Australian Government
Department of Health and Aged Care
Australian Industrial Chemicals Introduction Scheme

Decaoxatetratriacontane-1,34-disulfonic acid, dipotassium salt
Hexaoxadocosane-1-sulfonic acid, 22,22′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)
Tetraoxahexadecane-1-sulfonic acid, 16,16′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)
Nonaoxahentriacontane-1,31-disulfonic acid, dipotassium salt

Assessment statement (CA09793/CA09912/CA09913/CA09914/CA09915/CA09916)

26 June 2024

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AICIS assessment (CA09793/CA09912/CA09913/CA09914/ CA09915/CA09916)

Chemicals in this assessment

AICIS Approved Chemical Name (AACN)	Application no.
Decaoxatetratriacontane-1,34-disulfonic acid, dipotassium salt	CA09793
Hexaoxadocosane-1-sulfonic acid, 22,22′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	CA09912
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	CA09913
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	CA09914
Tetraoxahexadecane-1-sulfonic acid, 16,16′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	CA09915
Nonaoxahentriacontane-1,31-disulfonic acid, dipotassium salt	CA09916

Reason for the assessment

Applications for assessment certificates under section 31 of the *Industrial Chemicals Act 2019* (the Act).

Certificate Application type

AICIS received assessment certificate applications for the six chemicals in a Very Low to Low Risk type. The chemicals in this assessment meet the similar chemical and same end use criteria.

Defined scope of assessment

The chemicals have been assessed:

- as imported into Australia for a combined volume of 0.36 tonnes per year for six chemicals
- as imported at 10% concentration in rods in fully finished products for industrial use only
- for use in onshore and offshore oil and gas production wells.

Summary of assessment

Summary of introduction, use and end use

The assessed chemicals will not be manufactured, reformulated or repackaged in Australia. The assessed chemicals will be imported into Australia at 10% concentration bound as particles within plastic polymer rods as fully finished products. The assessed chemicals within plastic polymer matrix rods will be directly distributed to the customers. The assessed chemicals will be used only for industrial purposes for end use in onshore and offshore oil and gas production wells.

When used in oil and gas production wells, the assessed chemicals contained in plastic matrix rods will be deployed into the oil or gas well during the initial completion. In the well, the assessed chemicals will leach out from the polymer matrix when in contact with the aqueous phase.

Human health

Summary of health hazards

No toxicology data were provided for the assessed chemicals or analogue chemicals.

Hazard classifications relevant for worker health and safety

Based on limited data provided by the applicant, the assessed chemicals cannot be classified according to the *Globally Harmonized System of Classification and Labelling of Chemicals* (GHS) (UNECE 2017) for hazard classes relevant for worker health and safety as adopted for industrial chemicals in Australia.

Summary of health risk

Public

The assessed chemicals are only introduced for use by industrial workers and will not be available for use by the public. When introduced and used in the proposed manner, the public will not be exposed to the assessed chemicals.

This assessment does not identify any risks to public health that require specific risk management measures.

Workers

As the assessed chemicals are imported into Australia bound as particles within plastic matrix rods in fully finished products, there is minimum handling and exposure to the assessed chemicals during the work processes in oil and gas production wells.

Limited worker exposure is expected during installation operations (see **Supporting information**). During production operations, limited worker exposure is also expected as products containing the assessed chemicals have already been placed into screen completion equipment and there is no direct worker contact with the products containing the assessed chemicals.

According to the applicant, use of appropriate personal protective equipment (PPE) such as safety glasses and gloves will further limit worker exposure during the operation process.

This assessment does not identify any risks to workers that require specific risk management measures.

Environment

Summary of environmental hazard characteristics

According to domestic environmental hazard thresholds and based on the available data the assessed chemicals are:

- Persistent (P)
- Not Bioaccumulative (not B)
- Not Toxic (not T)

Environmental hazard classification

Based on the ecotoxicological data provided by the applicant, the assessed chemicals are not expected to be harmful to aquatic life. Therefore, the assessed chemicals do not satisfy the criteria for classification under the GHS for acute and chronic aquatic toxicities (UNECE, 2017).

Summary of environmental risk

The assessed chemicals will be introduced for use in onshore and offshore oil and gas production wells.

