



**UA HSE**  
**Performance Team**

# Global Upstream OGP/API Tier 1 and 2 Process Safety Event Classification Guidance

PMR 2015 Parameters 3.1 and 3.2

## Global Upstream OGP/API PSE Classification Guide – Reporting Scope

***Process Safety - The management of Hazards that can give rise to major accidents involving release of potentially dangerous materials, release of energy (such as fire or explosion) or both.***

**Loss of Primary Containment (LOPC)** : An unplanned or uncontrolled release of any material from primary containment, including non-toxic and non-flammable materials (e.g. Steam, hot condensate, nitrogen, compressed CO<sub>2</sub> or compressed air). For drilling operations, any unplanned or uncontrolled release to the surface (seabed or ground level) should be included. LOPC is a type of event. An unplanned or uncontrolled release is an LOPC irrespective of whether the material is released into the environment, or into secondary containment, or into another primary containment not intended to contain the material released under normal operating conditions.

**Process:** Facilities used in drilling and production operations in the oil and gas industry. This includes rigs and process equipment (e.g. vessels, piping, valves, boilers, generators, pumps, compressors, exchangers, refrigeration systems) and includes storage tanks, ancillary support areas (e.g. boiler houses and waste water treatment plants), on-site remediation facilities, and distribution piping under control of the company. See OGP 456.

A **Tier 1 Process Safety Event** is an LOPC with consequence. It is an unplanned or uncontrolled release of any material, including non-toxic and non-flammable materials, from a process that results in consequences as listed, per the API 754 Guide. A Tier 1 Process Safety event may involve significant actual or potential impacts.

A **Tier 2 Process Safety Event** is an LOPC with consequence. It is an unplanned or uncontrolled release of any material, including non-toxic and non-flammable materials, from a process that results in consequences per the API 754 Guide. As an approximation Tier 2 events are roughly an order of magnitude lower impact than Tier 1 Process Safety Events.

1. Incidents: All LOPCs that reach the consequence criteria of a Tier 1 or Tier 2 PSE are included unless specifically excluded by one of the four categories below:
  - a. LOPC's from truck/rail operations when not connected to process
  - b. Routine emissions allowable under permit/regulations
  - c. Personal Safety events that are not directly associated with an onsite response to an LOPC
  - d. LOPC events from ancillary equipment not connected to process (e.g. small sample containers)
2. Shell reports Tier 1 and Tier 2 Process Safety Events to OGP as per the API and OGP definition. In addition to the scope identified by OGP, Shell has extended its internal reporting to include

events that are considered **Out of Scope** as per the API/OGP definition. These are only included in the internal reporting metrics and are not submitted for external reporting to OGP.

For PMR 2015, PSE's for Upstream are to include incidents that are:

- a. In API/OGP scope and;
- b. Out of API/OGP scope (i.e., excluded for OGP reporting yet included for internal reporting only).

HSSE Performance Analysts will assist to separate out the PSE's that are Out of Scope for external reporting (OGP).

3. International Association of Oil and Gas Producers (OGP) reporting includes only Drilling and Production activities. Therefore PSEs associated with construction, Oil sands or other should be considered as **Out of Scope**. OGP excludes heavy oil mining, production and upgrading in the guidance for application of API 754 to upstream facilities, these are in scope for Shell Upstream **internal reporting**.

All PTP and PTD Tier 1 and Tier 2 PSEs are to be considered out of scope for OGP reporting.

4. **Operations:** All drilling and productions operational activities are applicable to PSE reporting, including related facility start-up or shut-down operations, related construction or decommissioning operations, and events resulting from sabotage, terrorism, climatic episodes, earthquakes or other indirect causes.

Special Instruction on Specific Activities:

- a. Drilling activities – see Page 9
  - b. Oil sands mining and upgrading -see Page 10
  - c. Marine Transport operations – see Page 11
5. The following incidents must also be considered for Shell Upstream PSE's for internal reporting; however are Out of Scope for external reporting.
    - a. All Vacuum Truck operations
    - b. Office/Shop/Warehouse/Camp/Compound events involving LOPC
    - c. QA/QC/R&D laboratories ( Note: Pilot plants already in scope)
    - d. Onsite Fuelling of Heavy Equipment (incl. pickups/generators/heavy equipment/forklifts)
  6. **Assets:** Owned, operated and leased facilities over which the reporting organisation has operational control. NOV organisations which normally report incidents to Upstream should report PSEs in FIM where it is implemented. However, NOV incidents are not included in the HSSE data reported to Group (PMR), nor are they reported externally to OGP

