MILENA RADISAVLJEVIC

Who is commenting? *(choose the best fit)*
Representative of a product manufacturer(s)

If you are commenting as a representative, what is the name of the entity you are commenting on behalf of?
Duracell

If you represent a product manufacturer or industry group, what industry(ies) do you represent?
Battery industry

If you represent a product manufacturer, what types of components, products, or product categories do you manufacture that you will be requesting a CUU determination for?
Portable batteries

Do you have any recommended changes or other considerations that you think the MPCA should take into account when defining the term "essential for health, safety, or the functioning of society"? *(Please review the proposed definitions in the rule concept document prior to answering)*
no

Do you have any recommended changes or other considerations that you think the MPCA should take into account when defining the term "alternative"? *(Please review the proposed definitions in the rule concept document prior to answering)*
The inclusion of “non-chemical change” in the definition of an “alternative” is conceptually ambiguous and inconsistent with how PFAS substitution works in practice.

The definition frames an alternative as something that can be used “in place of a PFAS to achieve a functionally equivalent product. However, PFAS are defined by their chemical identity and function, meaning that replacing them typically requires the use of a different chemical substance or material. This inherently constitutes a chemical change.

Do you have any recommended changes or other considerations that you think the MPCA should take into account when defining the term "reasonably available"? (*Please review the proposed definitions in the rule concept document prior to answering*)
no

When considering the proposed definition of “product category”, how broadly should the agency group product categories? *(Examples: “vehicles” versus “sedans, SUV’s, vans, trucks, RV’s” or "printers" versus "receipt printers, thermal printers, label printers, residential printers, commercial printers, etc.")*
Product categories should be defined at a high level of granularity, rather than broadly grouped, to ensure that regulatory assessments are scientifically accurate and proportionate.

A broad categorization (e.g., grouping all batteries or all electronics together) risks overlooking significant differences in hazard profiles, composition, and exposure potential between subcategories. In particular:

Not every battery type has the same hazard profile. Differences in chemistry (e.g., lithium-ion, alkaline, nickel-based) lead to different material compositions, including varying presence and concentration of PFAS.

In addition, categorization should explicitly account for exposure potential, not only composition:

It is critical to distinguish whether PFAS are used in closed systems or not (e.g., internal battery components where there is no direct user contact under normal conditions), and
whether there is a realistic possibility of user exposure (e.g., coatings, consumables, or accessible components).

Should each request for a CUU determination be limited to a single product category, or should applicants be allowed to submit a request for a CUU determination for multiple product categories?
Applicants should be allowed to submit a request for a CUU for multiple product categories.

What safety or other standards require the use of PFAS in a product? *(Please include the specific citation)*
PFAS are not explicitly mandated by safety standards. Safety standards impose stringent performance requirements—such as stability at high temperatures, flame resistance, and long-term sealing integrity etc. In practice, in some cases currently only PFAS-based materials are reliable.

As a result, while not named, PFAS are functionally indispensable for ensuring compliance and safety, given that no technically feasible, equally safe alternatives currently exist for these critical performance criteria.

The agency is seeking feedback on the potential that the initial positive CUU determination duration for existing products will expire eight years from the date of issuance regardless of product category. This is intended to stagger renewal deadlines and ease the administrative burden of processing renewals.

- Do you have any concerns about unintended consequences with this proposal?
- Do you have any alternative recommendations to stagger renewal deadlines?

An eight-year expiration period may be too rigid, as it could lead to premature reassessment or substitution of PFAS in applications where they remain critical to performance and safety. This creates a risk of unintentionally compromising essential product functions or safety standards.

Moreover, the development and qualification of alternative materials is a complex and time-intensive process. It requires extensive validation, long-term stability assessments, and real-world performance testing—often exceeding an eight-year timeframe.

A more balanced approach would be to allow for periodic revalidation of criteria for specific PFAS-containing product groups, taking into account their distinct risk profiles and use conditions. Where justified, this could be accompanied by targeted exemptions or extensions of the original timelines, ensuring both regulatory objectives and product integrity are maintained.

