

ICCA Guidance for Reporting Performance

2025 Reporting Cycle (2024 data)



Last Updated: 31 July 2025

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I. Getting Started

Start your web browser and go to <https://kpi.responsible-care.com>.

The **2025 ICCA KPI Reporting Cycle** begins on 15 July and goes through **30 September 2025**.

All data reported should be from Responsible Care® companies only.

For questions on the new KPI Webtool, please refer to the “ICCA KPI Website Reporting Guidance”.

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II. Key Performance Indicators (KPI)

All data reported should be from Responsible Care® Companies only.

A. Company Information

1. Industrial Activities (Select all ISIC Codes that apply)

Manufacturers

- ☐ Manufacture of chemicals and chemical products
 - **201 Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics and synthetic rubber in primary forms**
 - 2011 Manufacture of basic chemicals
 - 2012 Manufacture of fertilizers and nitrogen compounds
 - 2013 Manufacture of plastics and synthetic rubber in primary forms
 - **202 Manufacture of other chemical products**
 - 2021 Manufacture of pesticides and other agrochemical products
 - 2022 Manufacture of paints, varnishes and similar coatings, printing ink and mastics
 - 2023 Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
 - 2029 Manufacture of other chemical products n.e.c.
 - **203 [2030] Manufacture of man-made fibres**
- ☐ Manufacture of rubber and plastics products
 - **221 Manufacture of rubber products**
 - 2211 Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres
 - 2219 Manufacture of other rubber products
 - **222 [2220] Manufacture of plastics products**
- ☐ Manufacture of other non-metallic mineral products
 - **231 [2310] Manufacture of glass and glass products**
 - **239 Manufacture of non-metallic mineral products n.e.c.**
 - 2391 Manufacture of refractory products
 - 2392 Manufacture of clay building materials
 - 2393 Manufacture of other porcelain and ceramic products
 - 2394 Manufacture of cement, lime and plaster
 - 2395 Manufacture of articles of concrete, cement and plaster
 - 2396 Cutting, shaping and finishing of stone
 - 2399 Manufacture of other non-metallic mineral products n.e.c.
- ☐ Manufacture of coke and refined petroleum products
 - **191 [1910] Manufacture of coke oven products**
 - **192 [1920] Manufacture of refined petroleum products**



Partners (Transportation, Warehousing, Logistics, etc.)

- ☐ Land transport and transport via pipelines
 - **491 Transport via railways**
 - 4911 Passenger rail transport, interurban
 - 4912 Freight rail transport
 - **492 Other land transport**
 - 4923 Freight transport by road
 - **493 [4930] Transport via pipeline**
- ☐ Water transport
 - **501 Sea and coastal water transport**
 - 5011 Sea and coastal passenger water transport
 - 5012 Sea and coastal freight water transport
 - **502 Inland water transport**
 - 5022 Inland freight water transport
- ☐ Air transport
 - **512 [5120] Freight air transport**
- ☐ Warehousing and support activities for transportation
 - **521 [5210] Warehousing and storage**
 - **522 Support activities for transportation**
 - 5221 Service activities incidental to land transportation
 - 5222 Service activities incidental to water transportation
 - 5223 Service activities incidental to air transportation
 - 5224 Cargo handling
 - 5229 Other transportation support activities
- ☐ Electricity, gas, steam and air conditioning supply
 - **352 [3520] Manufacture of gas; distribution of gaseous fuels through mains**
- ☐ Waste collection, treatment and disposal activities; materials recovery
 - **381 Waste collection**
 - 3811 Collection of non-hazardous waste
 - 3812 Collection of hazardous waste
 - **382 Waste treatment and disposal**
 - 3821 Treatment and disposal of non-hazardous waste
 - 3822 Treatment and disposal of hazardous waste
 - **383 [3830] Materials recovery**
- ☐ Remediation activities and other waste management services
 - **390 [3900] Remediation activities and other waste management services**

For more information on ISIC codes, please refer to the [International Standard industrial Classification of All Economic Activities \(ISIC\), Rev. 4](#).



2. Total Number of Facilities [Number of Facilities within the Reporting Association]

⇒ **UNITS: Expressed as the Number of Facilities within the Reporting Association.**

This parameter requires information regarding the total number of facilities for the member company. This may be reported as Total Manufacturing Facilities and Other facilities, which may include Headquarters, office, research & development.

3. Employees

⇒ **UNITS: Expressed as the Number of Employees within the Member Company.**

This parameter requires information regarding the total number of Employees for the member company.

Companies may also opt to disclose the Total number of Female Employees (Full time employees), Total number of Male Employees (full time employees), and total number that elected not to disclose.

⇒ **UNITS: Expressed as the Number of Hours Worked for Employees within the Member Company.**

This parameter requires information regarding the total number of hours worked for Employees for the member company.

4. Contractors

⇒ **UNITS: Expressed as the Number of Contractors within the Member Company.**

This parameter requires information regarding the total number of Contractors for the member company.

⇒ **UNITS: Expressed as the Number of Hours Worked for the Contractors within the Member Company.**

This parameter requires information regarding the total number of hours worked for Contractors for the member company.

5. Total Production

⇒ **UNITS: Expressed as the Total Production in Million Metric Tonnes.**

This parameter requires information regarding the metric tonnes of material produced at facilities falling under ISIC codes 201, 202, 203, 221, 222, 231, 239, 191, and 192 (see [Industrial Activities](#) section for more information). Each company reports a single, aggregated number for their facilities which includes all metric tonnes of products, including intra-company transfers of products with inherent market value. This number excludes wastes and recycled materials.

B. Health and Safety

1. Number of Fatalities for Employees

This parameter requires information regarding the total number of [fatalities](#) for member company employees. Provide the total number of fatalities and the total number of employees in survey. These figures are not ratios; they are raw numbers.

2. Lost Time Injury for Employees

⇒ **UNITS: Expressed as the total number of [lost time incidents](#).**

This parameter requires information regarding the lost time injury totals for employees. A [lost time injury](#) is a bodily injury that renders the person physically or mentally unable to work or complete the shift, determined by medical personnel, and resulting in at least one day off work. **NOTE: There are significant differences across**



countries as to what constitutes lost time injuries. Some countries may apply the 3-day rule, or other unique lost time reporting rules at national level. It is understood that this will cause some differences among the data reported. Therefore, please be sure to indicate which basis you use to report data on the form in the “Comments/Explanation” section. See **APPENDIX B** for the [Lost time Injury Rate Formula](#) which will be automatically calculated based on the data entered into the webtool.

3. Number of Fatalities for Contractors

This parameter requires information regarding the total number of [fatalities](#) for [contractors](#). Provide the total number of fatalities and the total number of contractors in survey. These figures are not ratios; they are raw numbers.

4. Lost Time Injury for Contractors

⇒ **UNITS: Expressed as the total number of [lost time incidents](#).**

The same definitions for lost time injuries apply to contractors as to employees, as above.

This parameter requires information regarding the lost time injury totals for [contractors](#). A [lost time injury](#) is a bodily injury that renders the person physically or mentally unable to work or complete the shift, determined by medical personnel, and resulting in at least one day off work. “Working hours of contractors” refers to the total number of hours that contractors spent on-site at member companies’ sites. Because companies may not have direct access to the number of working hours of its contractors, this can be estimated based on the total number of contractors, multiplied by a typical workday and number of days on-site in a year. While many countries do not require under regulation the tracking of safety data for contractors, the Responsible Care ethic suggests responsibility for employees as well as contract workers.

5. Process Safety Events

⇒ **UNITS: Total number of Process Safety Events: Tier 1 and Tier 2**

For details on reporting process safety events, please see [separate ICCA Guidance on Reporting Process Safety Events at the end of this document \(beginning on page 15\)](#). Total process safety events will be reported as **Tier 1** and **Tier 2**. If the data is not available by Tier 1 and Tier 2, you may report as Total Process Safety Events.

API RP 754, 3rd edition allows for classifying process safety events using the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) methodology or United Nations Dangerous Goods (UNDG) methodology. **Companies are asked to identify which method they use.** Refer to [page 9](#) (for UNDG) and [here](#) for GHG.

C. Environment

1. Sulphur Dioxide

⇒ **UNITS: Expressed as [Tonnes](#) of SO₂ per year**

Sulphur Dioxide emissions are airborne releases of sulphur and its compounds formed, for example, during combustion or production processes. The parameter includes SO₂ and SO₃.



2. Nitrogen Oxides

⇒ **UNITS: Expressed as [Tonnes](#) of NO₂ per year**

Nitrogen Oxides are airborne releases of compounds of nitrogen and oxygen formed, for example, from combustion processes and chemical processes involving nitrogen containing compounds. Both NO and NO₂ are combined in this measure and should be reported as a single number.

3. Volatile Organic Compounds

⇒ **UNITS: Expressed as [Tonnes](#) of VOC per year**

Volatile Organic Compounds are described as those organic chemical compounds that under normal conditions have a high enough vapor pressure to significantly vaporize and enter the atmosphere. This description allows for many interpretations, and where available, national definitions of VOCs should apply. There may be differences in the definition of VOCs from one country to another. Therefore, please specify in the “Comments/Explanation” section the basis used for reporting VOCs.

4. Greenhouse Gas Emissions

⇒ **UNITS: Expressed as [Tonnes](#) of CO₂e per year**

The chemical industry’s major contribution to CO₂ emissions is the combustion of fuels, both directly and indirectly associated with the usage of electricity. Therefore, these emissions are calculated on the basis of energy consumption. Process-related CO₂ emissions are not accounted for in this measure.

Scope 1 emissions: Scope 1 emissions are those compounds, in CO₂-equivalents emitted directly from a site as a result of fuel combustion for the production of electricity and steam. Scope 1 emissions are calculated as tonnes of CO₂-equivalent by multiplying the amount of solid, liquid and gaseous fuels used for energy production, by corresponding [CO₂-emission factors](#).

Other Greenhouse Gases are those gases listed in the Kyoto Protocol and include Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur hexafluoride (SF₆). These gases should be reported both in total tonnes emitted, and in CO₂ equivalents. The CO₂ equivalent is calculated by multiplying the tonnes released per year by the Global Warming Potential (GWP) of the gas relative to CO₂, as published by the Intergovernmental Panel on Climate Change (IPCC). The [GWP factors](#) as provided by the [IPCC](#) in its third Assessment Report are included in [APPENDIX B](#) of this document.

Scope 2 emissions: Scope 2 emissions are those emissions indirectly created by the purchase of energy from another source. Scope 2 emissions are calculated as tonnes of CO₂-equivalent by the multiplication of the amount of net purchased electricity by the average factor of CO₂ emissions per kwh produced. Each country has a different mix of sources to generate electricity and a different average of associated CO₂ emissions. *This EXCLUDES Life Cycle Analysis operation.*

The Total Greenhouse Gas Emissions are the combined Scope 1 and Scope 2 emissions.

