testing range from 5 to not more than 15 acres.[39]

MCNA requests that MDNR reduce the maximum field acreage size for composite sampling to a maximum of 20 acres in the final RIR and supporting documents. This will result in relatively insignificant changes to the cost calculation, as multiple soil cores (subsamples) can still be required at the same rate of approximately 1 core per acre. Labor costs will not increase since the overall number of soil cores will not increase, although the additional soil tests will add costs.

However, changing the maximum field acreage size could also provide cost savings for landowners by reducing the amount of nutrients that need to be land applied. Smaller field sampling sizes may also reduce the risk of over application of nutrients which in turn reduces the potential for excess nutrient runoff into nearby surface waters. Any changes to the costs will need to be added to Section 3 of the Draft RIR.

**B. The draft RIR and supporting documents do not adequately protect geologically sensitive areas like karst terrain.**

As MDNR knows, Missouri has significant karst features, particularly in the Ozarks and Ozark Border regions of the state.[40] MCNA is concerned that the Draft RIR and supporting documents do not provide enough protections for karst features which can lead to groundwater contamination. MDNR correctly includes a 300-foot setback from karst features in the INMTS. However, a simple setback is not sufficient to protect these features.

The INMTS currently includes a slope limitation of 10%.[41] While not specific to industrial land application, EPA recommends that surface application of sludge and liquid waste is limited to slopes of

[37] University of Georgia Cooperative Extension, Circular 1297, Soil Sampling Gride Size Considerations for Site-Specific Nutrient Management, May 14, 2024. Available at https://extension.uga.edu/publications/detail.html?number=C1297&title=soil-sampling-grid-size-considerations-for-site-specific-nutrient-management

[38] *Id.*

[39] Soil Test Handbook for Georgia, University of Geogia Cooperative Extension at 5. Available at https://secure.caes.uga.edu/extension/publications/files/pdf/SB%2062_2.PDF

[40] DNR's website describes karst as "a type of landscape characterized by the presence of springs, sinkholes, losing streams and caves, created as groundwater dissolves soluble rock such as limestone or dolomite." See https://dnr.mo.gov/land-geology/geology/karst-missouri.

[41] INMTS at 16.

6% or less due to the potential for runoff and erosion.[42] MCNA asks MDNR to include specific limitations on land application near karst features where slope or gradient exceeds a 6% slope (gradient) by modifying Section C of the INMTS. In turn, Section 3 of the RIR can be modified to add the 6% slope restriction as an environmental benefit for protecting Missouri's groundwater.

**C. Given the frequency of new waste addition to open storage basins, the RIR and supporting documents should require sampling more frequently than once per year.**

The Draft RIR and supporting documents must require more frequent sampling and testing of waste materials in open storage basins. Every time that new waste materials are added to an open basin, the concentration of listed contaminants can and will change. Also, the concentration of contaminants will change over time due to the biotic and abiotic processes that lead to the proliferation (or death) of microbes and production (or consumption) of chemical species (e.g., nitrogenous compounds, heavy metals, etc.). Thus, MDNR should require at least monthly sampling for all open storage basins given the variability of materials stored.

MDNR does makes this assumption in the Draft RIR at page 8, but the assumption is not reflected in the current version of the draft rule.[43] The INMTS requires sampling annually when wastes come from sources with Missouri State Operating Permits, and quarterly sampling for out-of-state waste or waste from sources without a Missouri State Operating permit.[44]

Although it is unclear why there is a discrepancy among the Draft Rule, the INMTS, and the Draft RIR. MCNA recommends that MDNR require monthly sampling of wastes stored in basins to ensure that waste is land applied at a rate that does not exceed the limits in the draft rule. The current inconsistency creates confusion and may make enforcement difficult. The change would not require modification to the cost estimates, or the entities affected in Section 3 of the Draft RIR since MDNR already assumes monthly sampling for the existing storage basins.

MCNA thanks MDNR for its consideration of these comments.

Sincerely,

Susan Williams, president
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660-888-3370

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[42] Process Design Manual, Land Application of Sewage Sludge and Domestic Septage, US Environmental Protection Agency, Office of Research and Development, EPA/625/R-95/001, September 1995 at 65 and Table 5-8. https://www.epa.gov/sites/default/files/2018-12/documents/process-design-manual-land-application.pdf
[43] Draft rule 10 CSR 20-6.015 (6)(B).

[44] INMTS Section A3. Subsection 1. Material Sampling.