7. **Facilities:** Include well site, production, export, storage, utilities, pilot plant, or laboratory areas of an upstream site or involves flow lines and pipelines to and from upstream sites. This includes tank farms, ancillary support areas (e.g., boiler houses and waste water treatment plants), and piping within the site. Subsea lines are included in scope.
8. Bulk storage and transportation vessels attached to process equipment for purpose of transfer are included. Fluids from transportation equipment (e.g. Trucks, Shovels, Rail\*\*) are excluded.
9. **Unsafe location API 754 definition:** An atmospheric pressure relief device discharge point or downstream destructive device (e.g. flare, scrubber) discharge point that results in a potential hazard such as the formation of flammable mixtures at grade level or on elevated work structures, presence of toxic or corrosive materials at grade or on elevated work structures, or ignition of relief streams at point of emission as specified in API 521 Section 6.3.4.3.
10. **Direct Cost:** defined as cost of repairs or replacement, cleanup, material disposal, environmental remediation and emergency response. Direct cost does not include indirect costs, such as business opportunity, business interruption and feedstock/product losses, loss of profits due to equipment outages, costs of obtaining or operating temporary facilities, or costs of obtaining replacement products to meet customer demand. Direct cost does not include the cost of the failed component leading to LOPC, if the component is not further damaged by the fire or explosion. See API 754 Sections 3.1.10.

Note that direct cost includes contractor equipment and assets under Shell's operational control.

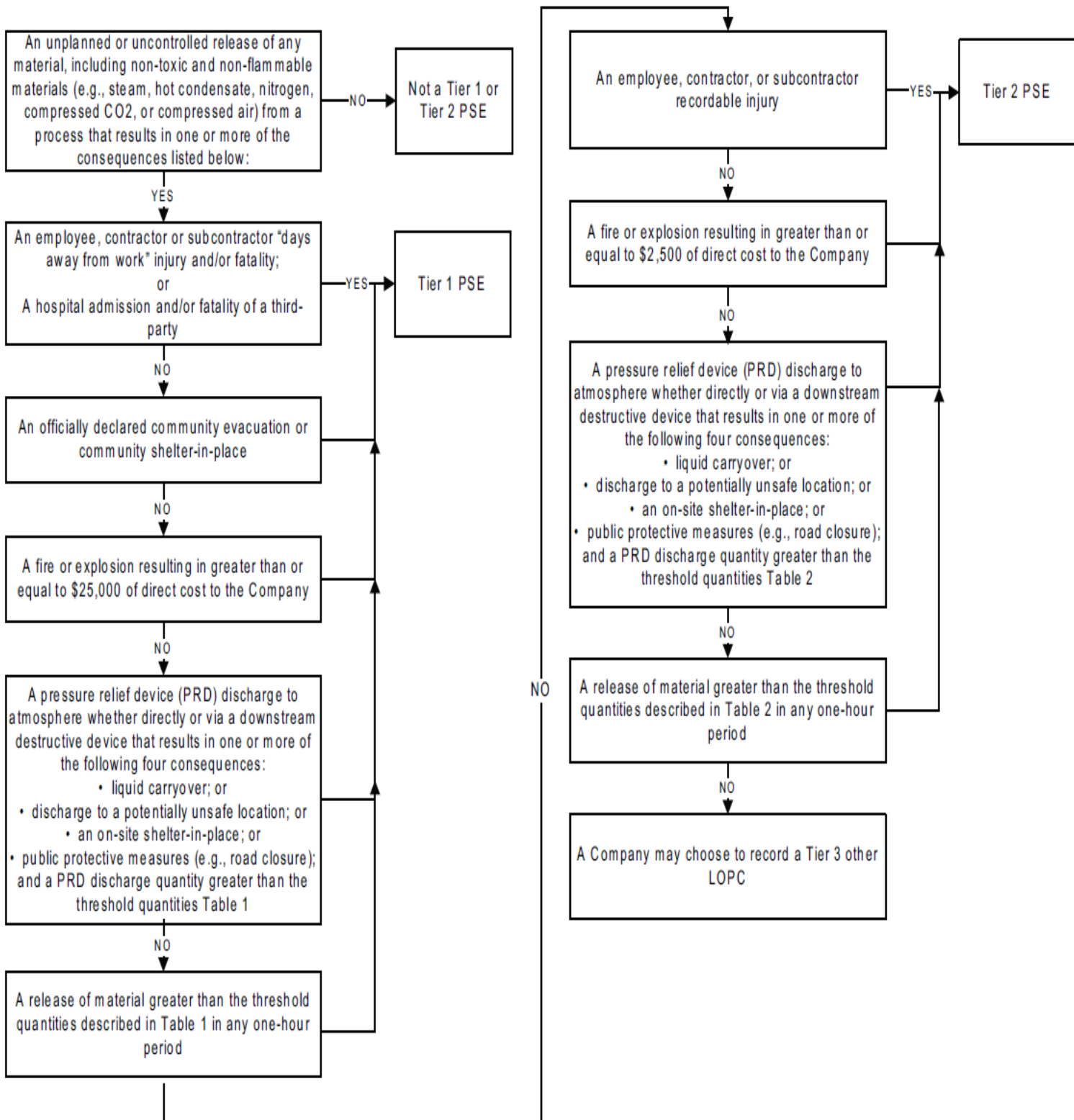
11. For Threshold Quantities (expressed in kg) of gas or liquid refer to Threshold Quantities Quick Reference Guide within this document. If your material is not listed, refer to Appendix A which includes OGP and API 754 Tables. For Toxic Inhalation Hazard (TIH) reference the API Guide for determining acute releases of toxic chemicals. Consult Material Safety Data Sheet (MSDS) for specific Packing Group, PH, Flash Point, and Toxicity levels to assist in identifying the proper material category, and relevant threshold release quantities.
12. PLEASE NOTE: Tiers referred to within this document are solely related to OGP/API Process Safety Event classifications. (For example, the UK Regulator also uses the term Tier for classifying oil on water spill response, in their case a Tier 1 incident is the smallest consequence incident.)