No significant release of the assessed chemicals is expected to occur after the product is used in off-shore and on-shore oil and gas production wells. The product is used in the controlled technology of the customer well and releases will be in very small quantities. The assessed chemicals are readily soluble in sea water and may be potentially released into the environment. The operator can choose to re-inject the water back into the oil/gas field through injection wells or they can collect the water for discharge. Treatment of the wastewater is required prior to discharge; however, treatment methods may change based on the site operator. Overall, minimal release of the assessed chemicals to the environment is expected.

Based on available biodegradation studies, the assessed chemicals are not readily biodegradable and are persistent. The assessed chemicals don't have a potential to bioaccumulate based on the low log K_{ow} = -6.6 to -4.66 and the assessed chemicals are not toxic to aquatic organisms.

Although the assessed chemicals are persistent according to the Australian Environmental Criteria for Persistent, Bioaccumulative and/or Toxic Chemicals (DCCEEW, 2022), they do not meet all three PBT criteria. Therefore, the assessed chemicals are unlikely to have unpredictable long-term effects. Based on the low volume introduced, low hazards and the assessed use pattern, the environmental risk from the introduction of the assessed chemicals can be managed.

Means for managing risk

No specific means for managing risk are proposed during the assessment.

A copy of the Safety Data Sheet (SDS) should be easily accessible to workers.

Conclusions

The Executive Director is satisfied that the identified risks to human health and the environment from the introduction and use of the industrial chemicals can be managed.

Note:

1. Obligations to report additional information about hazards under s 100 of the *Industrial Chemicals Act 2019* apply.
2. You should be aware of your obligations under environmental, workplace health and safety and poisons legislation as adopted by the relevant state or territory.

Supporting information

Chemical identity

Chemical Identity of CA09793

AACN	Decaoxatetratriacontane-1,34-disulfonic acid, dipotassium salt

Chemical Identity of CA09912

AACN	Hexaoxadocosane-1-sulfonic acid, 22,22′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)

Chemical Identity of CA09913

AACN	Tetraoxapentadecane-1-sulfonic acid, 15,15′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)

Chemical Identity of CA09914

AACN	Tetraoxapentadecane-1-sulfonic acid, 15,15′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)

Chemical Identity of CA09915

AACN	Tetraoxahexadecane-1-sulfonic acid, 16,16′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)

Chemical Identity of CA09916

AACN	Nonaoxahentriacontane-1,31-disulfonic acid, dipotassium salt

Chemical description

Each of the six assessed chemicals is a salt of a discrete chemical and each has a purity of greater than 90%.

Relevant physical and chemical properties

AACN (CA09793)	Decaoxatetratriacontane-1,34-disulfonic acid, dipotassium salt
Physical form	Off-white to brown powder
Melting point	206.8 °C
Water solubility	1,000 mg/L at 25 °C
Ionisable in the environment?	Yes
pK_a	1.652
log K_{ow}	-4.66

AACN (CA09912)	Hexaoxadocosane-1-sulfonic acid, 22,22′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)
Physical form	Off-white to brown powder
Melting point	206.8 °C
Water solubility	1,000 mg/L at 25 °C
Ionisable in the environment?	Yes
pK_a	1.767
log K_{ow}	-6.6

AACN (CA09913)	Tetraoxapentadecane-1-sulfonic acid, 15,15′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)
Physical form	Off-white to brown powder
Melting point	206.8 °C
Water solubility	1,000 mg/L at 25 °C
Ionisable in the environment?	Yes
pK_a	1.652
log K_{ow}	-5.2

AACN (CA09914)	Tetraoxapentadecane-1-sulfonic acid, 15,15′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)
Physical form	Off-white to brown powder
Melting point	206.8 °C
Water solubility	100 mg/L at 25 °C
Ionisable in the environment?	Yes
pK_a	1.652
log K_{ow}	-5.2

AACN (CA09915)	Tetraoxahexadecane-1-sulfonic acid, 16,16′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)
Physical form	Off-white to brown powder
Melting point	206.8 °C
Water solubility	> 1,000 g/L at 25 °C
Ionisable in the environment?	Yes
pK_a	1.767
log K_{ow}	-5.2

