Environment and Climate Change Canada | Environnement et Changement climatique Canada

ACCIDENT PREVENTION THROUGH THE ENVIRONMENTAL EMERGENCIES REGULATIONS 2019

Environmental Emergencies Prevention Program

Environment and Climate Change Canada

PSM Division
January 11, 2024

Environment and Climate Change Canada's 50th anniversary
50e anniversaire d'Environnement et Changement climatique Canada
Meteorological Service of Canada's 150th anniversary
150e anniversaire du Service météorologique du Canada

Canada

WHY ARE THE E2 REGULATIONS IMPORTANT?

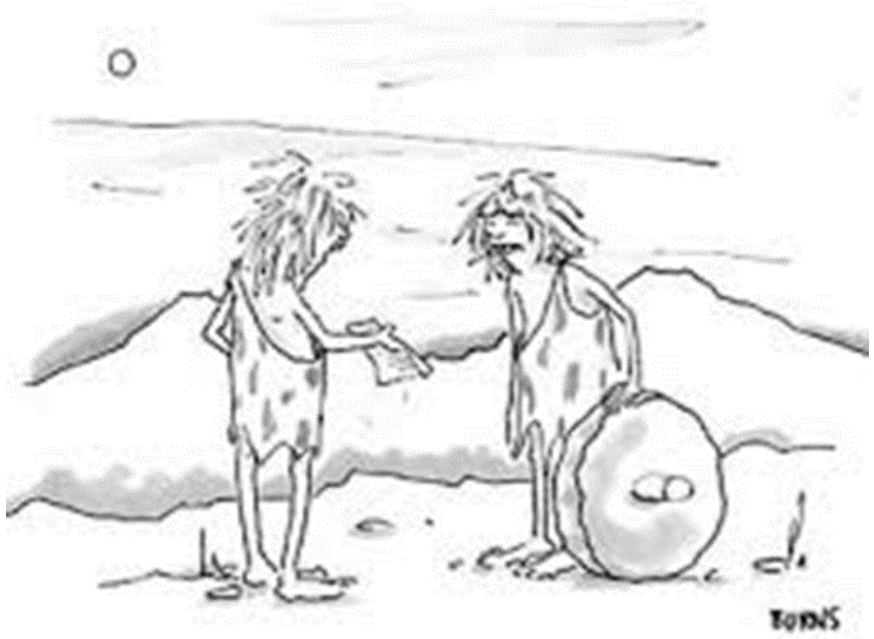
HOW MANY OF YOU ARE CURRENTLY COVERED UNDER E2?

HOW MANY OF YOU AREN'T SURE IF YOU ARE CAPTURED UNDER E2 OR HAVE QUESTIONS ABOUT THE REGULATIONS?

Toronto Propane Explosion - 2008 - Toronto propane explosion - Wikipedia

WHAT WE'LL COVER

- E2 Regulations under CEPA 1999
- Definitions/Terminology
- List of Substances
- Top Ten Substances
- Exclusions
- Developing/Implementing an E2 Plan
- Exercising an E2 Plan
- Public Notification
- Administrative Requirements
- Environmental Emergency Reporting
- CSA Z767 vs. E2 Regs
- Technical Guidance Material, Fact Sheets and Additional Info



"Oh yeah?! Well, I just invented regulations for the wheel!"

CEPA 1999 - PART 8 - E2 REGULATIONS

- *The Environmental Emergency* (E2) *Regulations* are made under Part 8 (Section 200) of *the Canadian Environmental Protection Act, 1999* (CEPA). The regulations aim to help reduce the frequency and severity of accidental releases of hazardous substances into the environment by requiring higher-risk facilities to prepare an E2 plan
- Section 200 of CEPA provides the authority to make regulations for the prevention of, preparedness for, response to and recovery from environmental emergencies
- The first E2 Regulations (E2R) were published in 2003
  - first amendments in 2011
  - E2R 2011 repealed and replaced with ER2019 in CGII on March 6, 2019.
  - E2R 2019 came into force on August 24, 2019

WHO CAN BE SUBJECT TO THE E2 REGULATIONS?

- Responsible Person - The regulations apply to any **person** who *owns* or has the *charge*, *management* or *control* of a specified substance located at a facility

- "Responsible person" may refer to a company, an individual or a government body

IMPORTANT DEFINITIONS

Facility	a property on which one or more fixed onshore installations are located and where a substance is present.
Maximum capacity	Maximum capacity in respect of a container system, means its full physical capacity, expressed in tonnes, including any capacity that is beyond the safe-fill limit set by the manufacturer of the receptacles that comprise the network.
Simulation Exercise	means an exercise simulating the response or a portion of the response to an environmental emergency involving the release of a substance.
Full-scale Simulation Exercise	means an action-based simulation exercise requiring the deployment of personnel, resources and equipment (Note: due to Covid-19, components such as ICP or EOC activation may be virtual).