The MPCA has developed a preliminary list of potentially eligible data categories that may be considered for trade secret requests. *(Please review the rule concept document for the list of potentially eligible data)*

- Do you have any concerns about unintended consequences with this proposal?
- Do you have any alternative recommendations for data that should or should not be eligible for trade secret requests?

The proposal may not sufficiently protect trade secrets, which is particularly concerning given that many participating stakeholders are direct competitors, increasing the risk of unintended disclosure of sensitive data such as formulations, concentrations, and supplier information.
A more appropriate alternative would be to ensure that all publicly available information is limited to general data, including the use of concentration ranges rather than exact values, while more sensitive information—such as detailed formulations or supplier-specific data—is disclosed only under NDA. This approach would better protect trade secrets while still enabling effective risk assessment.

What are the potential ongoing costs to society if the commissioner issues a positive currently unavoidable use determination for the continued use of PFAS within a product or product category? *(For example: environmental, human health, or remediation costs)*
Not applicable

For manufacturers: Administrative cost of requesting a CUU determination (Part 1 of 2). *Please provide your best estimates or rough orders of magnitude (for example "approx. 200 hours"). Precise accounting data is not necessary to answer this question.*

If your company currently possesses information regarding intentionally added PFAS (to the CAS number level) for all components in your product lines, please estimate the number of technical staff hours that were required to establish this baseline.
Not applicable

For manufacturers: Administrative cost of requesting a CUU determination (Part 2 of 2). *Please provide your best estimates or rough orders of magnitude (for example "approx. 200 hours"). Precise accounting data is not necessary to answer this question.*

If your company does not possess information regarding intentionally added PFAS (to the CAS number level) for all components in your product lines, please estimate the number of technical staff hours needed to obtain this data from your Tier 2 or 3 suppliers for a single product line.
Not applicable

For manufacturers: Expenditure considerations when seeking non-PFAS alternatives (Part 1 of 2). *Please provide your best estimates or rough orders of magnitude (for example "primary cost is CapEx"). Precise accounting data is not necessary to answer this question.*

If you have identified a technically viable non-PFAS alternative for one of your products that contains intentionally added PFAS, does implementing this alternative require Capital Expenditure (such as purchasing new molds, retooling machinery) or primarily Operational Expenditure (such as purchasing more expensive raw materials)?

- Please estimate the ratio of Capital Expenditure to Operational Expenditure (or indicate which category is the dominant cost driver).

Not applicable

For manufacturers: Expenditure considerations when seeking non-PFAS alternatives (Part 2 of 2).

If you have not identified a technically viable non-PFAS alternative for one of your products that contains intentionally added PFAS, have you conducted a Research & Development (R&D) feasibility study?

- If so, what was the cost of that study?

Not applicable

For manufacturers: Research and development safety validation cycles.

What is the typical duration of the R&D and safety validation cycle for a reformulated product in your sector (from concept to market entry)?

Does this cycle align with the 5-year renewal period typically associated with regulatory exemptions?

- If not, please explain the specific technical barriers that would require a longer validation period.

Not Applicable

Maintaining Performance and Safety: The Current Need for PFAS in Portable Battery Applications

1. Context

The development of this position paper is driven by the ongoing legislative and regulatory process on per- and polyfluoroalkyl substances (PFAS) in the State of Minnesota. Through "Amara's Law" (Minn. Stat. § 116.943), Minnesota has established a framework introducing phased product prohibitions, reporting obligations, and a future general ban on products containing intentionally added PFAS, unless such uses are determined to be "currently unavoidable." Within this framework, portable battery applications raise specific technical and safety considerations that warrant careful evaluation. Certain PFAS-based materials continue to perform essential functions within sealed battery systems, where they are critical to performance, durability, and intrinsic safety and where technically equivalent alternatives are not yet available. As the criteria and methodology for determining "currently unavoidable use" are developed through rulemaking and stakeholder engagement, this paper provides evidence-based technical input to support a proportionate, risk-based assessment of PFAS use in portable batteries, with particular attention to safety-critical applications, long qualification cycles, and the absence of consumer exposure.

