Summary of Risk Assessment Conducted Pursuant to subsection 83(1) of the *Canadian Environmental Protection Act, 1999*

New Substances Notification 20126: Phosphonic acid, octyl- (Chemical Abstracts Service Registry Number 4724-48-5)

Regulatory decisions

Under the provisions for Substances and Activities New to Canada in Part 5 of the *Canadian Environmental Protection Act, 1999* (CEPA), and pursuant to section 83 of the Act, the Minister of the Environment and the Minister of Health have assessed information in respect of the substance and have determined that it is not anticipated to enter the environment in a quantity or concentration or under conditions that have or may have an immediate or long term harmful effect on the environment or its biological diversity, constitute or may constitute a danger to the environment on which life depends, or constitute or may constitute a danger in Canada to human life or health.

Substance identity

The notified chemical is phosphonic acid, octyl- (Chemical Abstracts Service Registry Number[1] 4724-48-5).

Notified and potential activities

The substance is proposed to be imported into Canada in quantities greater than 10 000 kg/yr for the notified use as corrosion inhibitor in cleaning formulations, metalworking fluid and surface treatments. Potential uses may include household products cleaning and furniture care.

Environmental fate and behaviour

Based on its physical and chemical properties, if the substance is released to the environment, it will tend to partition to water. The substance is not expected to be persistent in this compartment because it is readily biodegradable in water (60-85% over 28 days). The substance is not expected to bioaccumulate based on its low octanol-water partition coefficient (log K_{ow} <3), and its low bioaccumulation and bioconcentration factors (<250 L/kg).

Ecological assessment

Based on the available hazard information, the substance has low chronic ecotoxicity to algae (10% effective concentration (EC_{10}) >10 mg/L). Based on the available hazard information, acute ecotoxicity to fish and daphnia could not be determined because limit values were reported. Using the EC_{10} from the most sensitive organism (green algae) and by applying an assessment factor of 10 to account for species sensitivity variation and mode of action, the predicted no-effect concentration (PNEC) was calculated to be in the range of 1000-10 000 μg/L, which was used to estimate the ecological risk.

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The notified and other potential activities in Canada were assessed to estimate the environmental exposure potential of the substance throughout its life cycle. Environmental exposure from the notified activities is expected to be mainly from cleaning of transport vessels, formulation and use in metal-working fluid and surface treatment by release of the substance to water resulting in predicted environmental concentrations (PECs) in the range of 10-100 μg/L, 1-10 μg/L and 100-1000 μg/L, respectively.

For potential activities such as cleaning of different transport vessels and manufacturing, environmental exposure is expected to be mainly by release of the substance to water resulting in a PEC in the range of 1-10 μg/L. For potential activities such as industrial use in the pulp and paper industry, environmental exposure is expected to be mainly by release of the substance to water resulting in a PEC in the range of 100-1000 μg/L.

Comparing the PEC with the PNEC, the ratio is less than 1. This, along with other lines of evidence including environmental fate, hazard, and exposure, indicates that the substance is unlikely to cause ecological harm in Canada.

Human health assessment

Based on the available hazard information, the substance has a low acute toxicity by the oral and dermal route (median lethal dose >2000 mg/kg body weight). It is not teratogenic by oral route of exposure. The substance has a low reproductive toxicity but may have moderate developmental toxicity (no-observed-adverse-effect level (NOAEL): 30-300 mg/kg-bw/day) and moderate to high subchronic toxicity (no-observed-effect level <100 mg/kg-bw/day) following repeated oral doses in mammalian test animals. It is not mutagenic *in vitro* and is not clastogenic *in vitro* and *in vivo*. Therefore, the substance is unlikely to cause genetic damage. The provisional tolerable daily intake (PTDI) was calculated to be in the range of 0.01-0.1 mg/kg-bw/day based on two studies including the NOAEL of the oral subchronic toxicity study in mammalian test animals. The PTDI is the estimated level of long-term exposure without risk of adverse health effects.

When the notified substance is used as a corrosion inhibitor, direct exposure of the general population is not expected due to the industrial nature of the use. Indirect exposure of the general population from environmental media such as drinking water is expected to be at low levels given the low potential for environmental release. Potential uses of the substance include household product applications, where direct exposure of the general population is expected to be mainly by dermal contact with the skin or by inhalation at levels in the range of 0.01 - 0.1 mg/kg bw/day (as a worst case scenario, i.e., furniture polish). Indirect exposure of the general population from environmental media is expected to be low.

Because all estimated human exposures are at levels that do not pose a concern, the substance is not likely to pose a significant health risk to the general population, and is unlikely to be harmful to human health.

Assessment conclusion

When the substance is used for notified and potential activities, it is not expected to be harmful to human health or the environment according to the criteria under section 64 of the Act.

A conclusion under CEPA, on this substance, is not relevant to, nor does it preclude an assessment against the hazard criteria for Workplace Hazardous Materials Information System that are specified in the *Controlled Products Regulations* or *Hazardous Products Regulations* for products intended for the workplace.