IMPORTANT DEFINITIONS

Container System

means any receptacle or network of receptacles that is used to contain a substance - including pipelines and pipes – except any part of the network that is automatically or remotely segregated from the rest of the network by shut-off valves, or other mechanisms, in the event of any environmental emergency

Environmental Emergency

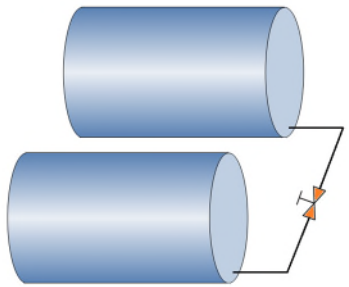
an **uncontrolled, unplanned or accidental release**, or release in contravention of regulations made under this Part, of a substance in the environment; **or**

the **reasonable likelihood** of the release of a substance into the environment

THIS NEW DEFINITION IS A CHANGE FROM THE PREVIOUS E2 REGS

- The 2011 E2 Regulations did not define Container System nor did it factor in the use of automatically or remotely segregated shut-off valves during container system capacity calculations.
- Prior to the 2019 E2 Regulations coming into force, facilities that had manual valves between containers could count them as segregated container systems for the purposes of calculating container capacity.

Under the previous 2011 E2R a manual valve used in this configuration would be considered 2 separate containers



Under the new 2019 E2R a manual valve located in the same configuration (located beside the containers in an unprotected area) would now be considered 1 container

Manually Operated Shut-Off Valve

WHAT IS CONSIDERED AN ACCEPTABLE AUTOMATIC OR REMOTELY OPERATED SHUT-OFF VALVE SYSTEM UNDER THE REGS?

- An automatic or remotely operated shut-off valve is designed to achieve rapid *isolation of interconnected containers* and piping in the event of a container system failure.
- When determining if a container system has an acceptable automatic or remotely operated shut-off valve or other mechanism there are three main performance based considerations:

1. **Is the segregation system capable of segregating the container, ensuring there is no flow of substance between the container and the rest of the system?**

2. **Can the segregation system be automatically or remotely operated from a safe distance on a 24/7 basis during an emergency?**

3. **Is the segregation system capable of functioning in any type of emergency (e.g. fire, spill, release)?**

WHY IS THIS IMPORTANT TO A REGULATEE?

- Having segregated (i.e. smaller) container systems aligns with one of the *Principles of Inherent Safety* (i.e. minimization) which reduces the potential risk of larger releases at facilities.
- The reportable size of a container system can be reduced through the presence of automatically or remotely operated shut-off valves, or other mechanisms.
- This, in turn, can *reduce regulatory burden* for regulatees under the E2 regs in some circumstances (reduced number of schedules, E2 plan no longer required, exercises not required, etc)

E2 REGULATIONS – LIST OF SUBSTANCES

- The E2 Regulations establish a *list of hazardous substances (Schedule 1 in the Regulations)*
  - *249* substances in total

- All substances on Schedule 1 of the E2 Regulations have at least *one emergency hazard characteristic* (explosion hazard, pool fire hazard, combustible, inhalation hazard, aquatically toxic, oxidizer that may explode)

SCHEDULE 1

(Paragraphs 2(1)(a) and (b), 2(2)(a) to (c), (h) and (i), 3(1)(a) and (b) and (2)(d) and (e), subsections 3(3) and (4), paragraph 4(1)(a), subparagraphs 4(1)(b)(i) and (ii) and paragraphs 7(1)(a) and 15(1)(a) and (b))