2. Main position

PFAS currently remains technically indispensable in several critical components of portable battery systems, particularly in applications where safety, reliability, and long service life are non-negotiable. At this time, no technically and economically feasible alternatives provide equivalent performance across the relevant portable battery applications.

The use of PFAS in portable batteries is limited to internal functional components within sealed electrochemical systems and does not lead to consumer exposure under normal and reasonably foreseeable conditions of use. Recognizing this application as a currently unavoidable use supports a proportionate, risk-based regulatory approach while enabling the progressive development and qualification of viable alternatives.

3. Introduction

Portable batteries are essential to modern society, enabling critical technologies in healthcare, emergency response, communication, professional work, and safety-critical infrastructure. These applications rely on battery systems that deliver high energy density, long-term reliability, and intrinsic safety under demanding operational conditions, including during power outages, emergency use, and mobile operation.

Certain per- and polyfluoroalkyl substances (PFAS) currently perform indispensable technical functions within portable battery systems. PFAS-based materials are used in internal battery components e.g., electrode binders, electrolyte salts, separator coatings, and seals, where they contribute directly to electrochemical stability, fire resistance, durability, and safe long-term performance. These materials have been optimized through decades of research and remain essential across a wide range of portable battery technologies.

Despite ongoing research and development efforts, no PFAS-free alternatives are currently available offering comparable technical performance i.e., full performance, safety, and reliability requirements for all portable battery applications, particularly in regulated and safety-critical sectors such as medical devices and emergency equipment. Battery innovation and qualification cycles are long, typically spanning 5-10 years or more, and premature substitution could introduce significant risks to product safety, availability, and lifetime.

Importantly, PFAS use in portable batteries is fully contained within sealed electrochemical systems, with no consumer exposure under normal and foreseeable conditions of use. Recognizing the use of PFAS in portable batteries as a currently unavoidable use would support a managed regulatory transition—maintaining the safe supply of essential battery technologies while enabling the progressive development, validation, and implementation of viable alternatives.

2. Definition of portable batteries

Portable batteries are sealed electrochemical energy storage systems weighing 5 kg or less that are designed to power devices intended for mobile, cordless, or emergency operation.

Portable batteries are not designed specifically for industrial use and are distinct from:

- Electric vehicle batteries
- Light means of transport (LMT) batteries
- Starting, lighting, and ignition (SLI) batteries

Typical examples include applications requiring battery systems that combine high energy density, operational reliability, and intrinsic safety, often under demanding environmental or operational conditions.

A. Role of portable batteries in modern communication and work

Modern communication systems and professional environments rely heavily on battery-powered electronics.

Examples include:

- smartphones and tablets used for communication, authentication, and access to digital services
- laptop computers designed with integrated battery systems
- wireless communication devices and headsets
- portable computing systems used in professional and technical environments

Portable batteries enable access to digital infrastructure that underpins economic activity, public services, and social connectivity. Avoidance of portable batteries would not simply represent the loss of convenience, but would significantly limit participation in modern digital and professional environments.

B. Portable batteries in safety, healthcare, and critical infrastructure

Portable batteries are embedded in numerous safety-critical and life-supporting systems. These systems rely on batteries because they must:

- operate independently from fixed power infrastructure
- remain functional during power outages

- operate while being transported or used in emergency environments

Currently, no technically viable non-PFAS substitutes exist that can provide the required level of reliability and operational independence.

Cardiac medical technologies provide a clear example for healthcare technologies where battery use is technically unavoidable.

Implanted cardiac devices must operate autonomously within the human body and therefore require sealed internal batteries. Without battery technology, implanted heart rhythm management systems would not be technically feasible.

Similarly*, Left Ventricular Assist Devices (LVADs)* used in advanced heart failure rely on external wearable batteries carried by patients. These batteries provide life-sustaining power and patients must always carry spare batteries to ensure continuous operation.

Many emergency and hospital medical systems also rely on battery operation or battery backup.

Device	**Battery Use**
Defibrillators (AEDs and hospital units)	Battery powered
Temporary pacemakers	Battery powered
ECG and cardiac monitors	Battery powered
Infusion pumps	Battery powered
ICU ventilators	Battery backup systems

Hospital safety standards require life-support equipment to maintain operation even in the event of loss of external power. Battery backup systems are therefore a mandatory safety feature.

