TSCA Section 5(a)(3) Determination for Premanufacture Notice (PMN) P-20-0154

Number: P-20-0154
TSCA Section 5(a)(3) Determination: The chemical substance is not likely to present an unreasonable risk (5(a)(3)(C))

Chemical Name:
Generic: Polyamines, reaction products with succinic anhydride polyalkenyl derivs, borates

Conditions of Use (intended, known, or reasonably foreseen)[1]:
Intended conditions of use (generic): Manufacture and process for use as and use as a lubricant additive dispersant, consistent with the manufacturing, processing, use, distribution, and disposal information described in the PMN.
Known conditions of use: Applying such factors as described in footnote 1, EPA evaluated whether there are known conditions of use and found none.
Reasonably foreseen conditions of use: Applying such factors as described in footnote 1, EPA evaluated whether there are reasonably foreseen conditions of use and found none.

Summary: The chemical substance is not likely to present an unreasonable risk of injury to health or the environment, without consideration of costs or other nonrisk factors, including an unreasonable risk to a potentially exposed or susceptible subpopulation identified as relevant by the Administrator under the conditions of use, based on the risk assessment presented below. Although EPA estimated that the anion and the cation could be very persistent, the substances have low potential for bioaccumulation, such that repeated exposures are not expected to cause food-chain effects via accumulation in exposed organisms. Based on estimated physical/chemical properties and test data on analogous chemical substances, EPA estimates that the chemical substance has low environmental hazard and potential for the following human health hazards: reproductive toxicity, specific target organ toxicity. EPA concludes that the new chemical substance is not likely to present an unreasonable risk under the conditions of use.

[1] Under TSCA § 3(4), the term "conditions of use" means "the circumstances, as determined by the Administrator, under which a chemical substance is intended, known, or reasonably foreseen to be manufactured, processed, distributed in commerce, used, or disposed of." In general, EPA considers the intended conditions of use of a new chemical substance to be those identified in the section 5(a) notification. Known conditions of use include activities within the United States that result from manufacture that is exempt from PMN submission requirements. Reasonably foreseen conditions of use are future circumstances, distinct from known or intended conditions of use, under which the Administrator expects the chemical substance to be manufactured, processed, distributed, used, or disposed of. The identification of "reasonably foreseen" conditions of use will necessarily be a case-by-case determination and will be highly fact-specific. Reasonably foreseen conditions of use will not be based on hypotheticals or conjecture. EPA's identification of conditions of use includes the expectation of compliance with federal and state laws, such as worker protection standards or disposal restrictions, unless case-specific facts indicate otherwise. Accordingly, EPA will apply its professional judgment, experience, and discretion when considering such factors as evidence of current use of the new chemical substance outside the United States, evidence that the PMN substance is sufficiently likely to be used for the same purposes as existing chemical substances that are structurally analogous to the new chemical substance, and conditions of use identified in an initial PMN submission that the submitter omits in a revised PMN. The sources EPA uses to identify reasonably foreseen conditions of use include searches of internal confidential EPA PMN databases (containing use information on analogue chemicals), other U.S. government public sources, the National Library of Medicine's Hazardous Substances Data Bank (HSDB), the Chemical Abstract Service STN Platform, REACH Dossiers, technical encyclopedias (e.g., Kirk-Othmer and Ullmann), and Internet searches.

Fate: Environmental fate is the determination of which environmental compartment(s) a chemical moves to, the expected residence time in the environmental compartment(s) and removal and degradation processes. Environmental fate is an important factor in determining exposure and thus in determining whether a chemical may present an unreasonable risk. EPA estimated physical/chemical and fate properties of the anion using data for analogue(s) (boric acids, CASRN 10043-35-3 and CASRN 13460-51-0) and of the cation using data for analogue(s) (polymers) and data submitted for analogue(s) ([claimed CBI]). In wastewater treatment, the anion is expected to be removed with an efficiency of 0% due to high water solubility and the cation is expected to be removed with an efficiency of 90% due to sorption. Removal of the anion and the cation by biodegradation is negligible. Sorption of the anion to sludge, soil, and sediment is expected to be low, and sorption of the cation to sludge is expected to be strong and to soil and sediment is expected to be very strong. Migration of the anion to groundwater is expected to be rapid due to low sorption to soil and sediment, and migration of the cation to groundwater is expected to be negligible due to very strong sorption to soil and sediment. Due to low estimated vapor pressure, the anion and the cation are expected to undergo negligible volatilization to air. Overall, these estimates indicate that the anion has low potential to volatilize to air and has high potential to migrate to groundwater, and that the cation has low potential to volatilize to air or migrate to groundwater.

