



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY AND POLLUTION PREVENTION

March 13, 2026

MEMORANDUM

SUBJECT: Policy on Standardized Risk Management for Mixed Metal Oxide (MMO) Cathode Active Materials (CAMs) in Battery Applications for Use in TSCA Section 5 New Chemical Reviews

FROM: Shari Z. Barash
Director
New Chemicals Division

TO: Staff of the New Chemicals Division
Office of Pollution Prevention and Toxics

The purpose of this memorandum is to outline the policy for the EPA New Chemicals Division's (NCD's) standardized risk management for use in Toxic Substances Control Act (TSCA) section 5 new chemical reviews of mixed metal oxide (MMO) cathode active materials (CAMs) in battery applications.

Background

MMOs are a key component in lithium-ion batteries used in automotives, semi-conductors, and renewable energy generation and storage, such as for artificial intelligence (AI) data centers. MMOs typically consist of lithium, nickel, cobalt and other metals, and they are the key material for production of CAMs used in battery cells, which are subsequently assembled into a battery.

MMOs, including CAMs, are subject to section 5 of TSCA, which requires manufacturers (including importers) to provide EPA with notice before initiating any manufacturing, processing, or use activities of a new chemical substance. When EPA receives a premanufacture notice (PMN), TSCA requires the Agency to assess potential hazards and exposures of the new chemical substance, determine whether it presents an unreasonable risk to human health or the environment under the conditions of use, and take steps to address that risk before it can enter commerce.

NCD has been using a standardized assessment approach for MMO CAMs to evaluate the hazard, environmental fate, releases, and exposures of PMN submissions. NCD has summarized that approach in the "Policy on Standardized Scientific Assessment for Mixed Metal Oxide (MMO) Cathode Active Materials (CAMs) in Battery Applications for Use in TSCA Section 5 New Chemical Reviews," memorandum (March 2026), hereafter referred to as "MMO CAM

Science Policy Memorandum” (U.S. EPA, 2026a). The standardized risk assessment is detailed in the *Standardized Scientific Assessment for Mixed Metal Oxide (MMO) Cathode Active Material (CAM) in Battery Applications for Use in TSCA Section 5 New Chemical Review*, hereafter referred to as “MMO CAM Standardized Scientific Assessment” (U.S. EPA, 2026c).

When assessing a new MMO CAM that falls within the scope outlined in the MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c) (referred to as “in-scope” throughout this memorandum), NCD will use the MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c), along with any individual discipline-specific reports as needed, to document how the Agency considered hazard and exposure for the individual MMO CAM submission. The MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c), individual discipline-specific assessment reports, and the case-specific cover sheet (see Appendix 1 of the MMO CAM Science Policy Memorandum [U.S. EPA, 2026a] for an example cover sheet) will serve as the risk assessment to characterize environmental fate, human health and environmental hazards, environmental releases, resultant exposures to human and aquatic species, and human health and environmental risks for each in-scope submission.

For in-scope MMO CAM PMNs and significant new use notices (SNUNs) received prior to February 2026 for which NCD completed the risk assessment at the time this policy was implemented, EPA intends to proceed to a TSCA section 5 determination based on the completed assessment conducted on that MMO CAM, as well as the MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c), and its supporting documents. The risk management is intended to address the risks identified in those supporting documents and to align with the risk management outlined in this document. Any existing determinations and Orders will remain in effect. For in-scope MMO CAMs received prior to February 2026 for which the risk assessment had not been completed at the time this policy was implemented and any new in-scope MMO CAMs, NCD will complete the review using the process outlined in the MMO CAM Science Policy Memorandum (U.S. EPA, 2026a) and apply the corresponding standardized risk management approach described in this document. NCD may consider applying aspects of the MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c) to an out-of-scope MMO CAM. If so, NCD will document the applicability of the MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c) to that chemical in the case-specific cover sheet. NCD intends to rely on the risk management in this memorandum to the extent it is still warranted. If it is not appropriate to rely on the MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c) for a MMO CAM falling outside the scope, NCD will develop an individual risk assessment and tailored risk management. EPA will issue a determination under TSCA section 5 following the risk assessment and, where necessary, take action to protect against unreasonable risk. NCD reserves the option to deviate from the policy as necessary to address the specifics of any individual case.

NCD has developed uniform risk management measures to address unreasonable risks identified during the MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c) utilizing TSCA section 5(e) Orders and significant new use rules (SNURs). To address the unreasonable risks, most section 5(e) Orders will contain requirements for: high efficiency engineering and administrative dust controls; dermal and respiratory personal protective equipment (PPE); occupational monitoring; air release limits; restrictions on releases to water; and hazard communication. NCD may modify the requirements when a new chemical substance falls

outside the scope of the MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c) (see MMO CAM Science Policy Memorandum [U.S. EPA, 2026a]) or where new information shows that different or alternative controls provide equal or greater protection.