Battery power in these applications is essential because it ensures the continuous and reliable operation of life-support and critical medical systems, enables the safe mobility of patients and healthcare professionals during transport and emergency response, supports implanted medical devices that cannot rely on external power sources, and provides the redundant power supply required under medical safety standards and regulatory frameworks to maintain uninterrupted patient care.

3. Technical role of PFAS in portable battery systems

PFAS materials currently perform essential functions in modern battery systems. These materials contribute directly to battery safety, durability, and electrochemical performance.

Examples include:

- PVDF binders used in electrodes to ensure chemical stability, adhesion, and long life cycle
- Fluorinated electrolyte salts that improve ionic conductivity, voltage stability, and fire resistance
- PTFE components and seals that ensure leak-tightness, thermal stability, and mechanical reliability

These materials are widely used in lithium-based portable batteries and have been optimized through decades of research and industrial qualification.

4. Considerations for PFAS substitution in portable batteries

Substitution of PFAS in battery components requires careful technical evaluation to ensure that any alternative materials:

- maintain electrochemical stability and performance
- meet minimum safety and performance thresholds
- ensure long-term reliability and durability
- comply with existing technical standards and regulatory requirements
- do not negatively affect recycling or end-of-life management processes

Acceptable performance deviations may vary depending on the criticality of the application. For example, consumer electronics may tolerate limited performance differences while medical or safety-critical devices often cannot tolerate reduced reliability or safety margins

At present, no universally validated PFAS-free alternatives provide equivalent performance across all portable battery applications.

5. Technology development and qualification cycles

Battery technologies require extensive development, validation, and qualification before commercial deployment. Qualification cycles typically range between **5 and 10 years**, particularly in regulated sectors such as medical devices.

Introducing new materials requires:

- redesign of battery chemistries and manufacturing processes
- validation of long-term safety and performance
- compliance testing against international safety standards (e.g., IEC, UL, medical device requirements)
- requalification across supply chains and manufacturing facilities

Consequently, the rapid removal of PFAS materials, without technically validated alternatives, could introduce significant risks to battery safety, reliability, and product availability.

Industry estimates suggest that 5–13 years may be required to fully develop and qualify alternatives for several PFAS-based battery materials in critical applications.

6. Implications of broad PFAS restrictions for portable batteries

Broad PFAS restrictions—particularly under the proposed EU REACH restriction—could affect several materials that are currently essential for portable battery performance.

Potential implications include:

- disruption of supply for battery-grade PVDF binders and fluorinated electrolyte salts
- extensive product redesign requirements
- requalification of manufacturing processes and suppliers
- delays in production and product availability

Small and medium-sized battery manufacturers may be particularly vulnerable to sudden regulatory shifts due to limited resources for rapid redesign and qualification.

7. Environmental considerations

Industry recognizes the environmental concerns associated with PFAS and supports measures to minimize emissions throughout the battery lifecycle, including during manufacturing, disposal, and recycling. At the same time, PFAS currently plays a critical role in ensuring battery durability, safety, and long service life. Premature substitution with lower-performance alternatives could reduce battery lifetime, increase replacement rates, and ultimately lead to greater material consumption and waste generation, thereby undermining circular economy objectives.

8. Considerations and managed transition

Portable batteries are fundamental in enabling technologies for digitalization, healthcare, emergency response, and the broader energy transition.

A regulatory approach that recognizes currently unavoidable uses while supporting the development of safer alternatives would enable continued innovation and responsible transition.

Industry therefore supports:

- targeted and risk-based regulatory measures
- sufficient transition periods aligned with battery qualification cycles
- time-limited derogations for safety-critical battery applications
- continued research and development of viable PFAS alternatives

Such an approach would allow the continued safe supply of portable battery technologies while enabling the progressive substitution of PFAS as technically viable alternatives become available.