List of Substances

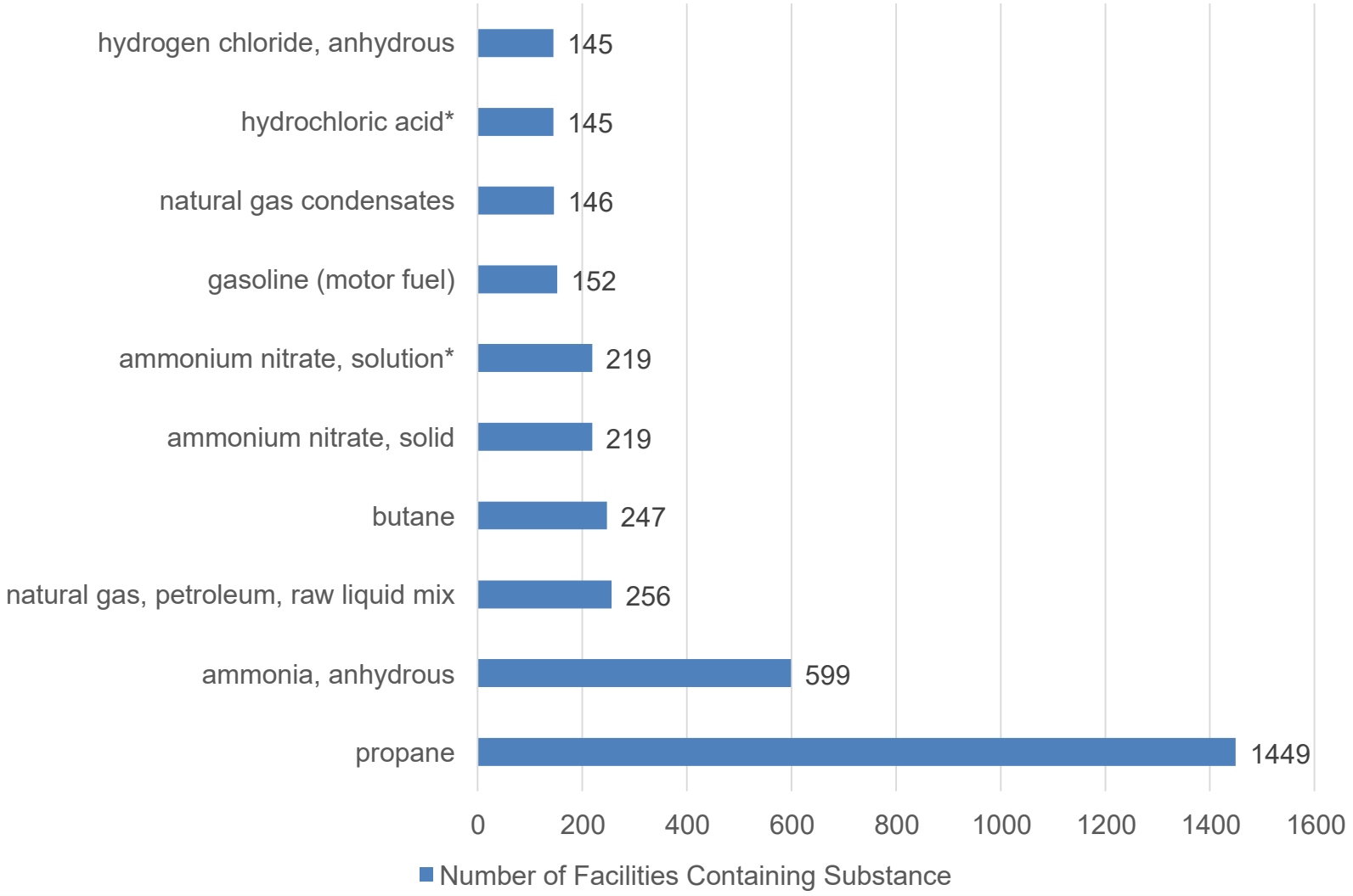
PART 1

	Column 1	Column 2	Column 3	Column 4	Column 5
Item	CAS Registry Number	Name of Substance	Concentration (% mass/mass)	Minimum Quantity (tonnes)	Hazard Category (Short Form)
1	56-23-5	Tetrachloromethane	10	0.22	A
2	57-14-7	1,1-Dimethylhydrazine	10	6.80	I
3	60-29-7	Ethyl ether	1	4.50	E
4	60-34-4	Methylhydrazine	10	6.80	I
5	67-66-3	Chloroform	10	9.10	I
6	71-43-2	Benzene	1	10	C
7	74-82-8	Methane	1	4.50	E
8	74-83-9	Methyl bromide	10	2.27	I

NEW SUBSTANCES ADDED TO 2019 E2 REGULATIONS

CAS#	Name of Substance	Threshold (tonnes)	CAS #	Name of Substance	Threshold (tonnes)
79-06-1	2-Propenamide	9.1	64741-47-5	Natural gas condensates, petroleum	340
80-05-7	Phenol, 4,4′-(1-methylethylidene)bis-	4.5	64741-48-6	Natural gas, petroleum, raw liquid mix	4.5
100-44-7	Benzene, (chloromethyl)	4.5	64741-86-2	Distillates, petroleum, sweetened middle	2500
110-49-6	Ethanol, 2-methoxy-, acetate	9.1	64741-87-3	Naphtha, petroleum, sweetened	4.5
110-54-3	Hexane	4.5	64742-80-9	Distillates, petroleum, hydrodesulphurized middle	2500
111-15-9	Ethanol, 2-ethoxy-, acetate	9.1	68334-30-5	Fuels, diesel	2500
120-80-9	1,2-Benzenediol	4.5	68476-30-2	Fuel oil, No. 2	2500
123-31-9	1,4-Benzenediol	0.22	68476-31-3	Fuel oil, No. 4	2500
123-91-1	1,4-Dioxane	9.1	68476-33-5	Fuel oil, residual	2500
126-73-8	Phosphoric acid, tributyl ester	4.5	68476-34-6	Fuels, diesel, No. 2	2500
732-26-3	Phenol 2,4,6-tris(1,1-dimethylethyl)	0.22	68527-27-5	Naphtha, petroleum, full-range alkylate, butane-containing	80
1314-62-1	Vanadium pentoxide	0.22	68553-00-4	Fuel oil, No. 6	2500
1336-21-6	Ammonium hydroxide	9.1	68919-39-1	Natural gas condensates	45
7646-79-9	Cobalt chloride	0.22	72102-55-7	Methylium, [4-(dimethylamino)phenyl]bis[4-(ethylamino)-3-methylphenyl]-, acetate	0.22
8002-05-9	Petroleum crude oil	2500	101316-57-8	Distillates, petroleum, hydrodesulfurized full-range middle	2500
17540-75-9	Phenol, 2,6-bis(1,1-dimethylethyl)-4-(1-methylpropyl)-	0.22	128683-25-0	Crude oil, oil sand	2500
41556-26-7	Decanedioic acid, bis(1,2,2,6,6-pentamethyl-4-piperidinyl) ester	1.13			