Under TSCA, EPA's NCD plays an important role by reviewing all new chemical substances before they enter the marketplace to ensure they do not pose an unreasonable risk to human health or the environment. This standardized review of MMO CAMs under TSCA section 5 will ensure consistency and efficiency in the review of incoming submissions. The MMO CAM Science Policy Memorandum (U.S. EPA, 2026a), the MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c), and this complementary risk management policy memorandum provide a protective, consistently applied baseline of controls aligned to identified hazards and exposure pathways. This approach translates science into clear, enforceable expectations, promotes predictability, and remains adaptable as new information emerges. This "Policy on Standardized Risk Management for Mixed Metal Oxide (MMO) Cathode Active Materials (CAMs) in Battery Applications for Use in TSCA Section 5 New Chemical Reviews" will advance EPA's mission to protect human health and the environment, while also advancing innovation, efficiency, and investment in domestic manufacturing.

Risk Determination

EPA will issue a determination that the MMO CAM may present an unreasonable risk of injury to health or the environment (pursuant to TSCA section 5(a)(3)(B)(ii)(I)) based upon the MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c), any discipline-specific reports, and the case-specific cover sheet, as well as any other related risk assessment documents as described in the MMO CAM Science Policy Memorandum (U.S. EPA, 2026a).

Risk Management

To protect against an unreasonable risk of injury to human health or the environment for the conditions of use for the MMO CAM New Chemical Substance, EPA intends to issue an Order to limit the manufacture, processing (including recycling), distribution in commerce, use, or disposal of the New Chemical Substance (pursuant to TSCA section 5(e)(1)(A)(ii)(I)).

Because TSCA section 5 Orders are only binding on the original PMN submitter for that substance, EPA intends to extend the requirements of an Order for a MMO CAM New Chemical Substance to any manufacturer or processor by issuing a SNUR. A SNUR requires that manufacturers (including importers) or processors notify EPA at least 90 days before beginning any activity that EPA has designated as a "significant new use." The new use designations will be the activities prohibited by the Order. The required notification initiates EPA's evaluation of the conditions of use associated with the chemical substance within the applicable review period.

EPA intends to issue consent orders that hold the submitter and any joint submitters or signatories of a PMN or SNUN for a MMO CAM to the following terms and conditions, unless other terms and conditions are deemed appropriate based on the individual discipline-specific assessment reports and another other relevant information for a specific PMN, as determined on a case-by-case basis.

The terms outlined below address the risks identified in the MMO CAM Standardized Scientific

Assessment (U.S. EPA, 2026c). Applied consistently across in-scope submissions, these are intended to ensure that MMO CAMs can be manufactured, processed, distributed in commerce, used, and disposed of without presenting an unreasonable risk to human health or the environment across intended and reasonably foreseen conditions of use.

Worker Protection and Exposure Monitoring

Based on the MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c), risks to workers are expected from dermal and inhalation exposures. To mitigate risks to workers, EPA will require engineering control measures (e.g., enclosure or confinement of the operation[s], general and local ventilation) or administrative control measures (e.g., workplace policies and procedures) to prevent exposure to the New Chemical Substance. Engineering controls will be required to have an overall minimum capture and control efficiency based on the specifications outlined in the PMN or SNUN (e.g., 99%).

In addition to engineering and administrative controls, EPA will require both dermal and respiratory PPE in combination with exposure monitoring. A subset of MMO CAMs (cobalt composition >3%) are expected to be skin and respiratory sensitizers. To protect against skin sensitization risks and systemic effects, EPA will require the use of dermal PPE where there is a potential for dermal exposure. Dermal PPE must be selected and used in accordance with the Occupational Safety and Health Administration (OSHA)'s requirements at 29 C.F.R. §§ 1910.132, 1910.133, and 1910.138.

The Order will require that potentially exposed workers wear specified respirators. If the cobalt composition is greater than 3%, a National Institute for Occupational Safety and Health (NIOSH) certified respirator with an assigned protection factor (APF) of at least 50 will be required based on respiratory sensitization hazards. If the cobalt composition is less than or equal to 3%, no respirator will be required when exposure monitoring measurements of the workplace air show that air-borne concentrations of the New Chemical Substance are below the defined new chemical exposure limit (NCEL). Prior to exposure monitoring, EPA will require the use of a NIOSH-certified respirator with an APF of at least 1,000 where there is a potential for inhalation exposure. EPA has determined that use of a respirator with an APF of 1,000 worn for a time-limited duration, while an exposure monitoring plan is developed and implemented, is protective for adverse respiratory effects (see “Time-Limited Use of a Respirator with an Assigned Protection Factor of 1000 for Industrial Hygiene Monitoring for Mixed Metal Oxides [MMO] in Cathode Active Materials [CAMs] and General Population Exposure Considerations,” memorandum, February 2026 [U.S. EPA, 2026b]).