9. Currently Unavoidable Use justification: Contained use of PFAS in portable batteries and absence of consumer exposure

In portable batteries, all intentionally added PFAS are used exclusively within internal functional components of sealed electrochemical systems. These materials are fully contained within the battery structure and are not accessible to users under normal conditions of use.

PFAS are used only in internal elements necessary for battery operation and safety, such as:

- electrode binders (e.g., PVDF)
- electrolyte salts and additives
- separator coatings
- internal seals and gaskets
- insulation materials

These components are located entirely within the sealed battery casing, which prevents any direct contact with users. No PFAS are present on external battery surfaces, including housing, terminals, labels, or any other user-facing elements.

Portable batteries are designed as closed electrochemical systems, where internal materials remain isolated throughout the entire service life of the product. The outer casing provides a robust physical barrier that is non-permeable and engineered to withstand mechanical stress, thermal variations, and environmental exposure during normal operation, handling, and transport.

As a result, under normal and foreseeable conditions of use, consumer exposure to intentionally added PFAS in portable batteries does not occur.

Given this fully contained use, the PFAS present in portable batteries function solely as technical materials required for battery performance and safety, without creating direct consumer contact pathways. This containment further supports the classification of these uses as currently unavoidable until technically equivalent alternatives can be developed, validated, and implemented across battery technologies.

Relevance for Currently Unavoidable Use

The use of PFAS in portable battery systems meets several key criteria typically considered when assessing currently unavoidable uses, including:

- Essential technical function:
  PFAS materials perform critical functions that are currently necessary to ensure battery safety, stability, and long service life. These include maintaining electrode integrity, ensuring electrochemical stability at high voltages, improving fire resistance, and enabling reliable sealing of battery cells.
- Lack of technically equivalent alternatives:
  While research into PFAS-free battery materials is ongoing, currently available alternatives do not yet provide equivalent performance across the full range of portable battery applications, particularly in safety-critical uses such as medical devices and emergency equipment.
- Long innovation and qualification cycles:
  Battery technologies require extensive testing and qualification cycles that can span 5–10 years or longer, particularly in regulated sectors such as medical devices and safety equipment. New materials must undergo rigorous safety validation and certification before they can be introduced into commercial products.
- Critical role of portable batteries in society:
  Portable batteries support essential societal functions including healthcare technologies, communication infrastructure, emergency response systems, and professional field operations. Disruption of battery materials without technically validated substitutes could affect the availability and safety of these systems.
- Fully contained use with no consumer exposure:
  PFAS used in portable batteries are confined within sealed electrochemical systems and do not create exposure pathways for consumers during normal product use.

Recognizing portable battery applications as a currently unavoidable use would enable a managed transition toward PFAS alternatives while maintaining the safety, reliability, and availability of critical battery-powered technologies.

Such recognition would allow:

- continued safe supply of portable batteries for essential applications
- sufficient time for industry to develop, test, and qualify alternative materials
- alignment of regulatory transition periods with battery innovation cycles
- avoidance of unintended consequences such as reduced battery lifetime, increased waste, or compromised safety

A balanced regulatory approach that acknowledges currently unavoidable uses in portable batteries would support both environmental protection objectives and the continued availability of essential battery technologies that modern society depends upon.

10. Conclusion

Based on the evidence presented, PFAS currently remain technically indispensable in several critical components of portable battery systems, particularly in applications where safety, reliability, and long service life are non-negotiable. PFAS materials perform essential technical functions that cannot presently be replicated by available substitutes. At this time, no technically and economically feasible alternatives provide equivalent performance across the relevant battery applications.

Furthermore, the use of PFAS in portable batteries is limited to internal functional components within sealed electrochemical systems. As a result, their use is fully contained and does not lead to consumer exposure under normal and reasonably foreseeable conditions of use.

Considering the extensive development, validation, and qualification timelines required for alternative materials, immediate substitution would pose disproportionate risks to product safety, technology performance, market availability, and regulatory compliance. Recognizing this application as a currently unavoidable use therefore supports a proportionate and risk-based regulatory approach. Such an approach ensures the continued safe supply of essential portable battery technologies while enabling the progressive research, development, and implementation of viable alternatives.

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