

APPENDIX I

Responsible Care Performance Reporting – Performance Indicators Questionnaire 2016

Definitions and Further Explanations

Core Parameters

1) **Number of Fatalities (employees only)**

- **Definition:** A fatality is an instantaneous work-related event or exposure, leading to death within one year.
- The parameter is expressed as **number of fatalities**.

2) **Lost Time Injuries Frequency Rate (employees only)**

- **Definition:** A lost time injury is 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 3 days off the job.
- The frequency rate is expressed as the **number of lost time injuries per million working hours**. = $\frac{a \times b}{c}$ where a = total number of accidents
b = 1,000,000 man-hours
c = total man-hours worked
- Employee is defined to include all permanent full or part-time employees.
- Contractor is defined as any non-company employee who is providing a service to the company on the company's premises. This definition does not differentiate between a contractor's direct employees and those of any sub-contractors.

3) **Sulphur Dioxide (SO_x)**

- **Definition:** Airborne emission of sulphur and its compounds formed during combustion, production or treatment processes.
- The parameter comprises SO₂ and SO₃ and is expressed as **tonnes SO₂**.

4) **Nitrogen Oxides (NO_x)**

- **Definition:** Airborne emission of compounds of nitrogen and oxygen from combustion, production or treatment processes.
- The parameter comprises NO and NO₂ and is expressed as **tonnes of NO₂**.

5) **Chemical Oxygen Demand (COD)**

- **Definition:** Chemical Oxygen Demand (COD) is the amount of oxygen required for the chemical oxidation of compounds in water, as determined using a strong oxidant (most standard methods use dichromate).
- The parameter is expressed as **tonnes of oxygen**.
- For sites that have their wastewater treated at a shared third party unit and cannot obtain individual data, the efficiency factor of the wastewater treatment unit should be taken into consideration when calculating the amount.

6) Energy Consumption

- **Definition:** Energy consumption is the amount of fossil fuels and electricity (the result of purchased electricity plus self-produced **renewable** electricity minus electricity sold to the network). The unit for electricity is the GWh but in order to add them up, electricity should be converted to TOE.
- The theoretical conversion factors are: $2.3876 \cdot 10^{-5}$ ktoe per GJ and 0.2332 ktoe per GWh.
- The parameter on energy consumption is expressed as **tonnes of fuel oil equivalent (TOE)**.

7) Carbon Dioxide (CO₂)

- **Definition:** The major contribution to CO₂-emissions by the chemical industry is from 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.
- **Direct Carbon Monoxide (CO₂):** The direct emissions of CO₂ are calculated as tons of CO₂ equivalent by multiplying the amount of solid, liquid and gaseous fuels used for energy use and for the generation of self produced electricity, by corresponding CO₂-emission factors (see Annex I).
- **Indirect Carbon Dioxide (CO₂):** The indirect emissions of CO₂ are calculated as the multiplication of the amount of net purchased electricity by the average factor of CO₂ emissions per kwh produced.

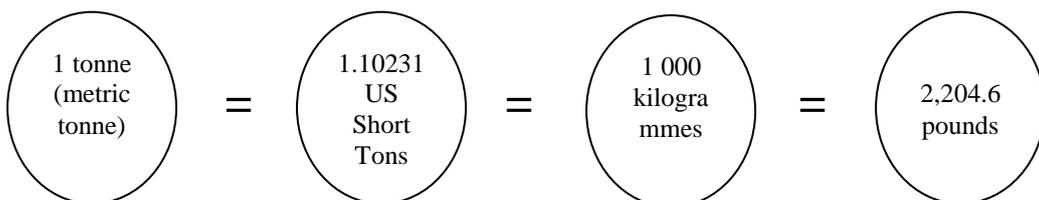
8) Other Greenhouse Gases

- **Definition:** Other Greenhouse Gases, listed in the Kyoto Protocol are:-
 - (i) Methane (CH₄)
 - (ii) Nitrous Oxide (N₂O)
 - (iii) Hydrofluorocarbons (HFC's)
 - (iv) Perfluorocarbons (PFC's)
 - (v) Sulphur Hexafluoride (SF₆)
- Emission data for these gases should be reported as **tons of CO₂ equivalents**. The impact of the release of these gases on Climate Change is calculated by multiplying the tons release per year by its Global Warming Potential (GWP) relative to carbon dioxide, as published by the Intergovernmental Panel on Climate Change (IPCC).