Prior to the manufacturer or processor conducting worker exposure monitoring, EPA will require submission of a detailed protocol for the monitoring of workplace exposures. Upon exposure monitoring results, EPA will require the use of a NIOSH-certified respirator with an APF in accordance with “Time-Limited Use of a Respirator with an Assigned Protection Factor of 1000 for Industrial Hygiene Monitoring for Mixed Metal Oxides (MMO) in Cathode Active Materials (CAMs) and General Population Exposure Considerations,”

memorandum, February 2026 (U.S. EPA, 2026b), which concludes that a NCEL¹ of 5.3E-04 mg/m³ as an 8-hour time-weighted average prevents worker risks. The NCEL (occupational inhalation limit) of 5.3E-04 mg/m³ is protective against non-cancer respiratory effects resulting from exposure occurring over a duration of less than one year. EPA is working to develop a lifetime protective NCEL and intends to modify orders issued using the interim NCEL. To ensure protection from unreasonable risks, EPA intends to prohibit inhalation exposure unless the orders are modified with lifetime protective values and corresponding mitigation measures.

The NCEL provisions in the Order, which are modeled after OSHA's Permissible Exposure Limits (PELs), will include requirements addressing performance criteria for sampling and analytical methods, periodic monitoring, respiratory protection, and recordkeeping. The PPE and exposure monitoring requirements in the Order will apply to manufacture, processing (including recycling), distribution in commerce, use, or disposal when there is potential for exposure to the New Chemical Substance. Within 60 days after manufacture or processing of the New Chemical Substance at a site, the Order will require that personal breathing zone monitoring be conducted for workers who are reasonably likely to have inhalation exposure to the New Chemical Substance to determine a measured exposure level to the New Chemical Substance and the appropriate APF—failure to do so will violate the terms of the Order and the company may be subject to both criminal and civil liability pursuant to TSCA section 16.

Manufacturing, Processing, and Use

The MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c) addresses environmental releases and human exposures from activities associated with battery production, drawing on information from MMO CAM new chemical submission physical and chemical property data, literature reviews, consultations with subject-matter experts at EPA, and site visits. It is reasonably foreseen that uses other than those associated with battery production may have different environmental releases and/or human exposures. To mitigate risks from reasonably foreseen conditions of use, the Order will hold to the intended use in battery applications.

The approach summarized in the MMO CAM Science Policy Memorandum (U.S. EPA, 2026a) applies to non-nano-sized MMO CAMs containing cobalt and nickel that are used in battery applications at high production volumes (e.g., millions kg/year).

The use of dust controls with an overall minimum capture and control efficiency based on the specifications outlined in the PMN or SNUN (e.g., 99%) will be required for both processing and use of the New Chemical Substance. The requirements of the Order, however, will not apply when the substance is incorporated into an “article” as defined at 40 CFR 720.3, except with regard to labeling requirements for batteries. Batteries are considered articles and

¹ Risk to workers for respiratory sensitization has been identified but not quantified when the cobalt composition is greater than 3%. Once an individual is sensitized, even minimal subsequent exposure can trigger severe allergic respiratory reactions. To protect against potential respiratory sensitization when cobalt is greater than 3%, EPA will not include a NCEL because a NIOSH-certified respirator of at least 50 will be required for each person subject to inhalation exposure.

exposure is not expected when the New Chemical Substance remains contained within the battery throughout its useful life.

Recycling or reclaiming substances from batteries or other items containing the New Chemical Substance is considered processing. Processing, as defined at 40 CFR 720.3, “means the preparation of a chemical substance or mixture, after its manufacture, for distribution in commerce” and includes when the chemical substance is “as part of a mixture or article containing the chemical substance.” When a battery or similar article containing the New Chemical Substance is processed, dust containing the substance may be generated. This includes recycling or reclamation activities from scrap or defective materials during manufacture or processing as well as end-of-life batteries. As a result, during recycling or reclamation activities, the dust control (i.e., engineering controls), worker PPE, release to water, release to air, and exposure monitoring requirements will apply. To make recyclers aware of the requirements of the Order and subsequent SNUR, EPA intends to require that batteries be labeled to indicate that the battery contains substances that are subject to TSCA restrictions.

Hazard Communication

Based on comparison to analogous chemical substances and data on components of MMO CAM substances, the identified human health hazards are carcinogenicity, genetic toxicity, reproductive toxicity, and specific target organ toxicity. If the cobalt composition is >3%, there are concerns for dermal and respiratory sensitization hazards. Based on the hazard data for the components of MMO CAMs, EPA concludes MMO CAMs will have high environmental hazard to aquatic organisms. Given the identified human and environmental hazards of MMO CAM substances, EPA will require the establishment of a hazard communication program, including the appropriate human health and environmental precautionary statements on each label and Safety Data Sheet (SDS) for the New Chemical Substance.