Persistence[2]: Persistence is relevant to whether a new chemical substance is likely to present an unreasonable risk because chemicals that are not degraded in the environment at rates that prevent substantial buildup in the environment, and thus increase potential for exposure, may present a risk if the substance presents a hazard to human health or the environment. EPA estimated degradation half-lives of the anion using data for analogue(s) (boric acids, CASRN 10043-35-3 and CASRN13460-51-0) and of the cation using data submitted for analogue(s) ([claimed CBI]). EPA estimated that the anion's and cation's aerobic and anaerobic biodegradation half-lives are > 6 months. These estimates indicate that the anion and the cation may be very persistent in aerobic environments (e.g., surface water) and anaerobic environments (e.g., sediment).

Bioaccumulation[3]: Bioaccumulation is relevant to whether a new chemical substance is likely to present an unreasonable risk because substances that bioaccumulate in aquatic and/or terrestrial species pose the potential for elevated exposures to humans and other organisms via food chains.

[2] Persistence: A chemical substance is considered to have limited persistence if it has a half-life in water, soil or sediment of less than 2 months or if there are equivalent or analogous data. A chemical substance is considered to be persistent if it has a half-life in water, soil or sediments of greater than 2 months but less than or equal to 6 months or if there are equivalent or analogous data. A chemical substance is considered to be very persistent if it has a half-life in water, soil or sediments of greater than 6 months or if there are equivalent or analogous data. (64 FR 60194; November 4, 1999)

[3] Bioaccumulation: A chemical substance is considered to have a low potential for bioaccumulation if there are bioconcentration factors (BCF) or bioaccumulation factors (BAF) of less than 1,000 or if there are equivalent or analogous data. A chemical substance is considered to be bioaccumulative if there are BCFs or BAFs of 1,000 or greater and less than or equal to 5,000 or there are equivalent or analogous data. A chemical substance is considered to be very bioaccumulative if there are BCFs or BAFs of 5,000 or greater or if there are equivalent or analogous data. (64 FR 60194; November 4 1999)

EPA estimated the potential for the anion to bioaccumulate using data for analogue(s) (boric acids, CASRN 10043-35-3 and CASRN 13460-51-0) and of the cation to bioaccumulate using data for analogue(s) (polymers). EPA estimated that the anion has low bioaccumulation potential based on bioconcentration or bioaccumulation data reported for boric acid CASRN 10043-35-3 and the cation has low bioaccumulation potential based on large predicted molecular volume, which limits bioavailability (anion bioconcentration factor = 33 [measured]). Although EPA estimated that the anion and the cation could be very persistent, the substances have low potential for bioaccumulation, such that repeated exposures are not expected to cause food-chain effects via accumulation in exposed organisms.

Human Health Hazard[4]: Human health hazard is relevant to whether a new chemical substance is likely to present an unreasonable risk because the significance of the risk is dependent upon both the hazard (or toxicity) of the chemical substance and the extent of exposure to the substance. EPA estimated the human health hazard of this chemical substance based on its estimated physical/chemical properties, and by comparing it to structurally analogous chemical substances for which there is information on human health hazard. Absorption of the new chemical substance and the low molecular weight (LMW) fraction ([claimed CBI] < 1,000 Daltons) is expected to be moderate through the skin and nil through the gastrointestinal (GI) tract and lungs, based on physical/chemical properties. The new chemical substance has anionic and cationic components. EPA identified hazards for systemic toxicity based on a structural alert (boron compounds) and systemic and reproductive/developmental toxicity based on analogue data for the anionic component of the new chemical substance. A Combined Repeated Dose Toxicity Study with the Reproduction/Developmental Toxicity Screening Test (OECD 422) conducted on a close analogue of the cationic component of the new chemical substance indicated no signs of adverse effects up to the highest dose tested (1000 mg/kg-bw/day). Therefore, EPA's assessment was based on the anionic component of the new chemical substance. EPA identified a $BMDL_{05}$ of 10.3 mg boron/kg-bw/day for developmental effects, which is protective for systemic and reproductive effects. This value was used to derive exposure route- and population-specific points of departure for quantitative risk assessment.