TOP SUBSTANCES REGULATED UNDER E2 REGS



EXCLUSIONS

The E2 Regulations, 2019 include ‘substance’, and ‘quantity’ exclusions:

- Certain categories of substances are excluded from the definition of ‘substance’ and thus, excluded from the requirements under Part 8 of CEPA which means excluded the E2 Regs;
- Quantities of substances, that are excluded from the determination of total quantity located at a facility. (Note: a “quantity” exclusion would not exempt from release reporting requirements)

Note: A substance is always excluded when it is present below the concentration threshold for the substance when in a mixture, solution or on its own.

WHEN DOES A FACILITY FIRST REGISTER TO ECCC UNDER THE REGULATIONS?

A facility needs to report quantities on site in a Schedule 2 to ECCC if:

- it has a Schedule 1 substance at or above the applicable threshold concentration and
- the quantity threshold is met or exceeded for one of the following situations:
  - The maximum expected *total quantity* (whether it is in a container system or not) exceeds the Schedule 1 threshold; **or**
  - The *maximum capacity* of the largest container system exceeds the Schedule 1 threshold.

Column 1	Column 2	Column 3	Column 4	Column 5
CAS Registry Number	Name of the Substance	Concentration (% mass/mass)	Minimum Quantity* (tonnes)	Hazard Category (Short Form)**
6484-52-2	Ammonium nitrate, solid	60	20	O

* Minimum Quantity = Threshold ** Hazard Category = I: Oxidizer that may explode

WHEN MUST A FACILITY PREPARE AN E2 PLAN?

- When the maximum expected *total quantity* on site, whether it is in a container system or not, *and* the *maximum capacity* of the largest container system *equals or exceeds the threshold* (column 4 of Sch.1) for that substance.

Column 1	Column 2	Column 3	Column 4	Column 5
CAS Registry Number	Name of the Substance	Concentration (% mass/mass)	Minimum Quantity* (tonnes)	Hazard Category (Short Form)**
6484-52-2	Ammonium nitrate, solid	60	20	O

* Minimum Quantity = Threshold ** Hazard Category = I: Oxidizer that may explode

PREPARATION OF AN ENVIRONMENTAL EMERGENCY PLAN

- An E2 Plan is required to be prepared within six months after the day on which a responsible person meets the specified quantity and capacity thresholds, as applicable.
- The responsible person must inform the Minister that the plan has been prepared or an existing Plan is being used.
  - via submission of Schedule 3.
- An existing plan can be used but it must be amended as necessary to meet the requirements of the E2 Regulations, 2019.
- An E2 Plan needs to be available for use at a facility and presented for inspection upon request.
- The E2 Plan must identify scenarios that are reasonably expected to occur that may cause harm to the environment or pose a danger to human life or health and must include a scenario identified in 4(2)(e) (aka worst-case scenario) and also in 4(2)(f) (aka alternative worst-case scenario), if any, for each E2 substance on-site.

E2 PLAN SCENARIOS

- Among other required information, the E2 Plan must provide information regarding
  - the impact distance in a
    - worst-case scenario; and
    - alternative to worst-case scenario(s)

  and

  - the method used to calculate the impact distance in both the scenarios.

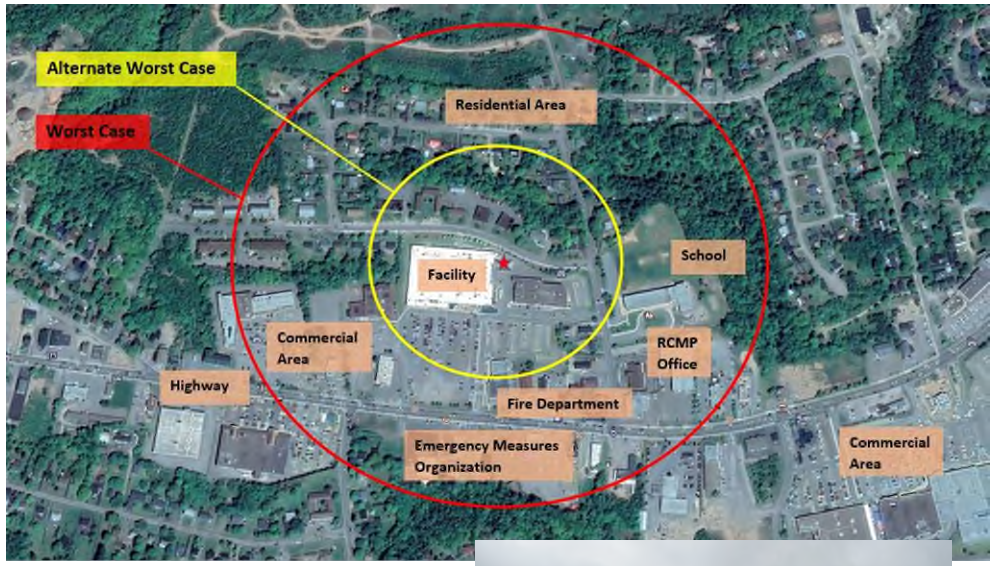
IDENTIFYING SCENARIOS

Recognized methods for hazard & risk analysis

- Checklists
- What-If? (brainstorming)
- HAZOP (hazard and operability study)
- Fault Tree Analysis
- FMEA (failure mode and effect analysis)
- Internal system?
- Past incidents/near-misses