\*\* Note for PMR 2015 LOPC from Rail transport is covered under Group Road Safety program.

Link to OGP Process Safety – Recommended Practice: <http://www.ogp.org.uk/pubs/456.pdf>

For API 754 Process Safety Documentation – contact Andrea Garner

## OGP/API PSE Classification Guide – Decision Logic Tree



## Excerpt API 754

Table 1—Tier 1 Material Release Threshold Quantities

Threshold Release Category	Material Hazard Classification <sup>a,c,d</sup>	Threshold Quantity (outdoor release)	Threshold Quantity (indoor <sup>b</sup> release)
1	TIH Zone A Materials	5 kg (11 lb)	2.5 kg (5.5 lb)
2	TIH Zone B Materials	25 kg (55 lb)	12.5 kg (27.5 lb)
3	TIH Zone C Materials	100 kg (220 lb)	50 kg (110 lb)
4	TIH Zone D Materials	200 kg (440 lb)	100 kg (220 lb)
5	Flammable Gases or Liquids with Initial Boiling Point $\leq 35$ °C (95 °F) and Flash Point $< 23$ °C (73 °F) or Other Packing Group I Materials excluding strong acids/bases	500 kg (1100 lb)	250 kg (550 lb)
6	Liquids with Initial Boiling Point $> 35$ °C (95 °F) and Flash Point $< 23$ °C (73 °F) or Other Packing Group II Materials excluding moderate acids/bases	1000 kg (2200 lb) or 7 bbl	500 kg (1100 lb) or 3.5 bbl
7	Liquids with Flash Point $\geq 23$ °C (73 °F) and $\leq 60$ °C (140 °F) or Liquids with Flash Point $> 60$ °C (140 °F) released at a temperature at or above Flash Point or strong acids/bases or Other Packing Group III Materials	2000 kg (4400 lb) or 14 bbl	1000 kg (2200 lb) or 7 bbl

It is recognized that threshold quantities given in kg and lb or in lb and bbl are not exactly equivalent. Companies should select one of the pair and use it consistently for all recordkeeping activities.

<sup>a</sup> Many materials exhibit more than one hazard. Correct placement in Hazard Zone or Packing Group shall follow the rules of DOT 49 *CFR* 173.2a <sup>[14]</sup> or UN Recommendations on the Transportation of Dangerous Goods, Section 2 <sup>[10]</sup>. See Annex B.

<sup>b</sup> A structure composed of four complete (floor to ceiling) walls, floor, and roof.

<sup>c</sup> For solutions not listed on the UNDG, the anhydrous component shall determine the TIH zone or Packing Group classification. The threshold quantity of the solution shall be back calculated based on the threshold quantity of the dry component weight.

<sup>d</sup> For mixtures where the UNDG classification is unknown, the fraction of threshold quantity release for each component may be calculated. If the sum of the fractions is equal to or greater than 100 %, the mixture exceeds the threshold quantity. Where there are clear and independent toxic and flammable consequences associated with the mixture, the toxic and flammable hazards are calculated independently. See Annex A, Examples 28, 29, and 30.