[4] A chemical substance is considered to have low human health hazard if effects are observed in animal studies with a No Observed Adverse Effect Level (NOAEL) equal to or greater than 1,000 mg/kg/day or if there are equivalent data on analogous chemical substances; a chemical substance is considered to have moderate human health hazard if effects are observed in animal studies with a NOAEL less than 1,000 mg/kg/day or if there are equivalent data on analogous chemical substances; a chemical substance is considered to have high human health hazard if there is evidence of adverse effects in humans or conclusive evidence of severe effects in animal studies with a NOAEL of less than or equal to 10 mg/kg/day or if there are equivalent data on analogous chemical substances. EPA may also use Benchmark Dose Levels (BMDL) derived from benchmark dose (BMD) modeling as points of departure for toxic effects. See https://www.epa.gov/bmds/what-benchmark-dose-software-bmds. Using this approach, a BMDL is associated with a benchmark response, for example a 5 or 10 % incidence of effect. The aforementioned characterizations of hazard (low, medium, high) would also apply to BMDLs. In the absence of animal data on a chemical or analogous chemical substance, EPA may use other data or information such as from in vitro assays, chemical categories (e.g., Organization for Economic Co-operation and Development, 2014 Guidance on Grouping of Chemicals, Second Edition. ENV/JM/MONO(2014)4. Series on Testing & Assessment No. 194. Environment Directorate, Organization for Economic Co-operation and Development, Paris, France. (http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2014)4&doclanguage=en)), structure-activity relationships, and/or structural alerts to support characterizing human health hazards.

Environmental Hazard[5]**:** Environmental hazard is relevant to whether a new chemical substance is likely to present unreasonable risk because the significance of the risk is dependent upon both the hazard (or toxicity) of the chemical substance and the extent of exposure to the substance. EPA estimated environmental hazard using predictions based on the negligible water solubility of the new chemical substance and acceptable analogue test data. Acute and chronic toxicity values estimated for fish, aquatic invertebrates, and algae are all no effects at saturation. These toxicity values indicate that the new chemical substance is expected to have low environmental hazard. Because hazards are not expected up to the water solubility limit, acute and chronic concentrations of concern are not identified.

Exposure: The exposure to a new chemical substance is potentially relevant to whether a new chemical substance is likely to present unreasonable risks because the significance of the risk is dependent upon both the hazard (or toxicity) of the chemical substance and the extent of exposure to the substance.

EPA estimates occupational exposure and environmental release of the new chemical substance under the intended conditions of use described in the PMN using ChemSTEER (Chemical Screening Tool for Exposures and Environmental Releases; https://www.epa.gov/tsca-screening-tools/chemsteer-chemical-screening-tool-exposures-and-environmental-releases). EPA uses EFAST (the Exposure and Fate Assessment Screening Tool; https://www.epa.gov/tsca-screening-tools/e-fast-exposure-and-fate-assessment-screening-tool-version-2014) to estimate general population, consumer, and environmental exposures.

EPA considers workers to be a potentially exposed or susceptible subpopulation (PESS) on the basis of greater exposure potential compared to the general population. EPA also considers PESS in conducting general population drinking water exposures by evaluating risks associated with water intake rates for multiple age groups, ranging from infants to adults. EPA considers consumers of specific products to be a potentially exposed or susceptible subpopulation on the basis of greater exposure potential compared to the general population who do not use specific products.

For this new chemical assessment, EPA assessed worker exposures via the dermal route; inhalation exposures to workers are not expected. Releases to water, air, and landfill were estimated. Exposures to the general population were assessed via drinking water, fish ingestion, groundwater impacted by landfill leachate, and fugitive air inhalation. Exposure to the general population via stack air inhalation was not assessed because releases to stack air were expected