WORST-CASE AND ALTERNATE SCENARIOS

- Worst Case Scenario (4(2)(e)) - The release of the greatest quantity of a hazardous substance that could be contained in the largest container system (or not in a container system)
  - e.g. Vapour Cloud Explosion involving all propane in largest container system (distance to 1 psi overpressure)
- Alternative worst-case scenarios are more likely to occur than worst-case scenarios, and, if possible, the one with the longest impact distance outside the boundary of the facility needs to be identified (4(2)(f));
  - e.g. pull-away hose rupture; leaking gaskets, pumps; transfer leaks, etc



EXTENT OF IMPACT ZONES

- Determine the spatial extent of potential impact zones for every identified scenario. In other words, to find the *distance to an endpoint* (effect threshold) that is protective to the general public.
- A list of recommended end points for measuring impacts from the hazards associated with E2 substances is in Appendix 6 of E2 Technical Guidance Document.
  - Modeling – computer programs that provide impact zones based on user-defined inputted information such the rate and duration of release, hazard level, weather parameters, …(e.g., ALOHA, RMP*Comp, PHAST, etc.)
  - Data Tables – data from research, experience that outline predictable outcomes of incidents, associations, regulators

E2 PLAN IMPLEMENTATION

The E2 Plan must be implemented and brought into effect within 12 months after the day on which a responsible person is required to prepare an E2 Plan under subsection 4(1).

– Minister informed via submission of Schedule 4.

"**bring into effect**" means that the E2 Plan must be prepared, completed, approved by senior management of the facility for use, and ready to be implemented in the event of an environmental emergency.

ANNUAL AND FULL SCALE SIMULATION EXERCISES

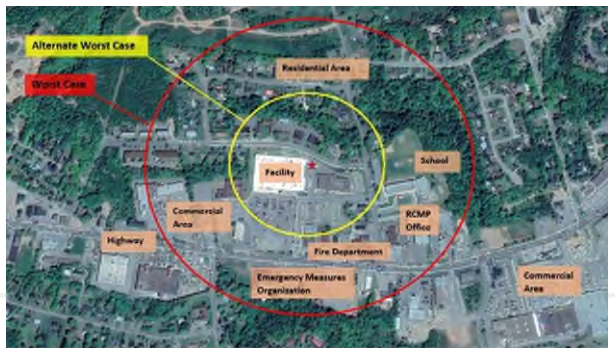
Where an E2 Plan is required, once the plan has been brought into effect, the following criteria must be met:

- The Plan must be exercised every year with respect to one substance from each of the applicable hazard categories
  - E2 scenarios in the plan identified for the substance(s) must be used
  - Examples of annual exercises are: drill, tabletop, operational, functional
- A full scale exercise must be carried out every five years with respect to any one substance
  - Regulatees must conduct the exercises with the deployment of personnel, resources and equipment
- Record of simulation exercise - After each simulation exercise, a responsible person must prepare a record containing the date, the summary and the results of the simulation exercise and any modifications to be made to the E2 plan as a result of the simulation exercise

PUBLIC NOTIFICATIONS - BEFORE AN ENVIRONMENTAL EMERGENCY 4(2)(K)

- A responsible person, either alone or jointly with local authorities is required to communicate before an environmental emergency with the members of the public who may be adversely affected and inform them of:
  - the possibility that an environmental emergency(ies) could occur and have an impact distance outside the boundary of the facility;
  - the potential consequences of the environmental emergency(ies);
  - the measures that will be taken in the event that the environmental emergency occurs.

It is important to note that these notifications are for alternative worst-case scenarios where the impact distance is outside the boundary of the facility.



PUBLIC NOTIFICATIONS – DURING AND AFTER AN ENVIRONMENTAL EMERGENCY 4(2)(L)

- A responsible person, either alone or jointly with local authorities is required to communicate during and after an environmental emergency with the members of the public who may be adversely affected and provide them with:
  - Information and guidance on the measures that could be taken to reduce the potential harm or danger;
  - explanation of how the actions taken would reduce the harm.