AACN (CA09916)	Nonaoxahentriacontane-1,31-disulfonic acid, dipotassium salt
Physical form	Off-white to brown powder
Melting point	206.8 °C
Water solubility	1,000 mg/L at 25 °C
Ionisable in the environment?	Yes
pK_a	1.652
log K_{ow}	-4.66

Human exposure

Workers

There will be no manufacturing, reformulation or repackaging of the assessed chemicals in Australia. The assessed chemicals will be imported into Australia at 10% concentration bound as particles within plastic matrix rods in fully finished products for use in onshore and offshore oil and gas production wells. The assessed chemicals contained in a polymer matrix within the plastic rods will be installed into the completion component by trained personnel from the applicant, locally in an appropriate workshop. The completion component will be transported to the onshore and offshore rig or platform and installed in the well. Following installation in the well, the well will then be completed, and production of oil and gas will start. During the production of oil and gas, the assessed chemicals will leach out from the polymer matrix rods when in contact with the aqueous phase.

As the assessed chemicals are bound in a polymer matrix within the plastic rods, no direct contact with the assessed chemicals will occur, and no dust or particles of the assessed chemicals are released, worker exposure to the assessed chemicals is minimal. Following installation of the plastic matrix rods into the completion component, no further contact will occur with the plastic rods containing the assessed chemicals.

According to the applicant, use of appropriate PPE such as safety glasses and gloves will reduce worker exposure during the operation process, and no equipment maintenance or cleaning is required.

Environmental exposure

The assessed chemicals will be imported into Australia bound as particles within plastic polymer rods for use in both onshore and offshore oil and gas production wells. No manufacture or reformulation is expected to occur in Australia.

When used in oil and gas production wells, the assessed chemicals contained in plastic matrix rods will be deployed into the oil or gas well during the initial completion. No releases of the assessed chemicals are expected during the initial installation. In the well, the assessed chemicals will leach out from the polymer matrix when in contact with the aqueous phase.

The site operator may re-inject the water containing the assessed chemicals back into the oil/gas field through injection wells, which is estimated to account for up to 70% of the introduction volume. Alternatively, waters containing the assessed chemicals may be collected for discharge. Any discharged waters are treated prior to release; however, treatment methods may change based on the site operator. Overall, release of the assessed chemicals into the environment is expected to be negligible.

Environmental fate

Degradation

Based on the measured biodegradation in water, the assessed chemicals are considered persistent.

Degradation studies conducted on the assessed chemicals according to OECD TG 306 indicate that the assessed chemicals are not readily biodegradable.

Test chemical	% degradation after 28 days
Decaoxatetratriacontane-1,34-disulfonic acid, dipotassium salt	8%
Hexaoxadocosane-1-sulfonic acid, 22,22′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	0%
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	7%
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	3%
Tetraoxahexadecane-1-sulfonic acid, 16,16′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	5%
Nonaoxahentriacontane-1,31-disulfonic acid, dipotassium salt	5.7%

Bioaccumulation

Based on the predicted log K_{ow} values, the assessed chemicals do not have the potential to bioaccumulate.

No bioaccumulation information was provided for the assessed chemicals. The measured and modelled partition coefficients (log K_{ow}) of the assessed chemicals are below the domestic bioaccumulation threshold of log K_{ow} = 4.2 (EPHC, 2009).

Test chemical	log K_{ow} value
Decaoxatetratriacontane-1,34-disulfonic acid, dipotassium salt	-4.66 (Calc.)
Hexaoxadocosane-1-sulfonic acid, 22,22′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	-6.6
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	-5.2
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	-5.2
Tetraoxahexadecane-1-sulfonic acid, 16,16′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	-5.2
Nonaoxahentriacontane-1,31-disulfonic acid, dipotassium salt	-4.66 (Calc.)

Predicted environmental concentration (PEC)

The predicted environmental concentration (PEC) has not been calculated as release of the assessed chemicals to the aquatic environment will be negligible based on the assessed use pattern.