D. Transport Incidents

1. Transport Incidents



⇒ **UNITS: Expressed as Total Number of [transport incidents](#)**

Internal reporting of [transport incidents](#) is already common practice in most chemical companies and offers individual companies a solid basis for carrying out [risk assessments](#) and taking remedial actions. Common industry reporting criteria are necessary to demonstrate performance improvements to our stakeholders. Reporting requirements and definitions for distribution incidents vary significantly depending on national regulation and legislation.

Recognizing that there are many ways to define transport incidents, associations should use a nationally recognized definition if one exists. For example, in the U.S., these incidents meet the reporting threshold requiring a [Department of Transportation](#) 5800 report. In the EU, a distribution incident involving Dangerous Goods must meet the reporting criteria in ADR. In the event that a national definition does not exist, please see the thresholds below. A reportable incident has occurred if at least one of the following has occurred during the shipment of chemical products:

- **Death or injury leading to intensive medical treatment, a stay in hospital of at least 1 day, or to more than 3 days' absence from work, irrespective of whether or not the chemical product contributed to the death and/or injury;**
- **Loss of product: any release of product of more than 50 kg/L of dangerous goods or more than 1000kg/L of non-dangerous goods;**
- **Material or environmental damage: any damage of more than 50,000 Euro (including environmental cleanup) resulting from a transport incident, irrespective of whether or not the chemical product contributed to the damage.**
- **Involvement of authorities: direct involvement of authorities and/or emergency services in the incident, evacuation of people, closure of public traffic routes for at least 3 hours.**

2. Total Volume Transported

⇒ **UNITS: Expressed as number of [Million Metric Tonnes](#)**

[Tonnes](#) transported shall also be provided for each mode, if possible, as well as total tonnes transported.

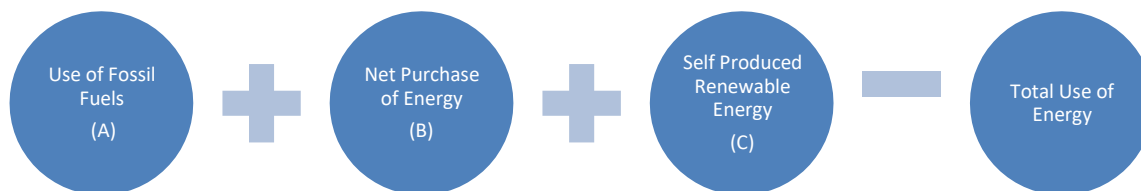
In addition, there may be other exclusions and definitions at the national/regional level. Any significant exclusions or differences from the definitions above should be noted in the “Comments/Explanation” section.

E. Use of Resources

1. Use of Energy

⇒ **UNITS: Expressed as [Gigajoules](#).**

Total energy usage is the sum of the consumption of fossil fuels, purchase of energy and self-produced energy.



Each of the three components above (A, B and C) should also be considered separately. In the case of the use of fossil fuels (A), only consumption as energy should be included. **Use of fuels as feedstock should not be included.** In addition, energy sold back to the grid can be subtracted from the part A total. If one of these elements is not included in your calculation, please specify in the “Comments/Explanation” section.

The net purchase of energy (B) also includes purchase of electricity and steam. Sales of either steam or electricity can be subtracted to obtain the net purchase amount.

The definition of self-production of energy defined as C above refers to non-fossil sources because other forms of self-production - thermal and thermo (electric) energy from fossil fuels - are already accounted for with component A.

All energy consumption is expressed as Joules. Companies can use general conversion factors for purchased electricity or if specific fuel mixes are known, more specific factors can be used.

2. Water Consumption

⇒ **UNITS: expressed as Millions of Cubic Meters consumed per year**

Companies are asked to supply overall usage as well as usage from specific sources, including Public Supply Water, Ground Water, Surface Water, Total Continental Water (A+B+C), Sea Water, and Other. Consumption is total amount of water pumped, piped, or otherwise brought onsite for use in manufacturing chemicals and related activities, that is not returned to its original source. Cefic members should enter their data in the “total continental water” field.

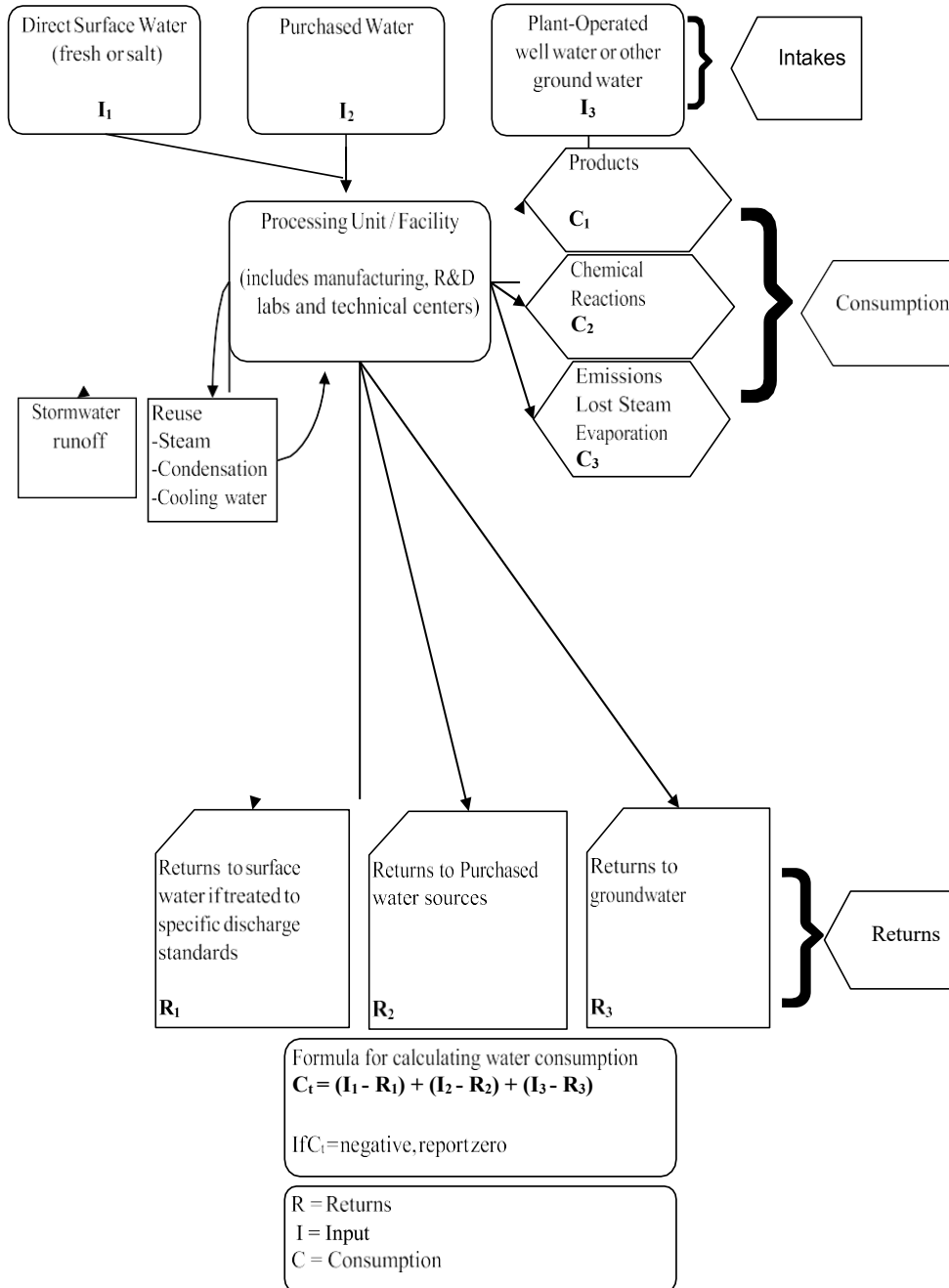
3. Water Withdrawn, if available

⇒ **UNITS: expressed as Millions of Cubic Meters consumed per year**

Companies are asked to supply overall withdrawn from specific sources, including Public Supply Water, Ground Water, Surface Water, Total Continental Water, Sea Water, and Other. Water withdrawn is total amount of water pumped, piped, or otherwise brought onsite for use in manufacturing chemicals and related activities.



Water Consumption Flow Chart



III. Metrics for European Companies only

Hazardous Waste for Disposal

UNITS: Expressed as Tonnes of waste per year

Hazardous waste is generally defined by the national association, according to national laws and regulations. In the event that no national standards exist, a United Nations abstract definition can be found in the Glossary. There is no distinction between onsite and offsite disposal. In the case that significant amounts of soil, for example, are sent for remediation during a one-time event, this should be noted separately.

Non-Hazardous Waste for Disposal

UNITS: Expressed as Tonnes of waste per year

Non-hazardous waste is generally defined by the national association, according to national laws and regulations. In the event that no national standards exist, a United Nations abstract definition can be found in the Glossary. There is no distinction between onsite and offsite disposal. In the case that significant amounts of soil, for example, are sent for remediation during a one-time event, this should be noted separately.

Carbon Dioxide

UNITS: Expressed as Millions of Tonnes of CO₂ per year

The chemical industry's major contribution to CO₂ emissions is the combustion of fuels, both directly and indirectly associated with the usage of electricity. Therefore, these emissions are calculated on the basis of energy consumption. Process-related CO₂ emissions are not accounted for in this measure.

Direct CO₂ emissions: Direct emissions of CO₂ are those compounds, in CO₂-equivalents emitted directly from a site as a result of fuel combustion for the production of electricity and steam. Direct CO₂ emissions are calculated as tonnes of CO₂-equivalent by multiplying the amount of solid, liquid and gaseous fuels used for energy production, by corresponding CO₂-emission factors. If a company produces energy, through a cogeneration process or otherwise, and subsequently sells the electricity or steam back to another user, these emissions can be subtracted for purposes of direct emissions reporting.

Indirect CO₂ emissions: Indirect CO₂ emissions are those emissions indirectly created by the purchase of energy from another source. Indirect emissions of CO₂ are calculated as tonnes of CO₂-equivalent by the multiplication of the amount of net purchased electricity by the average factor of CO₂ emissions per kwh produced. Each country has a different mix of sources to generate electricity and a different average of associated CO₂ emissions. This EXCLUDES Life Cycle Analysis operation.

The Total CO₂ emissions are the combined Direct and Indirect CO₂ emissions.

Chemical Oxygen Demand

UNITS: Expressed as Tonnes of oxygen per year

Chemical Oxygen Demand is the amount of oxygen required for the chemical oxidation of compounds in water, as determined using a strong oxidant. This measure quantifies total aquatic COD releases. For operations where wastewater is treated at a shared third party, and therefore individual waste stream data cannot be obtained, the efficiency factors of the wastewater unit should be taken into consideration.