NOTICE SUBMISSION/REPORTING TIMELINE SUMMARY

Notice	Information	Timeline for Notifying
Schedule 2	Company and Substance	Within 90 days of meeting or exceeding the specific threshold, and every five years thereafter; and
		Within 60 days after the reported company information has changed or either of the maximum expected quantity or maximum capacity has increased by 10% or more
Schedule 3	E2 Plan Preparation	Within six months within 6 months after the day on which an environmental emergency plan is required to be prepared under subsection 4(1)
Schedule 4	E2 Plan brought into effect	Within 12 months within 6 months after the day on which an environmental emergency plan is required to be prepared under subsection 4(1)
Schedule 5	Full-scale Exercise of E2 plan	Within 5 years after the day on which the E2 Plan is brought into effect, and every five years thereafter
Schedule 6	Change in circumstances	Within 60 days after the end of a 12 month period during which the threshold is no longer met
Schedule 7	Cessations of operations	Within 30 days before the day on which the operations are to cease, or as soon as feasible in the case of extraordinary circumstances
	Transfer of Ownership or charge or control	On or before the day on which the transfer takes place
Schedule 8	Written Report	As soon as possible in the case of 1. an environmental emergency involving the release of a hazardous substance that a. has or may have an immediate or long-term harmful effect on the environment, or b. constitutes or may constitute a danger, to the environment on which human life depends, or c. constitutes or may constitute a danger in Canada to human life or health 2. The reasonable likelihood of an occurrence of an environmental emergency

ONLINE E2 REPORTING SYSTEM

- Under the E2 Regulations, 2019, a responsible person is required to report the information required under the various Notices to the Minister through a new on-line reporting system developed in the Single Window Information Management (SWIM) System of ECCC.
- All facilities subject to the previous Regulations registered in our previous database must re-submit their information in the new E2 Reporting System.
- Creation of a SWIM account and access to the E2 Reporting System is available at: https://ec.ss.ec.gc.ca/
  - Quick reference guide to the E2 Reporting System available at: http://publications.gc.ca/site/eng/9.879354/publication.html
- Public safety authorities (e.g., fire dept) can access and use the data for planning and response purposes.

ENVIRONMENTAL EMERGENCY REPORTING

If there's an environmental emergency involving a listed E2 substance

Under Section 201 (1) of CEPA

1. Make a verbal notification through the Canadian Incident Notification System and provide follow-up written report to ECCC's Enforcement Branch
2. Take all measures to:
   - prevent the environmental emergency
   - repair, reduce or mitigate any negative effects on the environment or human life or health…
3. Make a reasonable effort to notify any member of the public who may be adversely affected by the environmental emergency

E2 Regulations require submission of electronic *written report* (Schedule 8) to Enforcement Branch via E2 Reporting System

***Conditions for reporting an environmental emergency*:**

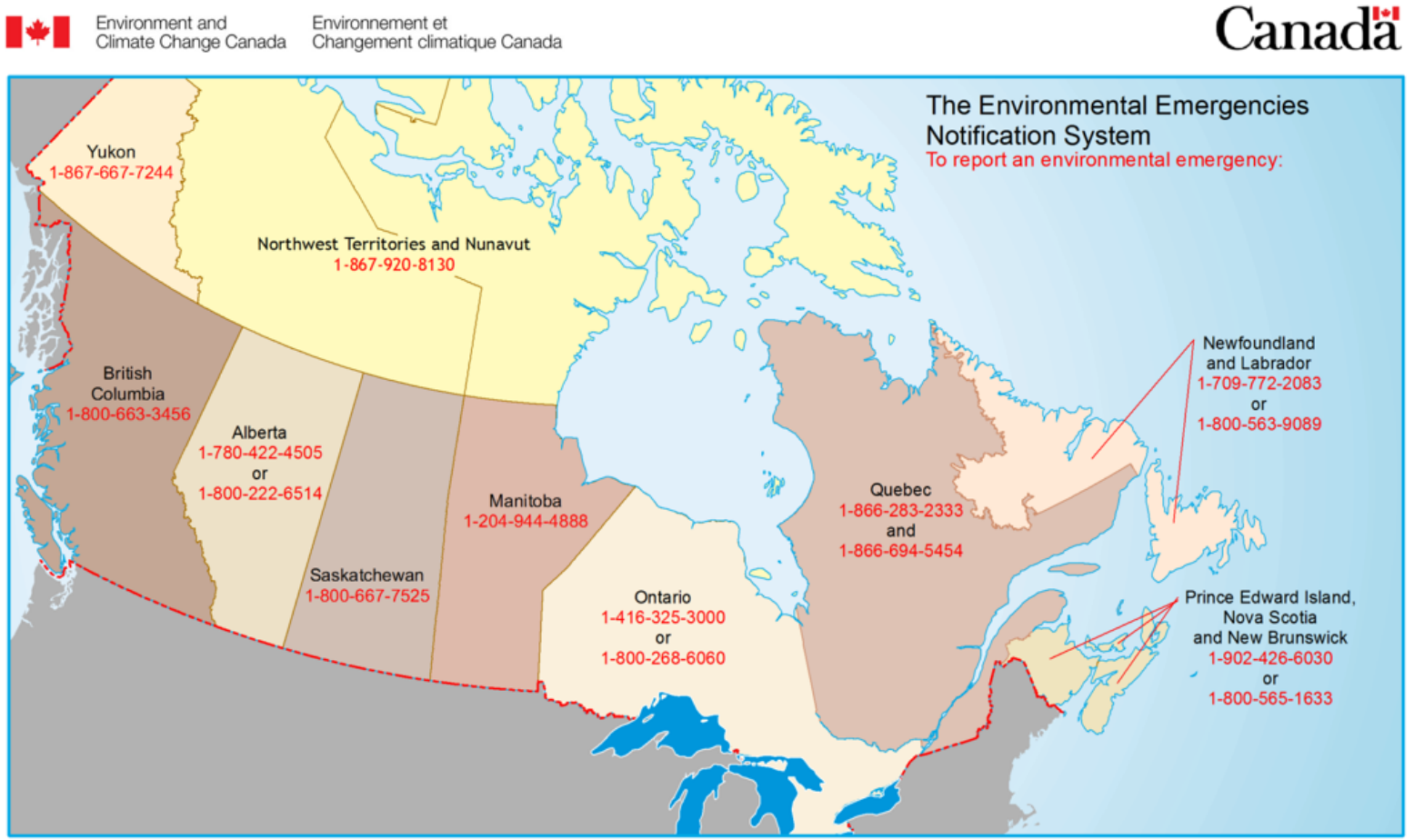
a) has or may have an immediate or long-term harmful effect on the environment;
b) constitutes or may constitute a danger to the environment on which human life depends; or
c) constitutes or may constitute a danger in Canada to human life or health.