Environmental effects

Effects on aquatic Life

Acute toxicity

The following measured median lethal concentration (LC50) values for fish were supplied by the applicant:

Test chemical	Endpoint	Method
Decaoxatetratriacontane-1,34-disulfonic acid, dipotassium salt	96 h LC50 > 408 mg/L	*Scophthalmus maximus* (Turbot) Mortality OECD TG 203 Semi-static conditions Nominal concentration
Hexaoxadocosane-1-sulfonic acid, 22,22′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	96 h LC50 > 605.8 mg/L	*Cyprindon variegatus* (Sheepshead minnow) Mortality OECD TG 203 Semi-static conditions Nominal concentration
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	96 h LC50 > 2,396.8 mg/L	*Cyprindon variegatus* (Sheepshead minnow) Mortality OECD TG 203 Semi-static conditions Nominal concentration
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	96 h LC50 > 2,262.2 mg/L	Cyprindon variegatus (Sheepshead minnow) Mortality OECD TG 203 Semi-static conditions Nominal concentration
Tetraoxahexadecane-1-sulfonic acid, 16,16′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	96 h LC50 > 2,446.2 mg/L	*Cyprindon variegatus* (Sheepshead minnow) Mortality OECD TG 203 Semi-static conditions Nominal concentration

The following measured median lethal concentration (EC50) values for aquatic invertebrates were supplied by the applicant:

Test chemical	Endpoint	Method
Decaoxatetratriacontane-1,34-disulfonic acid, dipotassium salt	48 h EC50 > 3,200 mg/L	*Acartia tonsa* (marine copepod) Immobility ISO 14669 Semi-static conditions Measured concentration

Hexaoxadocosane-1-sulfonic acid, 22,22′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	48 h EC50 > 605.8 mg/L	*Acartia tonsa* (marine copepod) Immobility ISO 14669 Semi-static conditions Measured concentration
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	48 h EC50 > 2,396.8 mg/L	Acartia tonsa (Marine copepod) Immobility ISO 14669 Semi-static conditions Measured concentration
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	48 h EC50 > 2,262.2 mg/L	*Acartia tonsa* (marine copepod) Immobility ISO 14669 Semi-static conditions Measured concentration
Tetraoxahexadecane-1-sulfonic acid, 16,16′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	48 h EC50 > 2,446.2 mg/L	*Acartia tonsa* (marine copepod) Immobility ISO 14669 Semi-static conditions Measured concentration
Nonaoxahentriacontane-1,31-disulfonic acid, dipotassium salt	48 h EC50 > 1,000 mg/L	*Acartia tonsa* (marine copepod) Immobility ISO 14669 Semi-static conditions Measured concentration

The following measured median effect concentration (ErC50) values for algae were supplied by the applicant:

Test chemical	Endpoint	Method
Decaoxatetratriacontane-1,34-disulfonic acid, dipotassium salt	72 h ErC50 > 1,400 mg/L	*Skeletonema costatum* (unicellular algae) Growth rate ISO 10253 Static conditions Nominal concentration
Hexaoxadocosane-1-sulfonic acid, 22,22′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	72 h ErC50 > 1,000 mg/L	*Skeletonema costatum* (unicellular algae) Growth rate ISO 10253 Static conditions Nominal concentration
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	72 h ErC50 > 6,328.7 mg/L	*Skeletonema costatum* (unicellular algae) Growth rate ISO 10253 Static conditions Nominal concentration

Tetraoxapentadecane-1-sulfonic acid, 15,15′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	72 h ErC50 > 9,992.4 mg/L	*Skeletonema costatum* (unicellular algae) Growth rate ISO 10253 Static conditions Nominal concentration
Tetraoxahexadecane-1-sulfonic acid, 16,16′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	72 h ErC50 > 10,000 mg/L	*Skeletonema costatum* (unicellular algae) Growth rate ISO 10253 Static conditions Nominal concentration
Nonaoxahentriacontane-1,31-disulfonic acid, dipotassium salt	72 h ErC50 > 1,000 mg/L	*Skeletonema costatum* (unicellular algae) Growth rate ISO 10253 Static conditions Nominal concentration

Chronic toxicity

The following measured no effect concentration (NOErC) values for algae were supplied by the applicant:

Test chemical	Endpoint	Method
Decaoxatetratriacontane-1,34-disulfonic acid, dipotassium salt	72 h NOErC = 560 mg/L	*Skeletonema costatum* (unicellular algae) Growth rate ISO 10253 Static conditions Nominal concentration
Hexaoxadocosane-1-sulfonic acid, 22,22′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	72 h NOErC = 10,000 mg/L	*Skeletonema costatum* (unicellular algae) Growth rate ISO 10253 Static conditions Nominal concentration
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	72 h NOErC = 1,000 mg/L	*Skeletonema costatum* (unicellular algae) Growth rate ISO 10253 Static conditions Nominal concentration
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	72 h NOErC = 3,200 mg/L	*Skeletonema costatum* (unicellular algae) Growth rate ISO 10253 Static conditions Nominal concentration

Tetraoxahexadecane-1-sulfonic acid, 16,16′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	72 h NOErC = 10,000 mg/L	*Skeletonema costatum* (unicellular algae) Growth rate ISO 10253 Static conditions Nominal concentration
Nonaoxahentriacontane-1,31-disulfonic acid, dipotassium salt	72 h NOErC > 1,000 mg/L	*Skeletonema costatum* (unicellular algae) Growth rate ISO 10253 Static conditions Nominal concentration

Effects on sediment dwelling life

The following measured LC50 values for crustaceans were supplied by the applicant:

Test chemical	Endpoint	Method
Hexaoxadocosane-1-sulfonic acid, 22,22′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	10 d LC50 > 14,784.8 mg/kg dw	*Corophium volutator* (European mud scud) OSPAR protocols 2005 Nominal concentration
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[1,2-phenylenebis(oxy)]bis-, potassium salt (1:2)	10 d LC50 > 14,183 mg/kg dw	*Corophium volutator* (European mud scud) OSPAR protocols 2005 Nominal concentration
Tetraoxapentadecane-1-sulfonic acid, 15,15′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	10 d LC50 > 14,184 mg/kg dw	*Corophium volutator* (European mud scud) OSPAR protocols 2005 Nominal concentration
Tetraoxahexadecane-1-sulfonic acid, 16,16′-[(4-methyl-1,2-phenylene)bis(oxy)]bis-, potassium salt (1:2)	10 d LC50 > 14,489 mg/kg dw	*Corophium volutator* (European mud scud) OSPAR protocols 2005 Nominal concentration

Predicted no-effect concentration (PNEC)

A Predicted no-effect concentration was not calculated for the assessed chemicals as the assessed chemicals were not harmful to aquatic or sediment dwelling life across all trophic levels in the studies supplied.

Categorisation of environmental hazard

The categorisation of the environmental hazards of the assessed chemicals according to the Australian Environmental Criteria for Persistent, Bioaccumulative and/or Toxic Chemicals (DCCEEW, 2022) is presented below:

Persistence

Persistent (P). Based on measured degradation values, the assessed chemicals are categorised as Persistent.

Bioaccumulation

Not Bioaccumulative (Not B). Based on low predicted log K_{ow} values, the assessed chemicals are categorised as Not Bioaccumulative.

Toxicity

Not Toxic (Not T). Based on the experimental ecotoxicity values above 1 mg/L, the assessed chemicals are categorised as Not Toxic.

Environmental risk characterisation

Although the assessed chemicals are persistent, the assessed chemicals do not meet all three PBT criteria and are hence unlikely to have unpredictable long-term effects (EPHC 2009). A Risk Quotient (PEC/PNEC) for the aquatic compartment could not be calculated. However, the assessed chemicals are not expected to be harmful to aquatic life, and release of the assessed chemicals to the aquatic environment will be negligible based on its assessed use pattern.

Thus, based on the low hazard of the assessed chemicals and the assessed use pattern, the risk from the assessed chemicals can be managed.

References

DCCEEW (2022) Australian Environmental Criteria for Persistent, Bioaccumulative and/or Toxic Chemicals, DCCEEW, accessed 06 May 2024

EPHC (2009) Environment Protection and Heritage Council, Environmental Risk Assessment Guidance Manual for industrial chemicals, Prepared by: Chris Lee-Steere Australian Environment Agency Pty Ltd, February 2009. ISBN 978-1-921173-41-7

UNECE (United Nations Economic Commission for Europe) (2017). Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Seventh Revised Edition. UNECE.