Phosphorus Compounds

UNITS: Expressed as Tonnes of phosphorus per year

Phosphorus Compounds are those aquatic releases of phosphorus compounds, as it pertains to eutrophication in water bodies, i.e., lakes, slow moving streams or estuaries. This measure quantifies the total aquatic phosphorus releases.

Nitrogen Compounds

UNITS: Expressed as Tonnes of nitrogen per year

Nitrogen Compounds are those aquatic releases of nitrogen compounds, as it pertains to eutrophication in water



bodies, i.e., lakes, slow moving streams or estuaries. This measure quantifies the total aquatic nitrogen releases.

IV. APPENDIX A. Glossary

Chemical

A chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process.

Chemical Product

An item derived from chemistry, or a service that provides a chemical function, and is offered for sale.

Contractor

Any person who is not an employee but is providing services to the establishment on its premises (owned property - owned, directly managed or full time chartered transport - property leased or accessed through rights secured by the establishment).

Distributor

Any natural or legal person established in a country, including a retailer, who only stores and places on the market a substance, on its own or in a preparation, for third parties.

Downstream User

Any natural or legal person established in a country, other than the manufacturer or the importer, who uses a substance, either on its own or in preparation, in the course of his industrial or professional activities (a distributor or consumer is not a downstream user).

Exposure

Exposure is the concentration or amount of a particular agent that reaches a target organism, system or (sub) population in a specific frequency for a defined duration.

Fatality

An instantaneous work-related event or exposure, leading to death within one year.

Hazard Assessment

A process designed to determine the possible adverse effects of an agent or situation to which an organism, system or (sub) population could be exposed. Hazard Assessment includes hazard identification and hazard characterization. The process focuses on the hazard, in contrast to risk assessment where exposure assessment is a distinct, additional step.

Hazardous waste

Waste that owing to its toxic, infectious, radioactive or flammable properties poses an actual or potential hazard to the health of humans, other living organisms, or the environment. Hazardous waste here refers to categories of waste to be controlled according to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Article 1 and Annex I). If data are not available according to the Basel Convention, amounts can be given according to national definitions or UN definitions available at <http://unstats.un.org>.



High Priority Chemicals

The GPS requires that companies prioritize their chemical products and identify those that are considered high priority for the purposes of closing data gaps, characterizing risks and developing risk management practices. Companies have flexibility in the processes they use to prioritize their chemical products. Such processes are described in the ICCA Product Stewardship Guidelines.

ICCA Product Stewardship Guidelines

The ICCA Product Stewardship Guidelines were developed by ICCA to assist companies and associations in understanding how to implement product stewardship, using a management systems approach, as well as implement the requirements of the Global Product Strategy.

Lost Time Injury

An instantaneous bodily defect so that the individual is physically or mentally unable - as determined by a competent medical person - to work on a scheduled day or shift, resulting in at least one day off the job. (The same definition applies to employees and contractors). The Lost Time Frequency Rate will be calculated by ICCA and is expressed as the number of lost time incidents per million worker hours. Some countries may report data based on the 3-day rule. ICCA generally converts these to 1-day data by using the transposition table, which will give an approximate result.

Prioritization Process

The GPS requires that companies prioritize their chemical products and identify those that are considered high priority for the purposes of closing data gaps, characterizing risks and developing risk management practices. Companies have flexibility in the processes they use to prioritize their chemical products. Such processes are described in the ICCA Product Stewardship Guidelines.

Process Safety Event (PSE)

An unplanned or uncontrolled release of any material—including non-toxic and non-flammable materials (e.g. steam, hot water, nitrogen, compressed CO₂, or compressed air)—from a process, or an undesired event or condition that under slightly different circumstances could have resulted in a release of material. For more information, please refer to the API RP 754, 3rd edition, which can be found [here](#).

Tier 1 Process Safety Event

Any A Tier 1 PSE is a LOPC with the greatest consequence as defined by this RP. A Tier 1 PSE is an unplanned or uncontrolled release of any material, including non-toxic and non-flammable materials (e.g. steam, hot water, nitrogen, compressed CO₂ or compressed air), from a process that results in one or more of the consequences listed on [page 9 here](#).

Tier 2 Process Safety Event

Any A Tier 2 PSE is a LOPC with lesser consequence. A Tier 2 PSE is an unplanned or uncontrolled release of any material, including non-toxic and non-flammable materials (e.g. steam, hot water, nitrogen, compressed CO₂, or compressed air), from a process that results in one or more of the consequences listed on [page 13 here](#) and is not reported as a Tier 1 PSE.

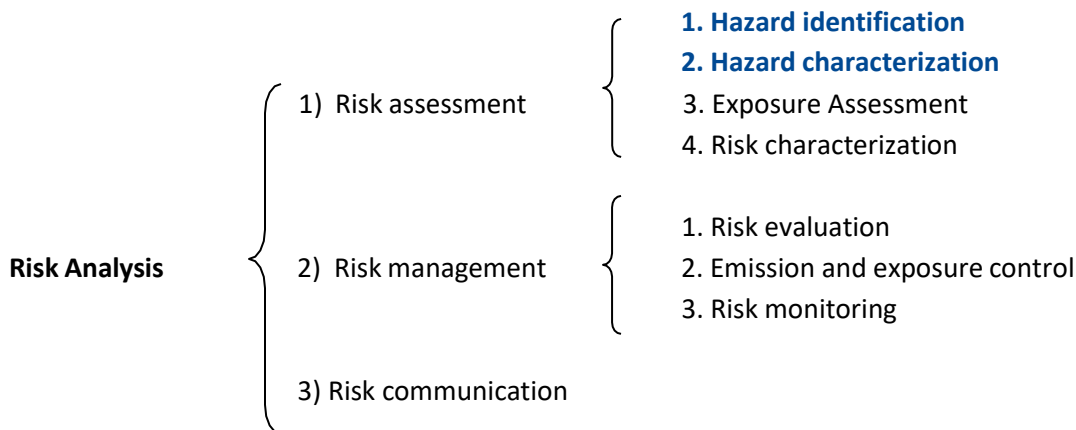
Product Stewardship

Product stewardship is the practice of making health, safety and environmental protection an integral part of the life cycle of chemical products.



Risk

The probability that an adverse affect (e.g., skin irritation or cancer) will result from a given substance. The risk posed by a substance depends both on the intrinsic properties of the substance (hazard) and on the exposure.



Risk Assessment

A process intended to calculate or estimate the risk to a given target organism, system or (sub) population, including the identification of attendant uncertainties, following exposure to a particular agent, taking into account the inherent characteristics of the agent of concern as well as the specific target system. The Risk Assessment process includes four steps: hazard identification, hazard characterization, exposure assessment, and risk characterization.

Risk Characterization

Risk characterization consists of the estimation of the incidence and severity of the adverse effects likely to occur in a human population or environmental compartment due to actual or predicted exposure to a substance. It may include “risk estimation” i.e., the quantification of that likelihood.

Risk Management

Risk control strategy by means of substitution, prevention or reduction of emission and exposure, training, hazard communication etc. thereby reducing the risk to human health or the environment. Risk management comprises three elements: risk evaluation; emission and exposure control; risk monitoring.

Supply Chain/Value Chain

All parties involved in the chemical supply chain including: raw materials suppliers, distributors, importers, formulators, manufacturers and end users of chemicals.

Transport Incident

Any significant incident that occurs during the transport of chemical products.

Tonne

A tonne is a Metric Ton equivalent to 1000 Kg and equivalent to 1.10231 U.S. Short tons weighing 2,204.6 pounds.

1 Tonne = 1,000 kilograms = 2,204.6 pounds = 1.10231 U.S. Short Tons



Volume Transported

Tonnes of chemical product shipped via air, rail, road, sea, inland waterway or pipeline between the site of a supplier company and that of the final customer. Includes the transport and off-site loading/unloading at ports, airports, warehouses, etc. and excludes the transport and loading/unloading activities at the premises of the supplier chemical company and the final customer.



V. APPENDIX B. Conversion Factors and Formulas

Carbon Dioxide Emissions Factors

Fuel	Carbon Emission Factor ¹ (kg C/GJ)	Carbon Dioxide Emission Factor ¹ (kg CO ₂ /GJ)	Carbon Dioxide Emission Factor ¹ (tonne CO ₂ /toe)	Carbon Dioxide Emission Factor ² (lb CO ₂ /MMBTU)
Crude Oil	20.0	73.4	3.1	160.60
Gasoline	18.9	69.4	2.9	151.77
Kerosene	19.6	71.9	3.0	157.39
Jet Fuel	19.5	71.6	3.0	156.59
Motor Gasoline	20.2	74.1	3.1	162.21
Residual Fuel Oil	21.1	77.4	3.2	169.43
Naphtha	20.0	73.4	3.1	160.60
Bitumen	22.0	80.7	3.4	176.66
Lubricants	20.0	73.4	3.1	160.60
Refinery Feedstocks	20.0	73.4	3.1	160.60
Other Oil	20.0	73.4	3.1	160.60
Steam Coal	25.8	94.7	4.0	207.17
Coking Coal	25.8	94.7	4.0	207.17
Petroleum Coke	27.5	100.9	4.2	220.83
Lignite	26.1	95.8	4.0	209.58
Sub-bituminous Coal	27.6	101.3	4.2	221.63
Peat	28.9	106.1	4.4	232.07
BKB & Patent Fuel	25.8	94.7	4.0	207.17
Coke	29.5	108.3	4.5	236.89
Natural Gas (dry)	15.3	56.2	2.4	122.86
Natural Gas Liquids	15.2	55.8	2.3	122.06
LPG	17.2	63.1	2.6	138.12

1 - Source: Greenhouse Gas Inventory Workbook Volume 2; IPCC/OECD Joint programme; see conversion example below.

2 – Source: Source: Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006, April 15, 2008; referenced from Intergovernmental Panel on Climate Change (IPCC), Second Assessment Report (SAR).

