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

Ministerial Condition No. 18685: 1-Propanaminium, 3-amino-*N* (carboxymethyl)-*N*,*N*-dimethyl-, *N*-C_{8-18} acyl derivatives, inner salts

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 determined that the substance is 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, and constitute or may constitute a danger in Canada to human life or health.

In order to ensure that the substance does not cause harm to the Canadian environment or human health, its manufacture or import is authorized subject to conditions on its formulation as described in Ministerial Condition No. 18685 published in the *Canada Gazette* Part I, Vol. 150, No. 52, December 24, 2016.

Substance Identity

The chemcial, 1-Propanaminium, 3-amino-*N*-(carboxymethyl)-*N*,*N*-dimethyl-, *N*-C_{8-18} acyl derivatives, inner salts (Chemical Abstracts Service Registry No. 97862-59-4), is of unknown or variable composition, complex reaction products, or biological material (UVCB) and can be classified as an amidopropyl betaine.

Notified and Potential Activities

The substance is proposed to be imported into Canada in quantities greater than 10 000 kg/yr for use as a surfactant for household cleaners and personal care products. Potential uses are expected to be similar to those notified.

Environmental Fate and Behaviour

Based on its physical and chemical properties, if released to the environment, the substance will tend to partition to water, soil and sediment. The substance is not expected to be persistent in water, soil and sediment based on its very high aerobic (>85%) and high anaerobic (60-85%) biodegradability. The substance is not expected to bioaccumulate based on its low predicted bioconcentration factor (<250 L/kg).

Ecological Assessment

Based on the available hazard information, the substance has moderate acute toxicity in algae and aquatic invertebrates (median effective concentration (EC_{50}) 1-100 mg/L). It has moderate

chronic toxicity in fish (no-observed-effect concentration (NOEC) 0.1-10 mg/L) and moderate to high chronic toxicity in aquatic invertebrates (NOEC <10mg/L). Using the EC_{50} from the most sensitive organism (aquatic invertebrates) and by applying an appropriate assessment factor, the predicted no-effect concentration (PNEC) was calculated to be 10-100 µg/L which was used to estimate the ecological risk

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 use of rinse-off products by consumers and industrial blending and formulation activities by release of the substance to the aquatic environment via waste water. The predicted environmental concentration (PEC) for notified activities is estimated to be 0.1-10 µg/L for consumer activities and 1-100 µg/L for industrial activities. The substance may potentially be used in other surfactant applications; however, these activities are expected to result in lower environmental exposure than the notified use.

Based on a comparison of the PEC for industrial releases with the PNEC, the substance is anticipated to cause ecological harm in Canada. The risks have been identified with the moderate to high ecotoxicity in conjunction with the potential for increased environmental release resulting from industrial blending and formulation activities.

Human Health Assessment

Based on the available hazard information on the substance and surrogate data on structurally related chemicals, the substance has a low to moderate potential for acute toxicity by the oral route of exposure (median lethal dose (LD_{50}) >300 mg/kg body weight) and a moderate potential for acute toxicity by the dermal route of exposure (LD_{50} 1000-2000mg/kg bw). The substance has a moderate potential for subchronic toxicity following repeat oral doses in mammalian test animals (90-day no-observed-adverse-effect level (NOAEL) 10-100 mg/kg-bw/d). It has high developmental toxicity for maternal endpoints (NOAEL 50-250 mg/kg-bw/d), and moderate developmental toxicity for fetal endpoints (NOAEL 250-1000 mg/kg-bw/d) following repeat oral doses in mammalian test animals. It is a weak dermal sensitizer (0-8% response (guinea pig maximization test)). It is not mutagenic *in vitro* and is not clastogenic *in vivo*. Therefore, the substance is unlikely to cause genetic damage. The provisional daily tolerable intake (PTDI) was determined to be 100-1000 µg/kg-bw/d based on the subchronic NOAEL from repeated-dose oral toxicity testing.

Based on a review of available hazard literature, the substance is unlikely to cause dermal sensitization, but weak to strong sensitization has been linked to two impurities present at varying levels in amidopropyl betaines. A review by Australia's National Industrial Chemicals Notification and Assessment Scheme for a similar substance and the Cosmetic Ingredient Review concluded that the substance was likely safe to use in cosmetics; however, both cited the presence of impurities which are linked to skin sensitization and which should be limited in products.

When the notified substance is used in household cleaners and personal care products, direct exposure of the general population is expected to be mainly by contact with the skin at low

levels. The anticipated concentration of the substance in household cleaner and cosmetics is low (0.1-10%) and dermal absorption is expected to be <10%. The total systemic exposure from direct dermal contact was estimated to be 100-1000 µg/kg-bw/d. Indirect exposure of the general population from environmental media such as drinking water is expected to be at levels of 0.01-1 µg/kg-bw/d mainly by ingestion. Other potential uses as a surfactant are expected to result in lower exposure than notified uses.

Based on sensitization effects associated with impurities present at varying levels, the substance is anticipated to be harmful to human health. The risks have been identified with dermal exposure when used in household cleaners and cosmetics.

Other Considerations

A similar substance is risk managed under Ministerial Condition No. 18427 to limit impurities in order to address health concerns regarding dermal sensitization.

Assessment Conclusion

The substance is suspected to have a harmful effect on the environment according to the criteria under paragraph 64 (*a*) of CEPA and to potentially constitute a danger to human health according to the criteria under paragraph 64 (*c*).

Due to the identified risk to the environment and human health, a Ministerial Condition No. 18685 was published in the *Canada Gazette* Part I, Vol. 150, No. 52, December 24, 2016, to restrict the manner in which the notifier may manufacture or import the substance with conditions on its formulation (i.e. concentration of impurities present) in order to mitigate these potential risks.

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.