Current as of June 21st, 2016

Substance Risk Evaluation for Determining Environmental Emergency Planning under the *Environmental Emergency Regulations* Set under the *Canadian Environmental Protection Act, 1999* (CEPA 1999)

Hydriodic Acid
(CAS No. 10034-85-2)

Risk Evaluation Conclusion:

- **Threshold Quantity of 3 tonnes (minimum concentration 0.1% and pH ≤ 2) due to corrosiveness**
- **Is a candidate for the *Environmental Emergency Regulations***

1.0 INTRODUCTION

The *Environmental Emergency Regulations*, developed under Part 8 of the *Canadian Environmental Protection Act, CEPA), 1999* (Government of Canada, 2011) establishes a list of substances for which fixed facilities must notify Environment Canada that they store or use the substance on-site, by providing notices to Environment Canada, reporting when the substance is released into the environment, and developing an environmental emergency plan (E2 plan) for each substance stored or used at a fixed facility at or above specified threshold quantities.

To determine if a substance is a candidate to be added to the *Environmental Emergency Regulations*, Environment Canada has developed a risk evaluation methodology based on the following hazard categories:

- Physical: flammable and combustible or oxidizing substances, or those having a potential to cause vapour cloud explosion or pool fires.
- Human Health: substances that are toxic by inhalation, are carcinogenic, or are corrosive.
- Environmental Health: substances that are: corrosive, persistent, bioaccumulative, or aquatically toxic.

For more information on the methodology for setting threshold quantities in the Environmental Emergency Regulations, please refer to Environment Canada (2015).

Hydriodic acid (CAS No. 10034-85-2) was selected for risk evaluation because it is a substance that meets the criteria for corrosive substances as defined by OECD (OECD, 2001) that, if spilled, could be immediately harmful to humans and/or the environment.

Following the risk evaluation, Environment Canada recommends that this substance be proposed for addition to Schedule 1 of the *Environmental Emergency Regulations* at a threshold quantity of 3 tonnes at a minimum concentration of 0.1% or at a pH ≤ 2.

2.0 SUMMARY OF THE RISK EVALUATION

2.1 Physical Hazard: Flammable, Combustible or Oxidizing Substances

Because hydriodic acid does not have a flash point (Ash and Ash, 2009) and has a boiling point of 127°C (Lewis, 2007), this substance does not have the possibility of a vapour cloud explosion.

Therefore, no threshold is set for this substance as a result of its potential for flammability or combustibility.

2.2 Physical Hazard: Potential for Pool Fires

Hydriodic acid is not capable of causing a pool fire.

2.3 Human Health Hazard: Inhalation Toxicity

Because hydriodic acid has a vapour pressure greater than 10 mmHg (1.33 kPa) at 25°C (SCAPA, 2012), the substance has sufficient volatility to constitute an inhalation danger. However, there are no inhalation toxicity values to be found.

Therefore, no threshold is set for the inhalation toxicity to humans.

2.4 Human Health Hazard: Carcinogenicity

Because hydriodic acid is not classified in any group of International Agency for Research on Cancer (IARC, 2014) or the U.S. Environmental Protection Agency (U.S. EPA, 2005), and because the substance does not have a half-life longer than five years in any medium, no threshold is set for the carcinogenicity of this substance.

2.5 Human and Environmental Health Hazard: Corrosive Substances

The substance has a measured pH equal to or less than 2, therefore a threshold of 3 tonnes is set for this substance.

2.6 Environmental Health Hazard: Persistent, Bioaccumulative, or Aquatically Toxic

Lethal concentration

This methodology was not used because pH ≤ 2 or pH ≥ 11.5 are considered corrosive to aquatic life.

Persistence

Hydriodic acid is classified as being practically non-persistent in water according to our risk evaluation methodology (Environment Canada, 2015).

Bioaccumulation

Hydriodic acid is practically non-bioaccumulative according to our risk evaluation methodology (Environment Canada, 2015).

2.7 Assigned Threshold

Following the risk evaluation methodology developed under section 200 of CEPA 1999, the categories (flammability, combustibility, oxidizers, inhalation toxicity, aquatic toxicity, carcinogenicity, corrosiveness, pool fires) having the lowest scientific threshold will be compared against other risk management considerations. For example, the threshold will be compared to other provincial and federal legislation or voluntary programs that may already provide adequate management of the risk from an environmental emergency. Proposed thresholds may also be modified based on policy and other considerations as assessed during the public consultation period. For more information regarding the determination of thresholds, please refer to the *Implementation Guidelines for the Environmental Emergency Regulations 2011* (Environment Canada, 2011).

Other Considerations

Before the preliminary consultations, the corrosives were set at 0.22 tonnes. After preliminary consultation, the proposed threshold for strong acids and bases has been increased to 3 tonnes with a concentration set at 0.1%. The new proposed threshold is set to 3 tonnes for the following reasons:

- The concentration at 0.1% will result in a pH ≤ 2 or pH ≥ 11.5 for strong bases or acids.
- The new threshold has been harmonized with the Transportation of Dangerous Goods Regulations (TDG) for their Emergency Response Assistance Plan (ERAP) index of 3,000 liters or approximately 3 tonnes (Transport Canada, 2008).
- According to the National Enforcement and Emergencies Management Information System and Intelligence System (NEMISIS) database, hydrochloric acid and sulphuric acid were both on record as having a "moderate" impact on air, land and fresh water after a spill of 3 tonnes. One spill of sulfuric acid was identified as having a "major" impact at 4.5 tonnes.

A “moderate” classification in NEMISIS has some of the following characteristics: there is a risk to endangered or threatened species or their habitat, or a significant life threatening risk to other wildlife; the incident causes significant disruption of public services or property damage and community health is or will be threatened; impacts of the incident on the environment are significant (e.g. fish kill) or not easily identifiable (e.g. requires further investigation).

This quantity for spills of 3 tonnes in NEMISIS is also the same as the quantity recommended by TDG for their ERAP for sulphuric acid, nitric acid, hydrobromic acid and perchloric acid (Environment Canada, 2015).

- The proposed threshold at 3 tonnes has been extended for bases as well.

Findings

A proposed threshold of 3 tonnes with a minimum concentration of 0.1% or at a pH of ≤ 2 is assigned for hydriodic acid based on its assessed corrosiveness. The threshold quantity and its respective concentration will not be finalized until after public consultation.

3.0 CONCLUSION

Information concerning the quantities of hydriodic acid (CAS No. 10034-85-2) in use in Canada indicates that the substance exists in commerce. Following the risk evaluation of hydriodic acid and taking into consideration the quantities in use in Canada, Environment Canada recommends that this substance be proposed for addition to Schedule 1 of the *Environmental Emergency Regulations* under CEPA 1999 at a threshold quantity of 3 tonnes at a minimum concentration of 0.1% or at a pH of ≤ 2.

Even if the quantity of a substance in use is below the threshold quantity indicated in the *Environmental Emergency Regulations*, Environment Canada recommends that emergency planning be applied to this substance in order to minimize, or prevent, any impacts on humans or the environment in the event of a release of the substance.

4.0 REFERENCES

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5.0 FURTHER READING

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