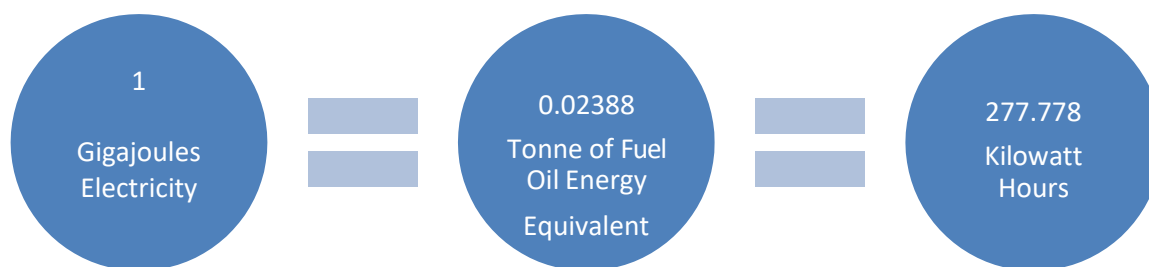


Examples for Calculating CO₂ Emissions

	Carbon emission Factor (Kg C/GJ)	Molecular Weight Ratio of CO ₂ /C (44/12=3.67)	CO ₂ emission Factor (kg CO ₂ / GJ)	CO ₂ Emission Factor (tonne CO ₂ /toe)
Steam Coal	25.80	3.67	94.69	3.961
Crude Oil	20.00	3.67	73.33	3.070
Natural Gas	15.30	3.67	56.15	2.349

Note: 1 toe = 41.868GJ

Electricity to Gigajoules



Calculating CO₂ Equivalents of Other Greenhouses Gases Using the Global Warming Potential (GWP) Factor

Source: Technical Summary of the IPCC WG1 AR4 Report, pg. 33, <http://ipcc-wg1.ucar.edu/wg1/wg1-report.html>

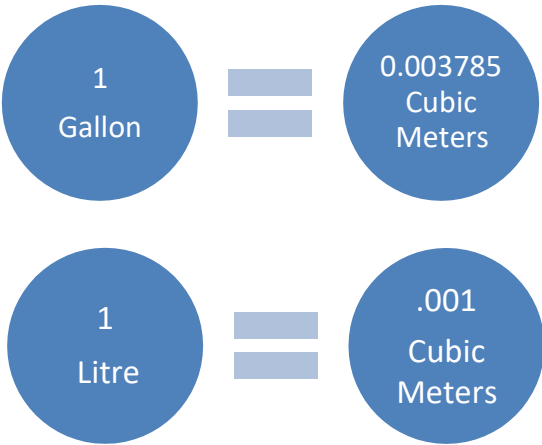
GHG	GWP (based on the effects of greenhouse gases over a 100-year time horizon)
CO ₂	1
CH ₄	25
N ₂ O	298
HFCs	From 124 to 14,800 - depending on the HFC
PFCs	From 7,390 to 12,200 - depending on the PFC
SF ₆	22,800



Lost Time Injury Rate Formula

LTI Rate = {
$$\frac{\text{Total Number of Lost Time Cases} \times 1,000,000}{\text{Total Number of Worker Exposure Hours}}$$
 }

Water Consumption - Conversions to Cubic Meters





INTERNATIONAL
COUNCIL OF
CHEMICAL
ASSOCIATIONS



GUIDANCE FOR REPORTING ON THE ICCA GLOBALLY HARMONIZED PROCESS SAFETY METRIC

2025 | The Responsible Care® Leadership Group

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A. Background

The Responsible Care® initiative began in 1985 as the chemical industry's commitment to continuous performance improvements. Process Safety has been a pillar of Responsible Care since its inception, and while many regional approaches to tracking and reporting process safety performance have developed over the 30 years of Responsible Care implementation, no globally harmonized system had been put into place. In 2012, in the wake of several high-profile process safety events, the International Council of Chemical Associations (ICCA) Board of Directors directed the Responsible Care Leadership Group (RCLG) to develop a recommendation for globally harmonized process safety performance reporting by no later than 2015.

Throughout 2013 and 2014, a Taskforce comprised of multinational companies and RCLG associations, worked to develop a globally harmonized ICCA approach to process safety performance reporting. A list of Taskforce members can be found in Appendix C. During the same timeframe, the American Petroleum Institute (API) also initiated a process to update its Recommended Practice 754 (RP-754) – Leading and Lagging Process Safety Metric Standard. RP-754 is broadly used in the refining and petrochemical sector and in the Americas region to track process safety performance. To optimize global adoption of a unified standard, the RCLG Taskforce strived to achieve full harmonization of its recommendation with the revised API RP 754 metric which was finalized in 2016. In August 2021, API published the third edition of API RP 754, which made enhancements to language within the RP, as well as changed how corrosives (acids and bases) are classified.

B. Executive Summary

After more than 2 years of discussion, research, debate and feasibility assessment, the Process Safety Harmonization Taskforce recommends that ICCA adopt a process safety event rate metric. The adoption of this metric would require each RCLG association to collect the number of process safety events experienced by their members on an annual basis, as well as total number of worker hours (employees and contractors) experienced by their members each year. The process safety event rate is the ratio of events to hours. The Taskforce also recommends that reporting of these data points to the RCLG be phased in over the next 3 years, allowing regions with the desire and ability to report immediately to do so, while also allowing additional time to companies and organizations that are developing the ability to track these data for the first time.

The criteria that determine whether a process-related event qualifies as a process safety event are based on a loss of primary containment of a chemical or a release of energy triggering thresholds any one of four impact areas: 1) safety/human health consequences; 2) direct cost due to damage from incident; 3) community impact; and 4) chemical release quantity (see the flow chart showing reporting triggers). These four impact areas in the recommended ICCA process safety event definition are identical to the impact areas in the RP-754 Tier 2 incident standard. The thresholds for reporting are also identical in all areas except for the chemical release quantity thresholds. To address this difference, the ICCA process safety event definition will allow companies the use of either the GHS-based reporting thresholds developed by ICCA for the chemical release criteria, or the UN Dangerous Goods (UNDG)-based reporting thresholds used in the RP-754 standard for Tier 2 incidents. The Taskforce believes that the two systems, though different, are comparably robust in the universe of chemicals covered and the severity of incidents captured by reporting. While there will be relatively little difference in the numbers of events captured and reported using the two different threshold approaches, there may be differences that would be most

clearly seen at the company level based on raw material and product use; hence the Taskforce cautions companies not to compare their results with companies that use a different chemical release threshold approach. Regardless, under the RCLG proposal, companies can choose the chemical release thresholds by which they report in to their national and regional associations. If associations are interested in translating results based on one reporting approach to another, the RCLG will provide a translation table. However, given the complexity of this exercise and the need to access raw incident data, the Taskforce does not believe that this adds value and recommends against it.

The Taskforce believes that this proposal for process safety event reporting enables broad-based global reporting of process safety performance across the chemical and petrochemical industries. It provides a roadmap for regions, associations and companies that are currently not tracking process safety performance to recognize the benefits that tracking and reporting bring. For regions, associations and companies that are already experienced in gathering process safety data, this recommendation allows for broader global alignment and focus on continuous improvement in process safety performance. The systems that are built to improve process safety performance are informed by robust process safety event data, and this is the major objective of this initiative.

C. Data to be reported by RCLG Associations to RCLG

On an annual basis, RCLG Companies are asked to report two data points into ICCA using the RCLG KPI Reporting Website on the schedule provided below.

1. **Total Member Company Worker Hours for Association (employee and contractor)**
2. **Total Number of Process Safety Events as Tier 1 and Tier 2 Events, or Total Events**

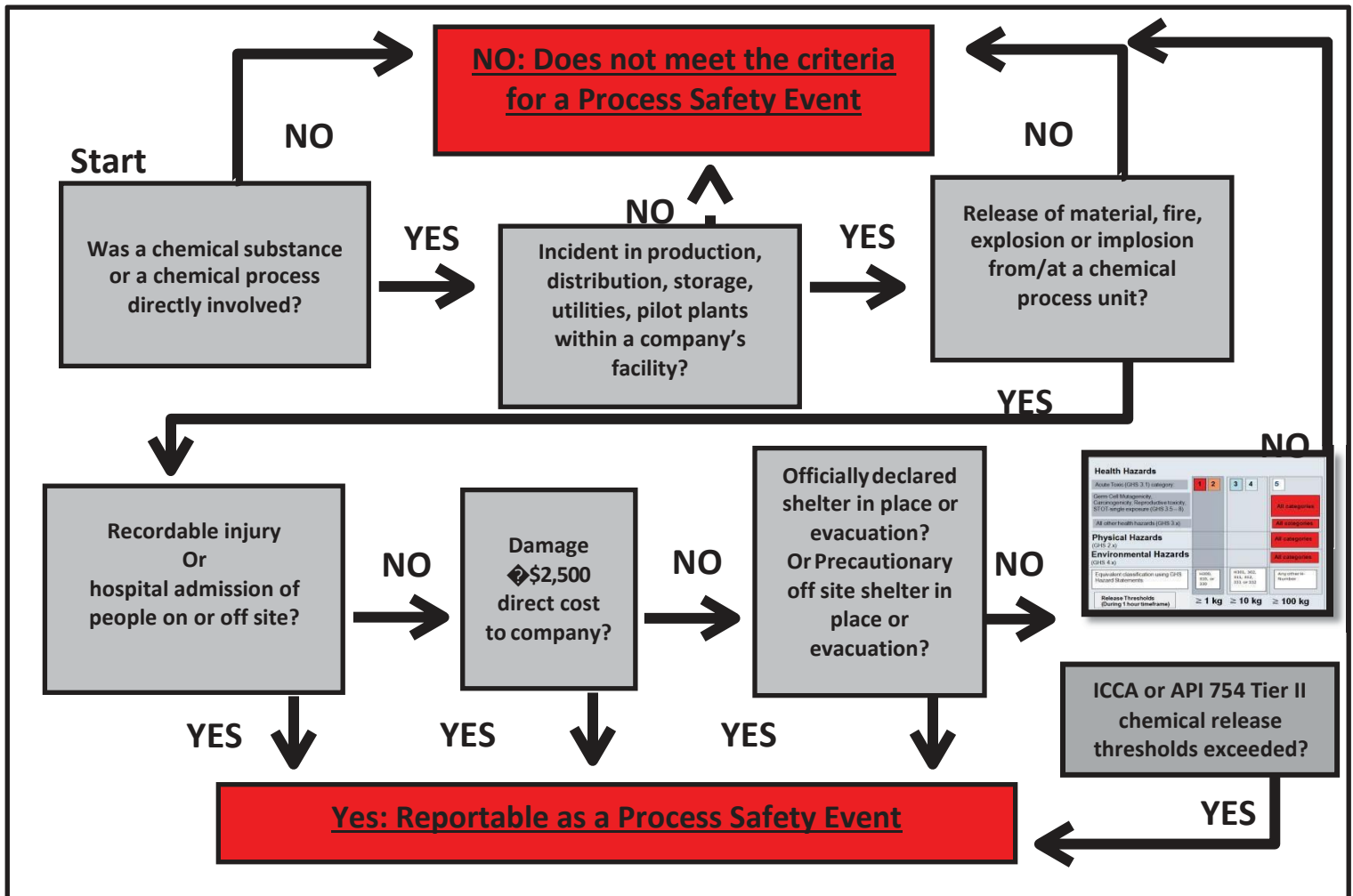
ICCA uses the above two data points to report process safety performance in the form of Process Safety Event Rate (PSER), normalized per 100 employees where an employee works 2,000 hours a year.