REPORTING ENVIRONMENTAL EMERGENCIES AT FACILITIES THAT DO NOT NEED TO SUBMIT NOTICES (I.E. REGISTER)

- Reporting Conditions:
  - Environmental emergency involving a substance listed in Schedule 1 at or above its threshold concentration (column 3); however,
  - The maximum expected quantity or the largest container system at the facility does not meet or exceed the thresholds listed for the substance in column 4 of Schedule 1 in the E2 Regs.
  - Meets the definition of Environmental Emergency (previous slide)

- Follow the link to the public spill reporting site at: https://pollution-waste.canada.ca/spill-reporting?GoCTemplateCulture=en-CA
  - Click Continue to proceed to the Schedule 8 Notice.
  - Fill out, certify and submit the requested information.
  - The information will be shared with the Environmental Officer who is on call for follow-up.
  - An email will be sent to the person who submits the notice to confirm receipt by ECCC.

CANADIAN INCIDENT NOTIFICATION SYSTEM



RELEASES IN CANADA – TOP 10

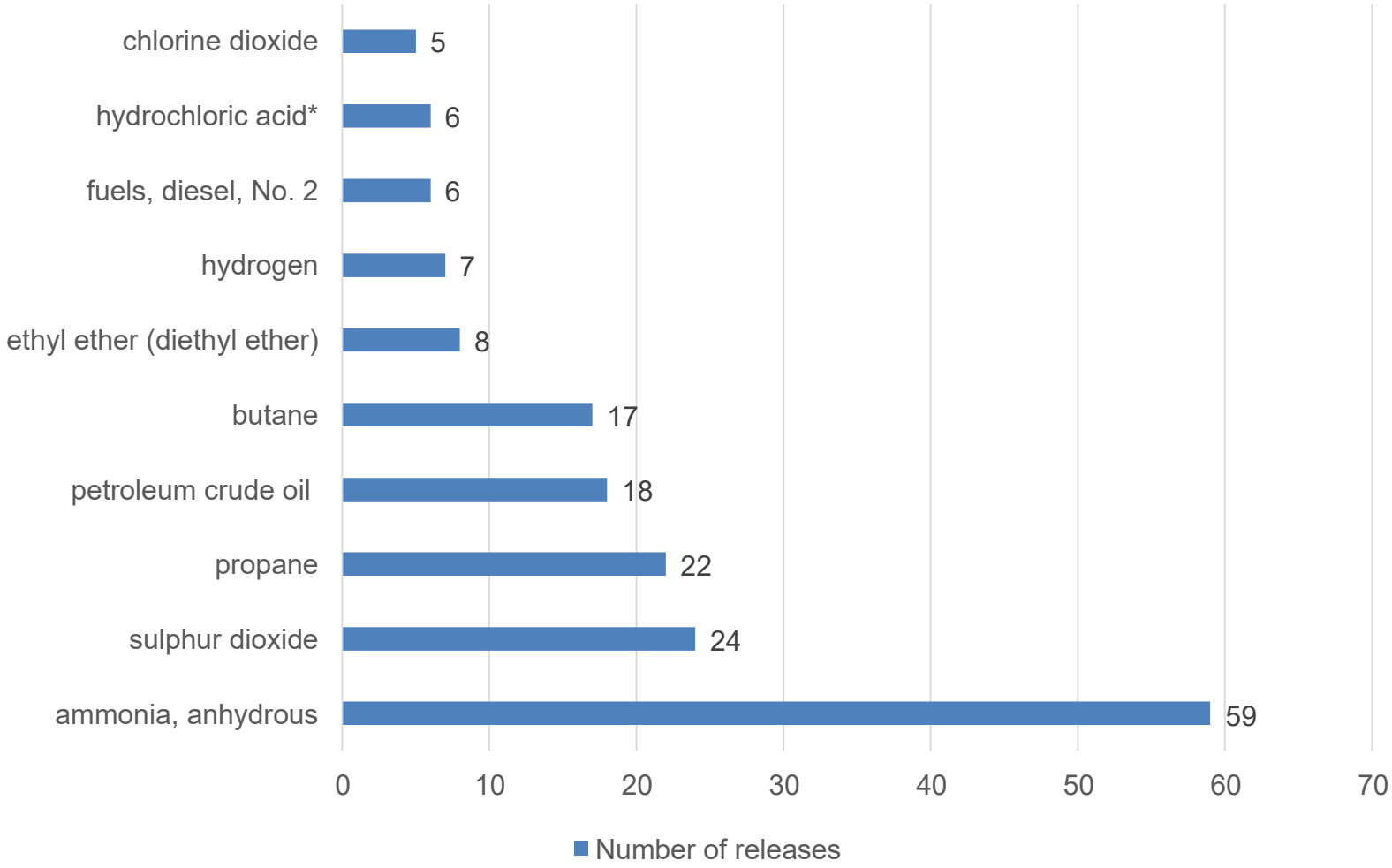


Table 1: substances with most releases as reported under the E2 Regs. from Aug. 2019 – Jan. 8, 2024 for Canada

E2 REGS VS. CSA Z767 DIFFERENCES

E2 Regs.

- Substance thresholds; legislative requirement
- Apply to fixed facilities
- Apply to small, medium, large-scale facilities
- Worst-case scenario - an identification of the harm to the environment or danger to human life or health that would likely result from an environmental emergency involving the release of the maximum quantity of the substance that could be contained in the container system that has the largest maximum capacity, if a quantity of the substance is in a container system
- Non-prescriptive / high-level / performance-based
- Revalidation of Schedule 2 information / 5 yrs.
- Some change management components embedded

CSA Z767

- No thresholds; voluntary standard (unless referenced in legislation)
- Apply to fixed and mobile facilities (i.e., transportation corridor, pipeline, well, and offsite workplace).
- Apply to small, medium and large facilities. But most used by medium/large.
- Worst credible scenario - the event scenario, which has the highest consequence, and which is reasonably plausible in comparison with the facility risk threshold
- Higher level of detail / more prescriptive
- Revalidation of hazard and risk assessment / 5 yrs. or whenever there is a change to the facility, operation, or operating environment that is outside of the context of previous risk assessment.