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## Excerpt API 754

Table 2—Tier 2 Material Release Threshold Quantities

Threshold Release Category	Material Hazard Classification <sup>a,c,d</sup>	Threshold Quantity (outdoor release)	Threshold Quantity (indoor <sup>b</sup> release)
1	TIH Zone A Materials	0.5 kg (1.1 lb)	0.25 kg (0.55 lb)
2	TIH Zone B Materials	2.5 kg (5.5 lb)	1.2 kg (2.8 lb)
3	TIH Zone C Materials	10 kg (22 lb)	5 kg (11 lb)
4	TIH Zone D Materials	20 kg (44 lb)	10 kg (22 lb)
5	Flammable Gases or Liquids with Initial Boiling Point ≤ 35 °C (95 °F) and Flash Point < 23 °C (73 °F) or Other Packing Group I Materials excluding strong acids/bases	50 kg (110 lb)	25 kg (55 lb)
6	Liquids with a Initial Boiling Point > 35 °C (95 °F) and Flash Point < 60 °C (140 °F) or Liquids with Flash Point > 60 °C (140 °F) released at or above Flash Point; or Other Packing Group II and III Materials excluding moderate acids/bases or Strong acids and bases	100 kg (220 lb) or 1 bbl	50 kg (110 lb) or 0.5 bbl
7	Liquids with Flash Point > 60 °C (140 °F) released at a temperature below Flash Point or Moderate acids/bases	1000 kg (2200 lb) or 10 bbl	500 kg (1100 lb) or 5 bbl
<p>In order to simplify determination of reporting thresholds for Tier 2, Categories 6 and 7 in Tier 1 have been combined into one category in Tier 2 (Category 6). The simplification is intended to provide less complicated requirements for those events with lesser consequences.</p> <p>It is recognized that threshold quantities given in kg and lb or in lb and bbl are not exactly equivalent. Companies should select one of the pair and use it consistently for all recordkeeping activities.</p> <p><sup>a</sup> Many materials exhibit more than one hazard. Correct placement in Hazard Zone or Packing Group shall follow the rules of DOT 49 CFR 173.2a <sup>(14)</sup> or UN Recommendations on the Transportation of Dangerous Goods, Section 2 <sup>(10)</sup>. See Annex B.</p> <p><sup>b</sup> A structure composed of four complete (floor to ceiling) walls, floor and roof.</p> <p><sup>c</sup> For solutions not listed on the UNDG, the anhydrous component shall determine the TIH zone or Packing Group classification. The threshold quantity of the solution shall be back calculated based on the threshold quantity of the dry component weight.</p> <p><sup>d</sup> For mixtures where the UNDG classification is unknown, the fraction of threshold quantity release for each component may be calculated. If the sum of the fractions is equal to or greater than 100 %, the mixture exceeds the threshold quantity. Where there are clear and independent toxic and flammable consequences associated with the mixture, the toxic and flammable hazards are calculated independently. See Annex A, Examples 28, 29, and 30.</p>			

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## Required Information for PSE event assessment for entry into FIM:

- Material(s) Released
  - Duration of the Release
  - Mass of material released in Kilograms
  - Indoor/Outdoor Release
  - Fire/Explosion & Direct Cost
  - Injuries associated with the LOPC
  - Whether material was contained or not
- 
- If using the Input Module – please answer all relevant questions which will then auto-populate these fields for you.
  - Visit <http://sww.shell.com/hse/it/fim/input.html> for more information on using the Input Module



## Global Upstream PSE Classification Guide Applicability to Wells

Reporting scope for Wells activities include all drilling and Completion/Wells Interventions (CWI) activities. All LOPC events from the well\*, processing equipment, storage tanks and ancillary support areas (referred to as the 'Process') are reviewed against the OGP/API Tier 1 & 2 criteria and are reported accordingly.

\*Includes any unplanned or uncontrolled release to the surface at seabed, ground level or drill floor.

As per OGP 456 guidance **Process** for drilling and CWI activities is defined as:

“Facilities used in drilling and production operations in the oil & gas industry. This includes rigs and process equipment (e.g. vessels, piping, valves, boilers, generators, pumps, compressors, exchangers, refrigeration systems) and includes storage tanks, ancillary support areas (e.g. boiler houses and waste water treatment plants), on-site remediation facilities, and distribution piping under control of the company.”

For drilling and CWI activities this includes not only LOPCs from the wellbore but also other surface equipment associated with drilling/CWI activities.

In addition to the Tier PSE reporting requirements, Wells Barrier Events, where no LOPC is involved are also reported separately per PMR 2015, Section 3 Process Safety and Parameter 3.7.

### Classifications for internal and external reporting

For external reporting 'in hole' is translated to the Period of Operations. The Period of Operations commences at spud for drilling or when having completed rig-up for CWI activities. The Period of Operations is completed when rigging down commences.

Activities that take place *during* the Period of Operations, that exceed the Tier 1 & 2 thresholds, are reported both internally and externally to OGP (Tier 1 or Tier 2)

Activities that take place *before or after* the Period of Operations, that exceed the Tier 1 & 2 thresholds, are reported internally ONLY. They are 'out of scope' for OGP (Tier 1 Out of Scope or Tier 2 Out of Scope)

### Exemptions for reporting of Tier incidents

Fluid losses occurring down hole, in the event of an underground blow-out, or during kick situations when the well is shut-in without surface excursions from the mud/brine containment systems (i.e. no surface LOPC has occurred) are EXCLUDED from both in and out of scope PSE reporting. These events should still be classified in accordance with the Wells Process Safety Incidents (WPSI) and Barrier Events guidance.