$(\text{Total Events} / \text{Total Hours}) \times 200,000 = \text{PSER}$

D. Reporting Process

RCLG Companies are asked to report the two process safety event rate data points annually to the ICCA through the RCLG KPI metrics reporting system: <https://kpi.responsible-care.com>. If you do not know your association's username and password, please contact the RCLG.

E. Overview of ICCA Process Safety Event Criteria as a Flow Chart



F. Key Criteria for Reporting Process Safety Events to RCLG

1. Total Worker Hours

RCLG companies should report the total number of employee hours worked for each member company in their association **and** the total number of contractor hours worked for each member company as a **combined, single number**. For the purposes of this guidance document, each association should refer to their local and regional definitions for employee and contractor. The goal for reporting total hours is to include **all individuals** who are involved with chemical manufacturing, except where those individuals are tasked with major construction projects such as large-scale investments with specific, one-time project organizations created for design, engineering, and construction of new or significant expansion to existing process facilities. When reporting total worker hours, companies should report the same hours used for reporting **personnel hours**. This way, companies can have the same data set for occupational and process safety. Personnel hours should include those hours from **all** chemical manufacturing operations, not just from facilities where a process safety incident occurred.

Process Safety Event

For the purposes of this ICCA Reporting, a process safety event has occurred when:

- A. A chemical substance or a chemical process is directly involved; AND**
- B. The incident occurred in production, distribution, storage, utility, pilot plant within the site boundaries of company's facility; AND**
- C. There was a release of material or energy (e.g., fire, explosion, implosion) from a process unit; AND**
- D. One or more of the following Reporting Thresholds have been met:**
 - 1. Safety / Injury**
 - Injury resulting in a Recordable, Lost Time Accident or Fatality; or Hospital admission of anyone on or off site; OR
 - 2. Direct Damage Cost**
 - A fire, explosion or clean up necessary to avoid/remediate environmental damage resulting in a direct cost equal to or greater than US\$2,500; OR
 - 3. Shelter in Place / Evacuation**
 - An officially declared shelter in place (on or off site); OR
 - An officially declared evacuation (on or off site); OR
 - A precautionary off-site shelter in place or evacuation OR
 - 4. Threshold Release**
 - The material released meets one of the GHS thresholds or the release thresholds in Table 1. (measured in amount released for one hour)

As a result of the August 2021 API RP 754 version 3 updates, Table 1 and 2 have been combined. Furthermore, classification of corrosives has changed in version 3. Corrosives (acids and bases) have been dropped in threshold release category (TRC) by one level, better aligning corrosive materials with the

other materials represented in Table 1. This rationale is due to incidents involving corrosives being generally localized with material that is not volatile, flammable, or toxic. The result of this change is that acids and bases can no longer result in a Tier 1 process safety event (PSE), and moderate acids/bases can no longer result in a Tier 2 PSE from a threshold quantity release. Only strong acids and bases can result in a Tier 2 PSE from a threshold quantity release. However, this does not affect how acids and bases are classified if they result in injuries or offsite impacts.

Note – Individuals who would like to view the API RP-754 version 3 Standard may purchase and download it at - <https://www.api.org/oil-and-natural-gas/health-and-safety/refinery-and-plant-safety/process-safety/process-safety-standards/rp-754>.

G. Detailed Guidelines on Identifying a Process Safety Event

1. Chemical Involvement

When a chemical substance or chemical process is directly involved

A chemical or chemical process must have been directly involved in the event or incident. For this purpose, the term "process" is used broadly to include the equipment and technology needed for petrochemical production, including reactors, tanks, piping, boilers, cooling towers, refrigeration systems, etc. An incident with no direct chemical or process involvement, e.g., an office building fire, even if the office building is on a plant site, is not reportable.

2. Location

The incident occurred in production, distribution, storage, utility, pilot plant within the site boundaries of company's facility

The incident occurs in production, distribution, storage (including active storage areas such as warehouses – see FAQ section), utilities or pilot plants of a facility reporting metrics under these definitions. This includes tank farms, ancillary support areas (e.g., boiler houses and waste water treatment plants) and distribution piping under control of the site. All reportable incidents occurring at a location will be reported by the company that is responsible for operating that location. This applies to incidents that may occur in contractor work areas as well as other incidents. At tolling operations and multi-party sites, the company that operates the unit where the incident initiated should record the incident and count it in their reporting.

3. Release of Material

There was a release of material or energy (e.g., fire, explosion, implosion) from a process unit

Release of Material – an unplanned or uncontrolled release of any material, including non-toxic and non-flammable materials (e.g., steam, hot water, nitrogen, compressed CO₂ or compressed air), from a process that results in consequences that exceed one or more of the 4 Reporting Thresholds listed in this document.

A release to a flare or scrubber is still considered to be within the primary containment as long as the mitigation system (e.g., scrubber, flare) is operated under normal conditions without any release above the thresholds defined for normal operation. A release to a secondary containment (e.g., waste water treatment or dike) will qualify as a process safety event because the substance is leaving the primary process system.

4. Thresholds

One or more of the following Reporting Thresholds must be met for reportable process safety events.

1. Safety / Injury

Injury resulting in a Recordable, Lost Time Accident or Fatality; or Hospital admission of anyone on or off site;

Recordable injuries are work-related injuries that results in any of the following: death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, loss of consciousness, or a significant injury diagnosed by a physician or other licensed health professional.

Lost time injuries and fatalities that occur as a result of process-related loss of primary containment, fire, or explosion are those that fit into one of the following categories:

- **Employee (Lost time and/or Fatality)**
- **Contractor and Subcontractor (Lost time and/or Fatality)**
- **Third Party (Injury/illness resulting in Hospital Admission or Fatality)**

Hospital Admission – formal acceptance by a hospital or other inpatient health care facility of a patient who is to be provided with room, board, and medical service in an area of the hospital or facility where patients generally reside at least overnight. Treatment in the hospital emergency room or an overnight stay in the emergency room would not by itself qualify as a “hospital admission.”

Examples of injury or fatality cases that would be reportable include a burn injury resulting from steam released during cleaning; a physical injury from a cap blown off by pressure during a pressure test; or a chemical burn from a spill while taking a sample. Examples of injuries or fatality cases that would not be reportable include a fall from an elevated work station while performing maintenance; a burn from a fire in a laboratory or office building; or injuries from an excavation cave-in. None of these cases are directly due to the release of energy or material from the process.

2. Direct Damage Cost

A fire, explosion or clean up necessary to avoid/remediate environmental damage resulting in a direct cost equal to or greater than US\$2,500

Costs to be considered for this threshold should be those costs directly attributed to the fire and/or explosion, such as the replacement value of equipment lost, structures lost, cost of repairs, environmental cleanup (on and off site), emergency response and/or fines. Direct cost does not include indirect costs, such as business opportunity losses, loss of profits due to equipment

outages, cost of obtaining or operating temporary facilities or cost of obtaining replacement products to meet customer demand (product losses).

3. Shelter in Place / Evacuation

An officially declared shelter in place or evacuation either on or off site OR a precautionary shelter in place or evacuation off site

For the purposes of this reporting, an officially declared shelter in place or evacuation, on or off site, OR a precautionary shelter in place or evacuation is declared off site would trigger this threshold

Officially Declared – A declaration by a recognized community official (e.g., fire, police, civil defense, emergency management) or delegate (e.g. Company official) authorized to order the community action (e.g. shelter-in-place, evacuation).

Precautionary Declaration - A precautionary public response is a measure taken from an abundance of caution and issued by a recognized community official or delegate who has reasonably determined that such an evacuation or shelter in place was necessary to protect the public health and safety.

Shelter in Place – is the use of a structure and its indoor atmosphere to temporarily separate individuals from a hazardous outdoor atmosphere

Evacuation – the act or process of removing persons from a place for reasons of safety or protection

4. Threshold Release

*An **acute release** that exceeds one of the GHS thresholds in **Table 1** or API 754 standard for Tier 2 process safety release threshold in **Table 2**.*

As mentioned in the Executive Summary, the ICCA process safety event definition allows use of either GHS-based reporting thresholds developed by ICCA for the chemical release criteria, or the UN Dangerous Goods (UNDG)-based reporting thresholds used in the RP-754 standard for Tier 2 incidents. In the new API RP 754 3rd edition, Table 1 and 2 are combined to include all threshold quantities, as reflected in **Table 2** on page 13. The GHS thresholds are listed in **Table 1**. It is intended for companies to decide which table to use and to allow companies the option to use one system globally.

Acute Release – A release of flammable, combustible, or toxic chemicals from the primary containment (i.e., vessel or pipe) greater than the chemical release threshold quantities is described in **Table 1** for GHS Classification and **Table 2** for API 754, 3rd edition classification.

Pressure Relief Device: Acute Releases, defined above, **include** releases to a properly designed and operating pressure relief device if a quantity is released greater than or equal to the threshold quantities in **Table 1** OR in the API 754 standard for Tier 2 process safety release thresholds in **Table 2**, that. that results in one or more of the following four consequences:

1. **Rainout;**
2. **Discharge to a potentially unsafe location;**
3. **An on-site shelter-in-place or on-site evacuation, excluding precautionary on-site shelter-in-place or on-site evacuation;**
4. **Public protective measures (e.g., road closure) including precautionary public protective measures.**

Releases to a properly designed and operating pressure relief device (such as a flare, scrubber, etc.) **do not** have to be reported if they do not meet one of the four criteria above.

Individuals who would like to view the API RP-754 Standard may download that standard at - <https://www.api.org/oil-and-natural-gas/health-and-safety/refinery-and-plant-safety/process-safety/process-safety-standards/rp-754>

1 Hour Rule

For the purpose of the reporting under this metric, release thresholds are established for materials over a one-hour time frame. If the release amount of a material reaches or exceeds the reporting threshold in a 1-hour time period or less, it is reportable. Typically, acute releases occur in 1- hour or less. If the duration of the release cannot be determined, the duration should be assumed to be 1 hour.

Primary Containment – A tank, vessel, pipe, rail car or equipment intended to serve as the primary container or used for the transfer of the material. Primary containers may be designed with secondary containment systems to contain and control the release. Secondary containment systems include, but are not limited to, tank dikes, curbing around process equipment, drainage collection systems into segregated oily drain systems, the outer wall of double walled tanks, etc.