- Change management requirements specified

E2 REGS VS. CSA Z767 COMMONALITIES

- Require hazard and risk analysis
- Require emergency response plans
- Require prevention, preparedness, response and recovery measures (i.e., training, ICS, PPE, etc.)
- Require revalidation
- Require simulation exercises (annual and full scale/5 yrs.)

**Z767 – A higher level of detail / more prescriptive*

FACT SHEETS

- 7 fact sheets available on E2 Website:
  - Overview of the *Environmental Emergency Regulations, 2019*
  - Reporting system
  - The use of an existing plan
  - Public notification
  - Major changes to the Regulations
  - Environmental emergency plan simulation exercises
  - Reporting an environmental emergency

TECHNICAL GUIDELINES FOR THE E2 REGULATIONS, 2019

- Available at: https://www.canada.ca/en/environment-climate-change/services/environmental-emergencies-program/regulations/technical-guidelines.html
- Designed to help regulatees better understand the E2 Regulations.
- Provides clarity and guidance on:
  - Who the regulations apply to
  - Calculating on-site substance quantities and container capacity
  - Benefits of environmental emergency planning
  - Who is required to prepare an environmental emergency plan
  - How to prepare an environmental emergency plan
  - What to include in your environmental emergency plan
  - Simulating scenarios identified in the environmental emergency plan
  - Notification requirements to the Government of Canada about the charge, management or control of a substance subject to these regulations
  - How chemical substances are evaluated for environmental emergency hazards
  - Failure to comply with the regulations

MORE INFO?

- URL: Canada.ca/environmental-emergency-regulations
- E2 Regulations website:
  https://www.canada.ca/en/environment-climate-change/services/environmental-emergencies-program/regulations.html
- 2019 E2 Regulations and List of Substances:
  http://gazette.gc.ca/rp-pr/p2/2019/2019-03-06/html/sor-dors51-eng.html
- Environmental emergencies regional contacts:
  https://www.canada.ca/en/environment-climate-change/services/environmental-emergencies-program/regional-contacts.html

QUESTIONS/FEEDBACK?

E2 Regulations:

- **What works well?**
- **What doesn't work?**
- **Are there Gaps?**

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With gratitude, I acknowledge that I live, work and learn on the traditional lands of the Xwsepsum (Esquimalt) and Lekwungen (Songhees) ancestors and families.

"That concludes my prepared remarks. I will now evade your questions."