9) Other Explanation

- **Tonne:** A tonne is a Metric Tonne equivalent to 1000 kg and equivalent to 1.10231 US Short tons weighing 2,204.6 pounds.

1 Tonne = 1,000 kilograms = 2,204.6 pounds = 1.10231 US 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.
- **Conversion Factors and Formulas**

Carbon Dioxide Emissions Factors:

Fuel	Carbon Emission Factors¹ (kg C/GJ)	Carbon Dioxide Emission Factor¹ (kg CO₂/GJ)	Carbon Dioxide Emission Factor¹ (tonne CO₂/toe)	Carbon Dioxide Emission Factor² (lb CO₂/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
Bituman	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.

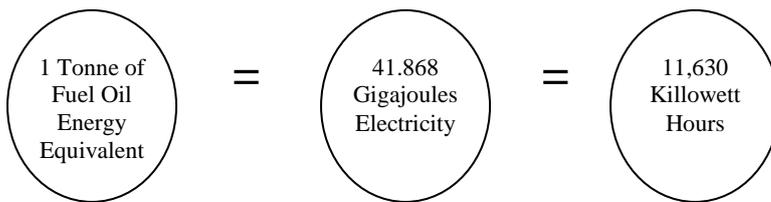
2-Source: Environmental Protection Agency, inventory of US Greenhouse Gas Emissions and sinks: 1990-2006, April 15, 2006; referenced from Intergovernmental Panel as Climate Change (IPCC), Second Assessment Report (SAR).

Examples for Calculating CO₂ Emissions:

	Carbon Emission Factor (kg C/GJ)	Molecular Weight Ratio of CO₂/C (44/12=3.67)	CO₂ Emission Factor (kg CO ₂ /GJ)	CO₂ 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 Tonnes of Fuel Oil Equivalents:

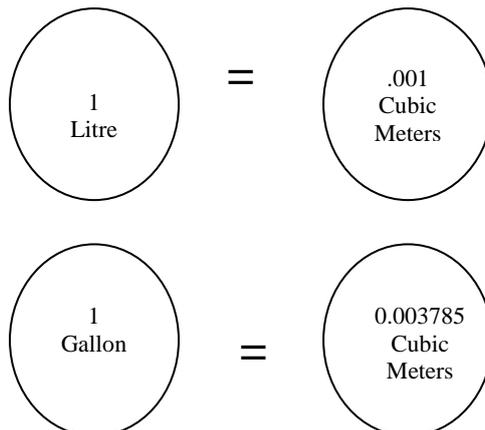


Calculating CO₂ Equivalents of other Greenhouses Gases using the Global Warming Potential (GWP) Factor:

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

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

Water Consumption – Conversions to Cubic Meters:



Appendix II

Transport Incidents

The distribution indicator relates to all incidents involving the movement of hazardous and non-hazardous chemicals. It covers the modes of transport by road and rail and includes the following:-

- death or injury
- spill or leakage
- property damage and/or material loss
- no spill or leak but public disruption
- adverse media attention

Incidents are categorized according to whether they were severe or less severe and whether distribution was by bulk or packaged cargoes.

Definition of Distribution Incidents Showing Breakdown by Severity		
<i>Type of Incident</i>	<i>Severe</i>	<i>Less Severe</i>
Death / Injury	Incident resulting in more than 3 days off from work	Incidents resulting in 1 – 3 days off work or treatment at approved medical centre
Spillage / Leakage	Hazardous material leakage of 200 kg or more Non-hazardous material leakage of 1000 kg or more	Hazardous material leakage of 10 kg or more but less than 200 kg. Non-hazardous material leakage of 100 kg or more but less than 1000 kg
Property Damage / Material - Loss including cost of environmental clean-up	In excess of RM50,000	Between RM5,000 and RM50,000
Public Disruption / Perceived Danger - Resulting in evacuation, road closure or other precautionary measures including attendance of emergency services	Last more than one hour	Last less than one hour
Adverse Media Coverage	National Level	Local Level

Appendix III

Total Worker Hours

RCLG Associations 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.** When 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 \$2,500 USDs;
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 in **Table 1**. (measured in amount released during **one hour**)

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