[5] A chemical substance is considered to have low ecotoxicity hazard if the Fish, Daphnid and Algae LC50 values are greater than 100 mg/L, or if the Fish and Daphnid chronic values (ChVs) are greater than 10.0 mg/L, or there are not effects at saturation (occurs when water solubility of a chemical substance is lower than an effect concentration), or the log Kow value exceeds QSAR cut-offs. A chemical substance is considered to have moderate ecotoxicity hazard if the lowest of the Fish, Daphnid or Algae LC50s is greater than 1 mg/L and less than 100 mg/L, or where the Fish or Daphnid ChVs are greater than 0.1 mg/L and less than 10.0 mg/L. A chemical substance is considered to have high ecotoxicity hazard, or if either the Fish, Daphnid or Algae LC50s are less than 1 mg/L, or any Fish or Daphnid ChVs is less than 0.1 mg/L (Sustainable Futures https://www.epa.gov/sustainable-futures/sustainable-futures-p2-framework-manual).

to be negligible (below modeling thresholds). Exposures to the general population resulting from down-the-drain consumer uses were assessed via drinking water and fish ingestion, and exposures to consumers were assessed via the dermal route.

Risk Characterization: EPA applies a margin of exposure approach to calculate potential human health risks of new chemicals. A benchmark (acceptable) margin of exposure (MOE) is derived by applying uncertainty factors for the following types of extrapolations: intra-species extrapolation (UF_H = 10 to account for variation in sensitivity among the human population), inter-species extrapolation (UF_A = 10 to account for extrapolating from experimental animals to humans) and LOAEL-to-NOAEL extrapolation (UF_L = 10 to account for using a LOAEL when a NOAEL is not available). Hence, in the New Chemicals Program, a benchmark MOE is typically 100 and 1,000 when NOAELs and LOAELs, respectively, are used to identify hazard. When allometric scaling or pharmacokinetic modeling is used to derive an effect level, the UF_H may be reduced to 3, for a benchmark MOE of 30. The benchmark MOE is used to compare to the MOE calculated by comparing the toxicity NOAEL or LOAEL to the estimated exposure concentrations. When the calculated MOE is equal to or exceeds the benchmark MOE, the new chemical substance is not likely to present an unreasonable risk. EPA assesses risks to workers considering engineering controls described in the PMN but in the absence of personal protective equipment (PPE) such as gloves and respirators. If risks are preliminarily identified, EPA then considers whether the risks would be mitigated by the use of PPE (e.g., impervious gloves, respirator).

Risks to human health for the new chemical substance were evaluated using a route-specific effect level (i.e., $BMDL_{05}$), described above. Risks were not identified for workers for developmental effects via dermal exposure based on quantitative hazard data for a hydrolysis product of the anionic component of the new chemical substance (MOE = 120; Benchmark MOE = 66). Risks were not evaluated for workers via inhalation exposure because exposures are expected to be negligible.

Risks were not identified for the general population for developmental effects via drinking water, fish ingestion, groundwater ingestion impacted by landfill leachate, or fugitive air inhalation based on quantitative hazard data for a hydrolysis product of the anionic component of the new chemical substance ($MOE_{AdultDW}$ = 3,475; $MOE_{InfantDW}$ = 827; $MOE_{Fish\ Ingestion}$ = 5,019; $MOE_{Landfill\ Leachate}$ = 92,954; $MOE_{Fugitive\ Air}$ = 3,614; Benchmark MOE = 66). Risks were not evaluated for the general population via stack air inhalation exposure because exposures were expected to be negligible. Risks were not identified for the general population for developmental effects via drinking water or fish ingestion exposures resulting from down-the-drain consumer uses based on quantitative hazard data for a hydrolysis product of the anionic component of the new chemical substance (MOE_{DW} > 7 million; $MOE_{Fish\ Ingestion}$ > 2 million; Benchmark MOE = 66). Risks were not identified for consumers for developmental effects via dermal exposure based on quantitative hazard data for a hydrolysis product of the anionic component of the new chemical substance MOE_{Dermal} = 5,462; Benchmark MOE = 66).

Risks from acute and chronic exposures to the environment are not expected at any concentration of the new chemical substance soluble in water (i.e., no effects at saturation).

TSCA Section 5(a)(3) Determination for Premanufacture Notice (PMN) P-20-0154

Because no unreasonable risks to workers, the general population, consumers, or the environment were identified, EPA has determined that the new chemical substance is not likely to present unreasonable risk to human health or the environment under the conditions of use.

11/4/2020
Date:

/s/
Madison H. Le, Director
New Chemicals Division
Office of Pollution Prevention and Toxics
U.S. Environmental Protection Agency