

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

**Cesium hydroxide, Solution
(CAS No. 21351-79-1)**

Risk Evaluation Conclusion:

- **Threshold Quantity of 0.22 tonnes (pH $\geq$ 11.5) 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) establish 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 (2014).

Cesium hydroxide, solution (CAS No. 21351-79-1) 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 0.22 tonnes.

2.0 SUMMARY OF THE RISK EVALUATION

2.1 Physical Hazard: Flammable, Combustible or Oxidizing Substances

Because cesium hydroxide, solution does not have an identified flash point or boiling point (no flash point or boiling point data were available during the data gathering process), this substance does not present 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

Cesium hydroxide, solution is not capable of causing a pool fire.

2.3 Human Health Hazard: Inhalation Toxicity

Because cesium hydroxide, solution does not have a vapour pressure greater than 10 mmHg (1.33 kPa) at 20°C (Genium, 2006), the substance does not have sufficient volatility to constitute an inhalation danger.

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

2.4 Human Health Hazard: Carcinogenicity

Because cesium hydroxide, solution is not classified in any group of International Agency for Research on Cancer (IARC, 2014) or the U.S. EPA (2005), 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 greater than 11.5, therefore a threshold of 0.22 tonnes applies.

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

Lethal concentration

This methodology was not used because $\text{pH} \leq 2$ or $\text{pH} \geq 11.5$ are considered corrosive to aquatic life.

Persistence

Cesium hydroxide, solution is classified as being indefinitely persistent in water.

Bioaccumulation

Cesium hydroxide, solution is practically non-bioaccumulative.

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 preliminary 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

At this time, there are no other considerations to take into account for this substance that would result in an increase or a decrease in the calculated threshold quantity.

Findings

A proposed threshold of 0.22 tonnes is assigned for cesium hydroxide, solution based on its assessed corrosiveness. The threshold quantity and its respective concentration will not be finalized until after preliminary public consultation.

3.0 CONCLUSION

Information concerning the quantities of cesium hydroxide, solution (CAS No. 21351-79-1) in use in Canada indicates that the substance exists in commerce. Following the risk evaluation of cesium hydroxide, solution 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 0.22 tonnes at a pH of ≥ 11.5 .

When doing the emergency planning of a substance, it is important to take into consideration not only the most stringent assigned threshold quantity, but all of the other higher-threshold quantities that are noted in association with this substance.

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

Environment Canada. 2011. Implementation Guidelines for the Environmental Emergency Regulations 2011. Available from:
<http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=1FB6D405-1>

Environment Canada. 2014. Summary of Risk Evaluation Framework for Determining Quantity Thresholds and Concentrations for Substances under the Environmental

Emergency Regulations Set under the Canadian Environmental Protection Act, 1999 (CEPA 1999). Environment Canada. Available from: <http://www.ec.gc.ca/ee-ue/default.asp?lang=En&n=9605FFBD-1>

Genium. 2006. Cesium Hydroxide. Genium Group Inc. CES5000. Available from: http://www.hz.genium.com/searchmsds/viewmsds/?MSDSNo=PRO2710&Method=MSDS_Materials.Name&Search=propane&Exact=&Limit=9999&Mode=1

Government of Canada. 2011. *Environmental Emergency Regulations, Canadian Environmental Protection Act, 1999*. Environment Canada. Registered on December 8, 2011. Available from: <http://www.gazette.gc.ca/rp-pr/p2/2011/2011-12-21/html/sor-dors294-eng.html>

IARC (International Agency for Research on Cancer). 2014. IARC Monographs Database on Cancer Risks to Humans. International Agency for Research on Cancer, World Health Organization. Available from: <http://monographs.iarc.fr/ENG/Monographs/PDFs/index.php>

OECD (Organisation for Economic Co-operation and Development). 2001. Environmental Directorate, Joint Meeting of the Chemicals Committee and the Working Party on Chemicals, Pesticides and Biotechnology, ENV/JM/MONO(2001)6.

U.S. EPA (United States Environmental Protection Agency). 2005. Guidelines for Carcinogenic Risk Assessment. Available from: <http://www.epa.gov/cancerguidelines/>

5.0 FURTHER READING

Ketcheson K, Shrives J. 2010. Comparison of Threshold Quantities for Substances with Final AEGL-2 and IDLH Values under CEPA's Environmental Emergency Regulations. In: Proceedings of the Thirty-third Arctic and Marine Oilspill Program Technical Seminar on Environmental Contamination and Response. Environment Canada: Ottawa (ON). pp. 843-861.

U.S. EPA (U.S. Environmental Protection Agency). 1994. List of Regulated Toxic and Flammable Substances and Thresholds for Accidental Release Prevention. Federal Register, 59(20). Document Number 94-1556. 31. Washington (DC). Available from : <http://www.gpo.gov/fdsys/pkg/FR-1994-01-31/html/94-1556.htm>