## Global Upstream PSE Classification Guide Applicability Oilsands - Mining Bitumen

1. Oilsand's are out of scope for external reporting of Process Safety Events (PSE's) to the Upstream Association of Oil and Gas Producers (OGP). However Oilsand's Mining and Upgrading are included in the evaluation of Tier 1 & 2 Process Safety Events as 'out of scope' (i.e. for internal Shell reporting).
2. Bitumen streams in the Extraction and Froth Treatment areas typically contain a high concentration of water and sand and are handled in open vessels, where there is no flammability or vapour risk. In view of this and to align with Oilsand's industry practice for Process Safety Events, Oilsand's Extraction and Froth Streams upstream of solvent (or diluent) addition will not be considered as PSEs from a Threshold Quantity perspective. Note however that unplanned or uncontrolled releases of these streams may trigger PSE classification if people impacts were to occur (see classification chart).
  - Oilsand's froth streams typically contain 54% Bitumen/35% water/11% sand and are handled at temperatures of less than 50 C. The Bitumen pour point is approximately 80 C and the flash point is typically 205 C. The bitumen in the stream is solid in nature and is well below the pour point and the flash point.
  - This Threshold Quantity exclusion does not apply to In Situ Bitumen, where Bitumen concentrations and stream temperatures are higher.
  - If there is change based on industry practice this will be re-evaluated.

## Global Upstream PSE Classification Guide Applicability to Marine Transport

Tier & Tier 2 released scenarios	Non reporting contractor / venture	Reporting contractor/ venture	Which statement to justify this
Product Transfers where the marine vessel is attached to production process or facility (e.g. condensate)	Excluded	In scope (OGP & PMR)	OGP 456 section 3.4 and 3.5 – marine operations connected to the process
Marine vessel is transferring product used for the operations of the facility ( e.g. diesel, oil based muds)	Excluded	Out of scope OGP In scope PMR	Marine transport operations where handling hydrocarbon results in a release.
Refueling	Excluded	Excluded	Not connected to facility or process.
Hull Breach	Excluded	Excluded	Not connected to facility or process.
Vessel own use fuel tank leak	Excluded	Excluded	Not connected to facility or process.
On board releases from boilers or machinery	Excluded	Excluded (2)	Not connected to facility or process.

1. Emergency Response vessels (oil skimming, oil collection, etc.) are not production or drilling supply/support vessels directly and are excluded in any case for OGP and PMR Reporting.
2. Included if marine production vessel such as Floating Production Storage Offloading (FPSO) vessel.

## Quick Reference Guide -Tier 1 & Tier 2 Material Threshold Quantities

Material Released	Tier 1 Thresholds (kg)		Tier 1 Material Category	Tier 2 Thresholds (kg)		Tier 2 Material Category
	Outdoor	Indoor		Outdoor	Indoor	
Amines *consult MSDS	500	250	Cat. 5	50	25	Cat. 5
Ammonia (NH3)	200	100	Cat. 4	20	10	Cat. 4
Ammonia Anhydrous	200	100	Cat. 4	20	10	Cat. 4
Aromatic Oil	2000	1000	Cat. 7	1000	500	Cat. 7
Asphalt	Not Tier 1 when released at temperature below its flash point			1000	500	Cat. 7
Base oil	2000	1000	Cat. 7	100	50	Cat. 6
Bitumen	Not Tier 1 when released at temperature below its flash point			1000	500	Cat. 7
Butane	500	250	Cat. 5	50	25	Cat. 5
Carbon Dioxide (CO2)	2000	1000	Cat. 7	1000	500	Cat. 7
Carbon Monoxide (CO)	200	100	Cat. 4	20	10	Cat. 4
Caustics (strong alkalis) pH > 11.5 *consult MSDS	2000	1000	Cat. 7	100	50	Cat. 6
Chlorine	25	12.5	Cat. 2	2.5	1.25	Cat. 2
Condensate (HC)	1000	500	Cat. 6	100	50	Cat. 6
Crude Oil HF (< 15 API, FP > 23 C)	2000	1000	Cat. 7	100	50	Cat. 6
Crude Oil LF (> 15 API, FP < 23 C)	1000	500	Cat. 6	100	50	Cat. 6
Cutback Bitumen	2000	1000	Cat. 7	1000	500	Cat. 7
Diesel Fuel	2000	1000	Cat. 7	100	50	Cat. 6
Diluent (HC)	1000	500	Cat. 6	100	50	Cat. 6
Diluted Bitumen **	1000	500	Cat. 6	100	50	Cat. 6
DIPA – Lean *consult MSDS	500	250	Cat. 5	50	25	Cat. 5
DIPA – Rich *consult MSDS	500	250	Cat. 5	50	25	Cat. 5
DTBP	1000	500	Cat. 6	100	50	Cat. 6
EDA	2000	1000	Cat. 7	100	50	Cat. 6
Ethane	500	250	Cat. 5	50	25	Cat. 5
Ethylene Glycol	Not Tier 1 when released at temperature below its flash point			1000	500	Cat. 7
Fuel Gas	500	250	Cat. 5	50	25	Cat. 5
Fuel oil	2000	1000	Cat. 7	100	50	Cat. 6
Gas Oil	2000	1000	Cat. 7	100	50	Cat. 6
Glycols	Not Tier 1 when released at temperature below its flash point			1000	500	Cat. 7
Heavy Fuel oils	2000	1000	Cat. 7	100	50	Cat. 6
Heavy Gas Oil	2000	1000	Cat. 7	100	50	Cat. 6
Heavy Vacuum Gas Oil	2000	1000	Cat. 7	100	50	Cat. 6
Hexanes	1000	500	Cat. 6	100	50	Cat. 6
Hydraulic Fluid/Oil	Not Tier 1 when released at temperature below its flash point			1000	500	Cat. 7