Releases to Air

Non-occupational, general population exposures include any type of exposure that occurs outside the boundaries of the workplace, except for use of consumer products. MMO CAM exposure to the general population may occur as a result of releases of MMO CAMs to the environment from manufacturing, processing, and industrial or commercial uses of the New Chemical Substance. The MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c) identified risk to the general population from inhalation of ambient air (i.e., air outside the boundaries of the workplace) due to releases of the New Chemical Substance from fugitive air and incinerator air emissions.

EPA has established an interim general population inhalation exposure limit and related risk management terms, which will protect against risks associated with inhalation exposures for up to one year. The Order for the New Chemical Substance will contain requirements that prohibit any release of the New Chemical Substance to the air at a single site such that the rolling average concentration over 14 days at the property boundary would be more than a maximum of $1.3E-4$ mg/m³ of the New Chemical Substance individually or in any

combination (i.e., in aggregate) with other cobalt containing MMO chemical substances (see “Time-Limited Use of a Respirator with an Assigned Protection Factor of 1000 for Industrial Hygiene Monitoring for Mixed Metal Oxides [MMO] in Cathode Active Materials [CAMs] and General Population Exposure Considerations,” memorandum, February 2026 [U.S. EPA, 2026b]). EPA is working to develop a lifetime protective value and intends to modify orders issued using this interim limit. To ensure protection from unreasonable risks, EPA intends to prohibit releases to air unless the orders are modified with lifetime protective values and corresponding mitigation measures.

The Order will require maintaining records demonstrating compliance with the air release limit using fence-line monitoring, mass balance testing, or any other scientifically valid method to demonstrate compliance. The Order will require that no later than 90 days after manufacturing or processing of the New Chemical Substance at a site, the Company must provide a plan to EPA documenting monitoring or methods to assure compliance with the air release limit and initiate the plan.

Releases to Water

The MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c) anticipates releases to water from manufacturing, processing, and recycling operations with associated potential environmental and human health concerns. EPA determined that the environmental hazard acute concentration of concern (COC) ranges from 4 to 110 parts per billion (ppb) and the chronic COC ranges from 1 to 5 ppb, which is considered a high environmental hazard. Harm to the aquatic environment may occur if the acute or chronic COC is exceeded. Based on the oral point of departure (POD) for the general population and using ranges of the most toxic metal component adjusted for the percent composition for MMO CAMs, EPA calculated a drinking water exposure limit as low as 129 ppb. To mitigate the risk from water releases, the Order will prohibit any release of the New Chemical Substance, or any waste stream containing the New Chemical Substance, into water.

Disposal

The MMO CAM Standardized Scientific Assessment (U.S. EPA, 2026c) predicts that MMO CAMs will have a high destruction and removal efficiency (DRE) as a result of incineration. Although the MMO CAM is not destroyed within the incinerator, an estimated 99.9% of the substance is effectively captured within the bottom ash of the incinerator, which is subsequently landfilled. Due to the identified hazards of the metal components, wastes containing the metal components must go to a Resource Conservation and Recovery Act (RCRA) Subtitle C landfill (40 CFR Part 264, Subpart N). To mitigate risk related to the landfilling and incineration of waste containing MMO CAMs, the Order will prohibit disposal of the New Chemical Substance other than by incineration or hazardous waste landfill in compliance with RCRA Subtitle C.

EPA may modify any of the above listed prohibitions and limitations if EPA receives additional testing, studies, reports, or other information that EPA determines, upon review, demonstrate that such prohibitions or limitations are no longer necessary to protect against an unreasonable risk of injury to human health or the environment. Where such information demonstrates that the

prohibitions or limitations of the order are not sufficient to protect against an unreasonable risk of injury to human health or the environment, EPA may modify or impose additional requirements, or take other action, as appropriate, to the extent necessary to protect against such risk.

References

U.S. EPA. 2026a. Memorandum. Policy on Standardized Scientific Assessment for Mixed Metal Oxide (MMO) Cathode Active Materials (CAMs) in Battery Applications for Use in TSCA Section 5 New Chemical Reviews. March 2026. Washington D.C. 10pp.

U.S. EPA. 2026b. Memorandum. Time-Limited Use of a Respirator with an Assigned Protection Factor of 1000 for Industrial Hygiene Monitoring for Mixed Metal Oxides (MMO) in Cathode Active Materials (CAMs) and General Population Exposure Considerations. February 2026. Washington D.C. 9pp.

U.S. EPA. 2026c. Standardized Scientific Assessment for Mixed Metal Oxide (MMO) Cathode Active Materials (CAMs) in Battery Applications for Use in TSCA Section 5 New Chemical Reviews. March 2026. EPA 747/B-26-003. Washington D.C. 19pp.