Severity Table Severity weighting can provide additional useful information about process safety events that may help drive performance improvement. **Appendix A** is the RCLG methodology for calculating a severity weight for process safety events. Using **Appendix A**, a severity weight for each process safety event may be calculated by summing the points associated with each consequence category. **The ICCA strongly encourages the use of a severity weighting system as the use of such a system increases the ability to communicate performance and is an easier way for our stakeholders to understand process safety events. Also, the severity weight will not be comparable among other process safety metric reporting formats.**

H. Table 1 – GHS Classification Table

Health Hazards					
Acute Toxic (GHS 3.1) category:	1	2	3	4	5
Germ Cell Mutagenicity, Carcinogenicity, Reproductive toxicity, STOT-single exposure (GHS 3.5 – 8)					All categories
All other health hazards (GHS 3.x)					All categories
Physical Hazards (GHS 2.x)					All categories
Environmental Hazards (GHS 4.x)					All categories
Equivalent classification using GHS Hazard Statements:	H300, 310, or 330	H301, 302, 311, 312, 331 or 332			Any other H- Number
Release Thresholds (During 1 hour timeframe)	≥ 1 kg	≥ 10 kg	≥ 100 kg		

I. Table 2 – API RP 754, 3rd Edition, Classification Table

Threshold Release Category	Material Hazard Classification Option 1	Material Hazard Classification Option 2	Tier 1		Tier 2	
			Threshold Quantity (outdoor)	Threshold Quantity (indoor)	Threshold Quantity (outdoor)	Threshold Quantity (indoor)
TRC-1	TIH Zone A Materials	H330 Fatal if inhaled, Acute toxicity, inhalation (chp 3.1) (cat 1)	≥ 5 kg (11 lb)	≥ 0.5 kg (1.1 lb)	≥ 0.5 kg (1.1 lb)	≥ 0.25 kg (0.55 lb)
TRC-2	TIH Zone B Materials	H330 Fatal if inhaled, Acute toxicity, inhalation (chp 3.1) (cat 2)	≥ 25 kg (55 lb)	≥ 2.5 kg (5.5 lb)	≥ 2.5 kg (5.5 lb)	≥ 1.25 kg (2.75 lb)
TRC-3	TIH Zone C Materials	H331 Toxic if inhaled, Acute toxicity, inhalation (chp 3.1) (cat 3)	≥ 100 kg (220 lb)	≥ 10 kg (22 lb)	≥ 10 kg (22 lb)	≥ 5 kg (11 lb)
TRC-4	TIH Zone D Materials	H332 Harmful if inhaled, Acute toxicity, inhalation (chp 3.1) (cat 4)	≥ 200 kg (440 lb)	≥ 20 kg (44 lb)	≥ 20 kg (44 lb)	≥ 10 kg (22 lb)
TRC-5	Flammable Gases	H220 Extremely flammable gas, Flammable gases (chp 2.2) (cat 1A) H221 Flammable gas, Flammable gases (chp 2.2) (cat 1B,2)	≥ 500 kg (1100 lb)	≥ 50 kg (110 lb)	≥ 50 kg (110 lb)	≥ 25 kg (55 lb)
	Liquids with Normal Boiling Point ≤ 35 °C (95 °F) and Flash Point < 23 °C (73 °F)	H224 Extremely flammable liquid and vapor, Flammable liquids (chp 2.6) (cat 1)				
	Other Packing Group I Materials (excluding acids/bases and excluding UNDG Class 1; Class 2.2; Class 4.2; Class 4.3; Class 7; and Class 9 materials)	H228 Flammable solid, Flammable solids (chp 2.7) (cat 1,2) H230 May react explosively even in the absence of air, Flammable gases (chp 2.2) (chemically unstable gas cat A) H231 May react explosively even in the absence of air at elevated pressure and/or temperature, Flammable gases (chp 2.2) (chemically unstable gas cat B) H232 May ignite spontaneously if exposed to air, Flammable gases (chp 2.2) (cat 1A pyrophoric gas)				
		H250 Catches fire spontaneously if exposed to air, Pyrophoric liquids and Pyrophoric solids (chp 2.9 & 2.10) (cat 1) H310 Fatal in contact with skin, Acute toxicity, dermal (chp 3.1) (cat 1)				
TRC-6	Liquids with Normal Boiling Point > 35 °C (95 °F) and Flash Point < 23 °C (73 °F)	H225 Highly flammable liquid and vapor, Flammable liquids (chp 2.6) (cat 2)	≥ 1000 kg (2200 lb) or ≥ 7 oil bbl	≥ 100 kg (220 lb) or ≥ 0.7 oil bbl	≥ 100 kg (220 lb) or ≥ 0.7 oil bbl	≥ 50 kg (110 lb) or ≥ 0.35 oil bbl
	Crude Oil ≥15 API Gravity (unless actual flashpoint available)	Crude Oil ≥15 API Gravity (unless actual flashpoint available)				
	Other Packing Group II Materials (excluding acids/bases and excluding UNDG Class 1; Class 2.2; Class 4.2; Class 4.3; Class 7; and Class 9 materials)	H240 Heating may cause an explosion, Self-reactive substances and mixtures and Organic peroxides (chp 2.8 & 2.15) (type A) H241 Heating may cause a fire or explosion, Self-reactive substances and mixtures and Organic peroxides (chp 2.8 & 2.15) (type B) H242 Heating may cause a fire, Self-reactive substances and mixtures and Organic peroxides (chp 2.8 & 2.15) (type C-F) H271 May cause fire or explosion; strong oxidizer, Oxidizing liquids and Oxidizing solids (chp 2.13 & 2.14) (cat 1) H310 Fatal in contact with skin, Acute toxicity, dermal (chp 3.1) (cat 2)				
TRC-7	Liquids with Flash Point ≥ 23 °C (73 °F) and ≤ 60 °C (140 °F)	H226 Flammable liquid and vapor, Flammable liquids (chp 2.6) (cat 3)	≥ 2000 kg (4400 lb)	≥ 200 kg (440 lb)	≥ 200 kg (440 lb)	≥ 100 kg (220 lb)
	Liquids with Flash Point > 60 °C (140 °F) released at a temperature at or above Flash Point	H227 Combustible liquid, Flammable liquids (chp 2.6) (cat 4) [**Released at a temperature at or above Flash Point **] Liquids with Flash Point > 93 °C (200 °F) released at a temperature at or above Flash Point	or ≥ 14 oil bbl	or ≥ 1.4 oil bbl	or ≥ 1.4 oil bbl	or ≥ 0.7 oil bbl

			Tier 1		Tier 2	
Threshold Release Category	Material Hazard Classification Option 1	Material Hazard Classification Option 2	Threshold Quantity (outdoor)	Threshold Quantity (indoor)	Threshold Quantity (outdoor)	Threshold Quantity (indoor)
	Crude Oil <15 API Gravity (unless actual flashpoint available)	Crude Oil <15 API Gravity (unless actual flashpoint available)				
	UNDG Class 2, Division 2.2 (non-flammable, non-toxic gases) excluding air	H270 May cause or intensify fire; oxidizer Oxidizing gases (chp 2.4) (cat1) UNDG Class 2, Division 2.2 (non-flammable, non-toxic gases) excluding air				
	Other Packing Group III Materials (excluding acids/bases and excluding UNDG Class 1; Class 2.2; Class 4.2; Class 4.3; Class 7; and Class 9 materials)	H272 May intensify fire; oxidizer, Oxidizing liquids and Oxidizing solids (chp 2.13 & 2.14) (cat 2,3) H311 Toxic in contact with skin, Acute toxicity, dermal (chp 3.1) (cat 3)				
TRC-8	Liquids with Flash Point > 60 °C (140 °F) and ≤ 93 °C (200 °F) released at a temperature below Flash Point	H227 Combustible liquid, Flammable liquids (chp 2.6) (cat 4) [**Released at a temperature below Flash Point **]	N/A	N/A	≥ 1000 kg (2200 lb) or ≥ 7 oil bbl	≥ 500 kg (1100 lb) or ≥ 3.5 oil bbl
	Strong acids/bases (see definition 3.1)	H314 Causes severe skin burns, Skin corrosion/irritation (chp 3.2) (cat 1A)				
		H370 Causes damage to organs, Specific target organ toxicity, single exposure (chp 3.8) (cat 1)				
Notes:						
1. It is recognized that threshold quantities given in kg or lb and bbl are not exactly equivalent. Companies should select one of the pair and use it consistently for all recordkeeping activities.						
2. Refer to 5.2.3 for guidance on selecting the correct Threshold Release Category and the use of Material Hazard Classification Option 1 and Option 2.						

J. Appendix A – Severity Table: Using A Severity Weighting System is Encouraged for All Associations

	Event Incident Categories				
Severity Level	Safety/Human Health	Direct Cost from Fire or Explosion	Material Release Within 1-Hr Period	Community Impact	Environmental Impact [off-site]
Level 4 1 point	<ul style="list-style-type: none"> Injury requiring treatment beyond first aid to an employee, contractor, or subcontractor. (Meets local regulations)	<ul style="list-style-type: none"> Resulting in Direct Damage Cost of \$2.5 K s up to \$25 K	<ul style="list-style-type: none"> Release volume between 1x s TQ < 40x	<ul style="list-style-type: none"> Officially declared shelter-in-place or officially declared evacuation (on or off site) Precautionary off site shelter in place or evacuation s 3 hours	<ul style="list-style-type: none"> Acute Environmental Remediation Cost \$2.5 K s up to \$25 K
Level 3 3 points	<ul style="list-style-type: none"> Days Away From Work injury to an employee, contractor, or subcontractor, or Injury requiring treatment beyond first aid to a third party (Meets local regulations) 	<ul style="list-style-type: none"> Resulting in Direct Damage Cost of \$25 K s up to \$250 K	<ul style="list-style-type: none"> Release volume between 40x s TQ < 160x	<ul style="list-style-type: none"> Officially declared shelter-in-place or officially declared evacuation (on or off site) Precautionary off site shelter in place or evacuation 3 hours up to 12 hours	<ul style="list-style-type: none"> Acute Environmental Remediation Cost \$25 K s up to \$250 K
Level 2 9 points	<ul style="list-style-type: none"> A fatality of an employee, contractor, or subcontractor, or A hospital admission of a third party (Meets local regulations)	<ul style="list-style-type: none"> Resulting in Direct Damage Cost of \$250 K s up to \$25 MM	<ul style="list-style-type: none"> Release volume between 160x s TQ < 640x	<ul style="list-style-type: none"> Officially declared shelter-in-place or officially declared evacuation (on or off site) Precautionary off site shelter in place or evacuation 12 hours up to 24 hours	<ul style="list-style-type: none"> Acute Environmental Remediation Cost \$250 K s up to \$25 MM
Level 1 27 points	<ul style="list-style-type: none"> Multiple fatalities of employees, contractors, or subcontractors, or multiple hospital admission of third parties, or A fatality of a third party (Meets local regulations) 	<ul style="list-style-type: none"> Resulting in Direct Damage Costs of up to \$25 MM	<ul style="list-style-type: none"> Release volume up to 640x TQ	<ul style="list-style-type: none"> Officially declared shelter-in-place or officially declared evacuation (on or off site) Precautionary off site shelter in place or evacuation up to 24 hours	<ul style="list-style-type: none"> Acute Environmental Remediation Cost up to \$25 MM