## Quick Reference Guide -Tier 1 & Tier 2 Material Threshold Quantities

Material Released	Tier 1 Thresholds (kg)		Tier 1 Material Category	Tier 2 Thresholds (kg)		Tier 2 Material Category
	Outdoor	Indoor		Outdoor	Indoor	
Hydrochloric Acid (HCl) solution *consult MSDS	2000	1000	Cat. 7	100	50	Cat. 6
Hydrogen Chloride (HCl) gas	100	50	Cat. 3	10	5	Cat. 3
Hydrogen	500	250	Cat. 5	50	25	Cat. 5
Hydrogen Sulphide (H2S)	25	12.5	Cat. 2	2.5	1.25	Cat. 2
Jet Fuel	1000	500	Cat. 6	100	50	Cat. 6
Kerosene	2000	1000	Cat. 7	100	50	Cat. 6
Light Gas Oil	2000	1000	Cat. 7	100	50	Cat. 6
Light Vacuum Gas Oil	2000	1000	Cat. 7	100	50	Cat. 6
Liquified Natural Gas	500	250	Cat. 5	50	25	Cat. 5
Liquified Petroleum Gas	500	250	Cat. 5	50	25	Cat. 5
LMHVGO	2000	1000	Cat. 7	100	50	Cat. 6
Lubrication Oil/Grease	Not Tier 1 when released at temperature below its flash point			1000	500	Cat. 7
Medium Gas Oil	2000	1000	Cat. 7	100	50	Cat. 6
Medium Vacuum Gas Oil	2000	1000	Cat. 7	100	50	Cat. 6
Mercaptan	500	250	Cat. 5	50	25	Cat. 5
Methane	500	250	Cat. 5	50	25	Cat. 5
Methanol	1000	500	Cat. 6	100	50	Cat. 6
Mineral Oil	1000	500	Cat. 6	100	50	Cat. 6
Molten Sulphur	Not Tier 1 when released at temperature below its flash point			1000	500	Cat. 7
Molybdenum Oxide	2000	1000	Cat. 7	100	50	Cat. 6
Naphtha	1000	500	Cat. 6	100	50	Cat. 6
Natural Gas	500	250	Cat. 5	50	25	Cat. 5
Nitrogen	2000	1000	Cat. 7	1000	500	Cat. 7
Oil Based Mud (OBM) - Shellsol Based	Not Tier 1 when released at temperature below its flash point			1000	500	Cat. 7
Oil Based Mud (OBM) - Diesel Based	Not Tier 1 when released at temperature below its flash point			1000	500	Cat. 7
Oil Based Mud (SBM) - Synthetic Based	Not Tier 1 when released at temperature below its flash point			1000	500	Cat. 7
Oxalic Acid	2000	1000	Cat. 7	1000	500	Cat. 7
Paraffins	2000	1000	Cat. 7	1000	500	Cat. 7
Pentanes	1000	500	Cat. 6	100	50	Cat. 6
Petrol/ Gasoline	1000	500	Cat. 6	100	50	Cat. 6
Propane	500	250	Cat. 5	50	25	Cat. 5
Raw Gas (also consider H2S)	500	250	Cat. 5	50	25	Cat. 5
Silver Nitrate, Silver Oxide, Silver Solution	1000	500	Cat. 6	100	50	Cat. 6