(K = 1,000 MM = 1,000,000) (For Environmental Impact, companies and associations should agree on input criteria where definitions aren't readily

Table D.1—Tier 1 Process Safety Event Severity Weighting

Severity Points	Consequence Categories				
	Safety/Human Health ^a	Direct Cost from Fire or Explosion	Material Release Within Any 1-Hr Period ^{a, d, e}	Community Impact	Off-Site Environmental Impact ^{b, c}
1 point	Injury requiring treatment beyond first aid to an employee, contractor, or subcontractor. (Meets the definition of a US OSHA recordable injury.)	Resulting in \$100,000 ≤ Direct Cost Damage <\$1,000,000.	Release volume 1× ≤ Tier 1 TQ < 3× outside of secondary containment.	— Officially declared shelter-in-place or public protective measures (e.g. road closure) for <3 hours, or — Officially declared evacuation <3 hours.	Resulting in \$100,000 ≤ Acute Environmental Cost <\$1,000,000.
3 points	— Days Away From Work injury to an employee, contractor, or subcontractor, or — Injury requiring treatment beyond first aid to a third party.	Resulting in \$1,000,000 ≤ Direct Cost Damage <\$10,000,000.	Release volume 3× ≤ Tier 1 TQ < 9× outside of secondary containment.	— Officially declared shelter-in-place or public protective measures (e.g. road closure) for > 3 hours, or — Officially declared evacuation > 3 hours < 24 hours.	— Resulting in \$1,000,000 ≤ Acute Environmental Cost <\$10,000,000, or — Small-scale injury or death of aquatic or land-based wildlife.
9 points	— A fatality of an employee, contractor, or subcontractor, or — A hospital admission of a third party.	Resulting in \$10,000,000 ≤ Direct Cost Damage <\$100,000,000	Release volume 9× ≤ Tier 1 TQ < 27× outside of secondary containment.	Officially declared evacuation > 24 hours < 48 hours.	— Resulting in \$10,000,000 ≤ Acute Environmental Cost <\$100,000,000, or — Medium-scale injury or death of aquatic or land-based wildlife.
27 points	— Multiple fatalities of employees, contractors, or subcontractors, or — Multiple hospital admission of third parties, or — A fatality of a third party.	Resulting in ≥\$100,000,000 of direct cost damages.	Release volume ≥ 27× Tier 1 TQ outside of secondary containment.	Officially declared evacuation > 48 hours.	— Resulting in ≥ \$100,000,000 of Acute Environmental Costs, or — Large-scale injury or death of aquatic or land-based wildlife
^a Where there is no secondary containment, the quantity of material released from primary containment is used. Where secondary containment is designed to only contain liquid, the quantity of the gas or vapor being released and any gas or vapor evolving from a liquid must be calculated to determine the amount released outside of secondary containment. ^b Judging small, medium or large-scale injury or death of aquatic or land-based wildlife should be based on local regulations or Company guidelines. ^c The severity weighting calculation includes a category for "Off-Site Environmental Impact" and injury beyond first aid (i.e. OSHA "recordable injury") level of Safety/Human Health impact that are not included in the Tier 1 PSE threshold criteria. However, the purpose of including both of these values is to achieve greater differentiation of severity points for events that result in any form of injury or environmental impact. ^d For the purpose of Severity Weighting, general paving or concrete under process equipment, even when sloped to a collection system, is not credited as secondary containment. ^e Material release is not tabulated for fires or explosions. These events severity will be determined by the other consequence categories in this table.					

Appendix A above is designed to be used with the GHS Classification System **ONLY** (Table 1). If your company is using the API RP 754 version 3 Process Safety Metric Threshold Table, Table 2 in this document, please use the API RP 754 Process Safety Severity Table. It is important to state that the severity table in the API RP 754 Standard is for Tier 1 incidents only. **Comparing the relative severity of events using different tables will not be statistically valid.**

Acute Environmental Cost - Cost of short-term cleanup and material disposal, associated with a PSE with off-site environmental impact. Companies may choose to assign severity to costs associated with off-site environmental impacts in a separate category.

Rate Adjusted Metrics

Utilizing the severity table described above, there are a variety of rate-based metrics which can be generated. These include:

Process Safety Total Incident Rate (PSTIR):
$$\frac{\text{Total event incidents} \times 200,000}{\text{Total Worker Hours}}$$

Process Safety Event Severity Rate (PSESr) (i.e., severity-weighted Process Safety incident rate formula):

$$\text{PSESr} = \frac{\text{Total severity score for all events} \times 200,000}{\text{Total Worker Hours}}$$

In determining this rate, 1 point is assigned for each Level 4 incident attribute, 3 points for each Level 3 attribute, 9 points for each Level 2 attribute, and 27 points for each Level 1 attribute. Theoretically, a process safety event could be assigned a minimum of 1 point (i.e., the incident meets the attributes of a Level 4 incident in only one category) or a maximum of 135 points (i.e., the incident meets the attributes of a Level 1 incident in each of the five categories.)

PS Level “X*” incident rate:
$$\frac{\text{Total Severity Level “X*” PS incident} \times 200,000}{\text{Total employee, contractor \& subcontractor work hours}}$$

Where X* can be the total count of Severity Level 4, 3, 2, or 1 incidents. The severity level of an incident is the maximum severity rating of the five consequence categories.

Normalization – In some associations and member companies, process safety events are normalized on a ‘per 100’ employee basis given that one worker averages 2,000 per year. So, to normalize on a ‘per 100’ employee basis, events are multiplied by 200,000 worker hours. In other associations and member companies, events are normalized on a ‘per 500’ employee basis and events are multiplied by 1,000,000 worker hours. Associations and members should discuss this option and come to a conclusion together. The above formulas are set at a ‘per 100’ employee rate.

(K = 1,000 MM = 1,000,000) (For Environmental Impact, companies and associations should agree on input criteria where definitions aren’t readily

K. Appendix B – Frequently Asked Questions

Applicability

It is recommended that companies record and report Process Safety Events occurring at Company-owned or operated facilities, except as noted below:

1. **PSEs that originated off Company property**
2. **Marine transport vessel incidents, except when the vessel is connected to the facility for the purposes of crude or product transfer**
3. **Truck and/or rail incidents, except when the truck or rail car is connected to the facility for the purposes of crude or product transfer**
4. **Routine emissions that are allowable under permit or regulation**
5. **Underground contamination that had no process safety consequences. Note: The exclusion does not apply if the release resulted in an aboveground reportable PSE, such as release of toxic vapors or pooling of flammable liquids**
6. **Office building incidents (e.g., office heating equipment explosions, fires, spills, releases, personnel injury or illness, etc.)**
7. **Personnel safety "slip/trip/fall" incidents that are not directly associated with evacuating from, or responding to a loss of containment incident**
8. **Loss of Primary Containment (LOPC) incidents from ancillary equipment not connected to the process (e.g., small sample containers)**
9. **Planned and controlled drainage of material to collection or drain system designed for such service (Note: Exclusion does not apply to an unintended and uncontrolled release of material from primary containment that flows to a collection or drain system)**
10. **Mechanical work being conducted outside of process units or in maintenance shops**

Interpretations and Examples

The following interpretations and examples have been prepared to help clarify areas of potential uncertainty in the evaluation of reportable Process Safety Incidents (PSE).

COMPANY PREMISES

1. A third-party truck loading a flammable product on Company Premises, experiences a leak and subsequent fire and property loss damages of \$7,000 (direct costs). Although the truck is "Operated-by- Others", it is connected to the process. The incident would be a reportable PSE if property losses in direct costs were equal to or greater than \$2,500 or some other PSE threshold was met or exceeded (e.g., a fatality).
2. Similar example as #1. The truck loaded with flammable product overturns on route out of the plant, resulting in a fire and loss of the truck. This would not be reported as a PSE since the truck is no longer connected to the plant.

LOSS OF CONTAINMENT

3. A faulty tank gauge results in the overfilling of a product tank containing “flammable liquids”. Approximately 700 kg of liquid overflows into the tank's diked area. This incident is a reportable PSE since it is an "acute" spill greater than 100 kgs, regardless of secondary containment.
4. A maintenance contractor opens a process valve and gets sprayed with sulfuric acid resulting in a severe burn and lost time injury. This would be a reportable PSE. It is an unintended event involving a material and a loss of containment. For fatalities and days away from work injuries and illnesses, there is no release threshold amount.
5. An operator opens a quality control sample point to collect a routine sample of product and receives a bad hand laceration requiring stitches due to a broken glass bottle and misses the next day of work. This is not a reportable PSE because it is not related to a loss of containment.

ACUTE RELEASES

6. While troubleshooting a higher-than-expected natural gas flow rate, operating personnel find a safety valve on the natural gas line that did not reset properly and was relieving to the atmospheric vent stack through a knock-out drum. Upon further investigation, it is determined that a total of 100,000 kg of natural gas was relieved at a steady rate over a 6-month period. This is not a reportable PSE as the release rate (~10 kg per hour) is not “acute”, (i.e., does not exceed the 100 kg TQ for flammable vapors per 1 hour time period).

FLARES & EMISSION CONTROL DEVICES (e.g., scrubbers)

7. If a chemical is routed to a flare or emission control device (e.g., scrubber), it would not be classified as a PSE as long as that flare or control device operates as designed.
8. If a scrubber is overwhelmed by a flowrate greater than the design of the scrubber system and discharges a chemical more than the reporting threshold, it would be reported as a PSE as noted in this document.

As a note, an upset emission from a permitted or regulated source – **including pressure relief devices** - of a quantity greater than or equal to the threshold quantities in Table 1 or 2 in any one-hour period, that results in one or more of the following four consequences:

- rainout;
- discharge to a potentially unsafe location;
- an on-site shelter-in-place or on-site evacuation, excluding precautionary on-site shelter-in-place or on-site evacuation;
- public protective measures (e.g., road closure) including precautionary public protective measures;

Should be reported as a PSE.

SAFETY RELIEF DEVICE / SYSTEM

9. There is a unit upset and the relief valve opens to an atmospheric vent which has been designed, resulting in a gas release to the atmosphere with no adverse consequences. This would not be a reportable PSE since vapors and gases released to atmosphere from safety valves, high-pressure rupture disks, and similar safety devices that are properly designed for that event per API Standard 521 or equivalent are excluded, as long as the release did not result in (1) a liquid carryover that created a reportable PSE related to the liquid (e.g., lost time incident, fatality, a fire or explosion that caused \$2,500 or more of direct cost, liquid release or toxic aerosol release at or above threshold amounts, etc.), or (2) activation of a shelter-in-place response on or off-site, or (3) public protective measures be taken.
10. There is a unit upset and the relief valve fails to open, resulting in overpressure of the equipment and an "acute" release of flammable gas from a leaking flange. The amount released is above the 100 kg (within 1 hour) threshold. This is a reportable PSE. Releases from flanges are not excluded from PSE reporting.

DAYS AWAY FROM WORK INCIDENTS

11. An operator is walking, then slips and falls to the floor and suffers a lost time injury. The slip/fall is due to weather conditions, "chronic" oily floors and slippery shoes. This is not a reportable PSE. Personnel safety "slip/trip/fall" incidents that are not directly associated with evacuating from or responding to a loss of containment incident are specifically excluded from PSE reporting.
12. Same as above, except that the operator slipped and fell while responding to a small flammable liquid spill (e.g., less than 10 kg in 1 hour). This would be PSE reportable since the operator was responding to a loss of containment incident. A PSE is reportable if the loss of primary containment occurs on Company Premises and results in a lost time incident or fatality. For fatalities and lost time incidents, there is no release threshold amount.
13. Same as above, except that the operator slipped and fell several hours after the incident had concluded. This would not be PSE reportable. The terms "evacuating from" and "responding to" in the reporting exclusion mean that the loss of containment and associated emergency response activities are on-going. Slips/trip/falls after the event have concluded (such as "after-the-fact" clean-up and remediation) are excluded from PSE reporting.
14. A scaffold builder suffers a lost time injury after falling from a scaffold ladder while evacuating from a loss of containment incident on nearby equipment. This is a reportable PSE.
15. An operator walks past an improperly designed steam trap. The steam trap releases, and the

operator's ankle is burned by the steam, resulting in a lost time injury. This is a reportable PSE because even though the loss of containment was steam (vs. hydrocarbon or chemical), the physical state of the material was such that it caused a lost time injury.

16. An enclosure has been intentionally purged with nitrogen. A contractor bypasses safety controls, enters the enclosure and dies. This is a reportable fatality, but not a reportable PSE since there was no unplanned or uncontrolled loss of primary containment.
17. Same as above, except that nitrogen inadvertently leaked into the enclosure. This would be a reportable PSE (and fatality) since there was a fatality associated with an unplanned loss of primary containment.
18. An operator responding to an H₂S alarm collapses and is injured. If the alarm was triggered by an actual unplanned or uncontrolled H₂S LOPC, the event would be a reportable PSE. If the alarm was a false alarm, the event would not be a reportable PSE because there was no actual release.

PIPELINES

19. A pipeline leaks and releases 2000 lbs (900 kgs) of flammable vapor above ground within 1 hour. However, the release occurred in a remote location within the site. The release is PSE reportable, since "remoteness" is not a consideration.

FIRES or ENERGY RELEASES NOT ASSOCIATED WITH CHEMICAL RELEASE

As a general rule, a fire or energy release is reported as a PSE only if caused by chemical release or results in a chemical release in excess of the reporting quantities. Examples include:

20. An electrical fire impacts the operation of the process resulting in the release of 400 kg of toluene. This event would be reported as a PSE since the chemical release exceeds the 100 kg reporting threshold for toluene.
21. An electrical fire, loss of electricity, or any other loss of utility occurs which may cause a plant shutdown and possibly incidental equipment damage greater than \$2,500 (e.g., damage to reactors or equipment due to inadequate shutdown) but does not create a chemical release greater than the threshold quantity, or cause a fatality or serious injury. This event would not be reported as a PSE since the equipment damage was not caused by a chemical process fire/explosion and there was not a chemical release greater than the threshold quantity.

MARINE TRANSPORT VESSELS

22. A company operated Marine Transport Vessel has an onboard "acute" spill of combustible material greater than 100 kg. The event is not PSE reportable since Marine Transport Vessel incidents are specifically excluded, except when the vessel is connected to the refinery, petrochemical, or chemical manufacturing facility for the purposes of crude or product

transfer.

23. A third-party barge is being pushed by a tug and hits the company dock. A barge compartment is breached and releases 1,000 kg of diesel to the water. The event is not a reportable PSE since the marine vessel was not berthed at the dock and actively involved in crude or product transfer operations.

TRUCK AND RAIL

24. A company railcar derails and spills more than 1,000 kg of gasoline while in transit. The incident is not PSE reportable since rail incidents off company property are specifically excluded.
25. A third-party truck/trailer overturns while in the Company Premises, resulting in an "acute" spill of gasoline greater than 1,000 kg. The incident is not PSE reportable if the truck is no longer connected to the loading/unloading facilities. However, it is recommended that companies also have transportation incident metrics, which would capture this event.
26. A contract truck hauler is unloading caustic and the hose separates and generates an airborne aerosol and/or liquid caustic spill of 2500 kg. The event is a reportable PSE since the caustic TQ of 100 kg was exceeded and the truck was still connected to the loading/unloading facility immediately prior to the incident.

OFFICE BUILDING

27. There is a boiler fire at the Main Office complex, and direct cost damages totaled \$75,000. The incident is not PSE reportable since Office Building incidents are specifically excluded.

MAN-MACHINE INTERFACE INCIDENTS

28. An operations technician is injured while working around the finishing equipment in a polymers plant. The injury is caused by the mechanical, man-machine interface with the equipment. This would not be a reportable Process Safety Event because there was no loss of containment of hazardous material.

MIXTURES

29. If a mixture by itself has a GHS classification, you use that classification to determine the threshold. If the mixture itself does not have a GHS-classification, we go back to the individual components of the mixture and based on kg released per threshold group calculate a 'weighted' contribution to the thresholds. Example: a release of 100 kg of a mixture in a one hour period that consists of 0.5 kg of a substance classified as acute toxic H300, 4.5 kg of substance classified with H301 and 40 kg of a substance with another H-number and the remaining 55 kg of water with no GHS classification would be calculated as $0.5/1 + 4.5/10 + 40/100 = 0.5 + 0.45 + 0.4 = 1.35$ is exceeding 1 and would be counted as a reportable process safety incident even though none of

the individual hazardous components exceeded the threshold for the individual substance.

DIRECT DAMAGE COSTS

30. Direct damage costs considered for this threshold should be those costs directly attributed to the fire and/or explosion, such as the replacement value of equipment lost, structures lost, cost of repairs, environmental cleanup, emergency response and/or fines. Direct cost does not include indirect costs, such as business opportunity losses, loss of profits due to equipment outages, cost of obtaining or operating temporary facilities or cost of obtaining replacement products to meet customer demand (product losses).
31. As an example, a leak of flammable gas occurred in a vent line connected to a gas treatment system. At the same time, a failure in the process allowed air to enter in the same vent line. An explosion occurred and the over pressure damaged the vent line and associated upstream equipment including a seal pot. Nobody was hurt. The cost for repair was about \$12,000. This is a PSE considering the cost to repair the equipment due to the explosion and fire.
32. As an example, after a PSE event, a company releases 50 kg of a very special, GHS Category 5 product which causes \$2,000 of damage to equipment. The product released was a very special blend of materials and the company incurs over \$50,000 in materials associated with the product loss. This event is not reportable as PSE since the reportable threshold for GHS Category 5 releases is 100 kgs and product losses do not count as Direct Damage Costs.

NATURAL DISASTERS

33. Natural disasters can present substantial risks to chemical process operations and damage to plant equipment which may result in a loss of containment of hazardous substances. Where the potential for one or more types of natural disasters is deemed relevant to plant operations, process safety and operational systems shall address the applicable risk in terms of hazards and consequence analysis, plant design, operating procedures for loss of utilities and process shutdown, and emergency planning and response.

Types of natural disasters includes hurricanes and typhoons (including associated storm surge), floods, tornadoes, earthquakes, derechos (straight line windstorms), wildfires, volcanic eruptions, tsunamis, and avalanches.

If your facility experiences a natural disaster that triggers one or more of the thresholds, it should be reported as a process safety event.

PRECAUTIONARY PUBLIC RESPONSE

34. A precautionary public response is a measure taken from an abundance of caution. For example, a company may require all workers to shelter-in-place in response to an LOPC independent of or prior to any assessment (e.g., wind direction, distance from the LOPC, etc.) of the potential hazard to those workers. For example, a recognized community official (e.g., fire, police, civil

defense, emergency management) may order a community shelter-in-place, evacuation, or public protective measure (e.g., road closure) in the absence of information from a company experiencing a process safety event, or 'just in case' the wind direction changes, or due to the sensitive nature of the potentially affected population (e.g., school children, the elderly).

ACTIVE WAREHOUSE

35. An active warehouse is an on-site warehouse that stores raw materials, intermediates, or finished products used or produced by a process. From a process perspective, an active warehouse is equivalent to a bulk storage tank. Rather than being stored in a single large container, the raw materials, intermediates, or finished products are stored in smaller containers (e.g., totes, barrels, pails, etc.).

L. Appendix C – List of 2016 Process Safety Event Metric Creation Taskforce Members

Name	Affiliation
Peter Schmelzer	Bayer, CEFIC - Chairman
Americo Diniz Carvalho Neto	Braskem
Bradford Johnson	American Chemistry Council
David Cummings	DuPont
Debra Phillips	American Chemistry Council
Hans Schwarz	BASF
Kathryn Walton	Plastics and Chemicals Industries Association
Kazuyuki Akita	Japan Chemical Industry Association
Kelly Keim	ExxonMobil Chemical Company, API Representative
Kenan Stevick	Dow
Kiyokazu Murata	Japan Chemical Industry Association
Larry Bowler	SABIC
Lorna Young	Chemistry Industry Association of Canada
Louisa Nara	Center for Chemical Process Safety
Luiz Shizuo Harayashiki	Associação Brasileira da Indústria Química
Masatoshi Kumamoto	Japan Chemical Industry Association
Milton Lacerda	Petrobras
Phil Scott	Chemical Industries Association
Piet Knijff	DSM, European Process Safety Centre
Scott Donaldson and Eamon Chandler	Shell
Scott Wallace	Olin Corporation
Shakeel Kadri	Air Products and Chemicals, Inc.

M.Appendix D – Optional Excel Reporting Form

When member companies begin tracking process safety events, a single form should be utilized for all member companies to make data analysis easier and to allow all members to work from the same tracking sheet. The RCLG has developed an optional tracking sheet that members and associations can start with when developing their own tracking sheet.

This document consists of a contact page, the survey itself, and a ‘do not edit’ page where the drop down menu answers are stored.

The document can be found in the Microsoft Teams folder for KPI Reporting Guidance Documents.