## Quick Reference Guide -Tier 1 & Tier 2 Material Threshold Quantities

Material Released	Tier 1 Thresholds (kg)		Tier 1 Material Category	Tier 2 Thresholds (kg)		Tier 2 Material Category
	Outdoor	Indoor		Outdoor	Indoor	
Short Residue	2000	1000	Cat. 7	1000	500	Cat. 7
Sodium Aluminate	1000	500	Cat. 6	100	50	Cat. 6
Solvent (HC)	1000	500	Cat. 6	100	50	Cat. 6
Stabilizer Bottoms	1000	500	Cat. 6	100	50	Cat. 6
Steam	See decision logic tree					
Sulfinol *consult MSDS	Not Tier 1 when released at temperature below its flash point			1000	500	Cat. 7
Sulphur	2000	1000	Cat. 7	100	50	Cat. 6
Sulphur, Molten	2000	1000	Cat. 7	1000	500	Cat. 7
Sulphur Dioxide (SO <sub>2</sub> )	100	50	Cat. 3	10	5	Cat. 3
Sulphuric Acid *consult MSDS	2000	1000	Cat. 7	100	50	Cat. 6
Toluene	1000	500	Cat. 6	100	50	Cat. 6
Xylene	1000	500	Cat. 6	100	50	Cat. 6

\*Consult Material Safety Data Sheet for specific Packing Group, PH, Flash Point, and Toxicity levels to assist in identifying the proper material category.

\*\* Threshold indicated is a screening value for Heavy Oil Diluted Bitumen. Due to the range in diluents/solvent concentrations depending on the point in the production process, a more detailed calculation based on API Table 1 & 2 footnote may be used based on the summation of fraction threshold for the diluents/solvent and the Bitumen under consideration.

NOTE: For liquids with flashpoint > 60C, chart assumes release at a temperature below flashpoint. Refer to OGP 456 Tables B-4, B-5 & B-6 located in Appendix B and/or API 754 Tables 1 & 2 located in Appendix C for any materials not shown above, as well as precise thresholds when flashpoints are a consideration.

## Appendix A - OGP Table B-4 PSE Classification Guide – Tier 1 & 2 Threshold Quantities\*

**Table B-4 (of 6): Non-Toxic Material Release Threshold Quantities for LOPC**

LOPC is recordable as a PSE only when release is 'acute', i.e. exceeds a threshold quantity in any one hour period. PSE Tier is highest of all that apply	Tier 1 (Categories below refer to API/ANSI standard RP 754)		Tier 2 (Categories below refer to API/ANSI standard RP 754)	
	Outdoor release	Indoor release	Outdoor release	Indoor release
<b>Material hazard classification (with example materials)</b>				
Flammable Gases – e.g. <ul style="list-style-type: none"> <li>methane, ethane, propane, butane,</li> <li>natural gas</li> <li>ethyl mercaptan</li> </ul>	500 kg (1,100 lb) (Cat.5)	250 kg (550 lb) (Cat.5)	50 kg (110 lb) (Cat.5)	25 kg (55 lb) (Cat.5)
Flammable Liquids with Boiling Point ≤ 35°C (95°F) and Flash Point < 23°C (73°F) – e.g. <ul style="list-style-type: none"> <li>liquefied petroleum gas (LPG),</li> <li>liquefied natural gas (LNG)</li> <li>isopentane</li> </ul>	500 kg (1,100 lb) (Cat.5)	250 kg (550 lb) (Cat.5)	50 kg (110 lb) (Cat.5)	25 kg (55 lb) (Cat.5)
Flammable Liquids with Boiling Point > 35°C (95°F) and Flash Point < 23°C (73°F) – e.g. <ul style="list-style-type: none"> <li>gasoline/petrol, toluene, xylene,</li> <li>condensate</li> <li>methanol</li> <li>&gt; 15 API Gravity crude oils (unless actual flashpoint available)</li> </ul>	1,000 kg (2,200 lb) or 7 bbl (Cat.6)	500 kg (1,100 lb) or 3.5 bbl (Cat.6)	100 kg (220 lb) or 1 bbl (Cat.6)	50 kg (110 lb) or 0.5 bbl (Cat.6)
Combustible Liquids with Flash Point ≥ 23°C (73°F) and ≤ 60°C (140°F) – e.g. <ul style="list-style-type: none"> <li>diesel, most kerosenes,</li> <li>&lt; 15 API Gravity crude oils (unless actual flashpoint available)</li> </ul>	2,000 kg (4,400 lb) or 14 bbl (Cat.7)	1,000 kg (2,200 lb) or 7 bbl (Cat.7)	100 kg (220 lb) or 1 bbl (Cat.6)	50 kg (110 lb) or 0.5 bbl (Cat.6)
Liquids with Flash Point > 60°C (140°F) released at a temperature at or above its flash point – e.g. <ul style="list-style-type: none"> <li>asphalts, molten sulphur,</li> <li>ethylene glycol, propylene glycol</li> <li>lubricating oil</li> </ul>	2,000 kg (4,400 lb) or 14 bbl (Cat.7)	1,000 kg (2,200 lb) or 7 bbl (Cat.7)	100 kg (220 lb) or 1 bbl (Cat.6)	50 kg (110 lb) or 0.5 bbl (Cat.6)
Liquids with Flash Point > 60°C (140°F) released at a temperature below its flash point – e.g. <ul style="list-style-type: none"> <li>asphalts, molten sulphur,</li> <li>ethylene glycol, propylene glycol</li> <li>lubricating oil</li> </ul>	Not applicable	Not applicable	1,000 kg (2,200 lb) or 10 bbl (Cat.7)	500 kg (1,100 lb) or 5 bbl (Cat.7)

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## Appendix A cont. - OGP Table B-5 PSE Classification Guide – Tier 1 & 2 Threshold Quantities\*

Table B-5 (of 6): Toxic Material Release Threshold Quantities for LOPC

LOPC is recordable as a PSE only when release is "acute" i.e. exceeds a threshold quantity in any one hour period. PSE Tier is highest of all that apply	Tier 1 (Categories below refer to API/ANSI standard RP 754)		Tier 2 (Categories below refer to API/ANSI standard RP 754)	
	Outdoor release	Indoor release	Outdoor release	Indoor release
<b>Material hazard classification (with example materials)</b> TIH Hazard Zone A materials – includes: <ul style="list-style-type: none"> <li>acrolein (stabilised)</li> <li>bromine</li> </ul>	5 kg (11 lb) (Cat.1)	2.5 kg (5.5 lb) (Cat.1)	0.5 kg (1 lb) (Cat.1)	0.25 kg (0.5 lb) (Cat.1)
TIH Hazard Zone B materials – includes: <ul style="list-style-type: none"> <li>hydrogen sulphide (H<sub>2</sub>S),</li> <li>chlorine (Cl<sub>2</sub>)</li> </ul>	25 kg (55 lb) (Cat.2)	12.5 kg (27.5 lb) (Cat.2)	2.5 kg (5.5 lb) (Cat.2)	1.3 kg (2.8 lb) (Cat.2)
TIH Hazard Zone C materials – includes: <ul style="list-style-type: none"> <li>sulphur dioxide (SO<sub>2</sub>)</li> <li>hydrogen chloride (HCl)</li> </ul>	100 kg (220 lb) (Cat.3)	50 kg (110 lb) (Cat.3)	10 kg (22 lb) (Cat.3)	5 kg (11 lb) (Cat.3)
TIH Hazard Zone D materials – includes: <ul style="list-style-type: none"> <li>ammonia (NH<sub>3</sub>)</li> <li>carbon monoxide (CO)</li> </ul>	200 kg (440 lb) (Cat.4)	100 kg (220 lb) (Cat.4)	20 kg (44 lb) (Cat.4)	10 kg (22 lb) (Cat.4)
Other Packing Group I Materials – includes: <ul style="list-style-type: none"> <li>aluminum alkyls</li> <li>some liquid amines</li> <li>sodium cyanide</li> <li>sodium peroxide</li> <li>hydrofluoric acid (&gt;60% solution)</li> </ul>	500 kg (1,100 lb) (Cat.5)	250 kg (550 lb) (Cat.5)	50 kg (110 lb) (Cat.5)	25 kg (55 lb) (Cat.5)
Other Packing Group II Materials – includes: <ul style="list-style-type: none"> <li>aluminum chloride</li> <li>phenol</li> <li>calcium carbide</li> <li>carbon tetrachloride</li> <li>some organic peroxides</li> <li>hydrofluoric acid (&lt;60% solution)</li> </ul>	1,000 kg (2,200 lb) or 7 bbl (Cat.6)	500 kg (1,100 lb) or 3.5 bbl (Cat.6)	100 kg (220 lb) or 1 bbl (Cat.6)	50 kg (110 lb) or 0.5 bbl (Cat.6)

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## Appendix A cont. - OGP Table B-6 PSE Classification Guide – Tier 1 & 2 Threshold Quantities\*

**Table B-6 (of 6): Other Material Release Threshold Quantities for LOPC**

LOPC is recordable as a PSE only when release is "acute" i.e. exceeds a threshold quantity in any one hour period. PSE Tier is highest of all that apply	Tier 1 (Categories below refer to API/ANSI standard RP 754)		Tier 2 (Categories below refer to API/ANSI standard RP 754)	
	Outdoor release	Indoor release	Outdoor release	Indoor release
<b>Material hazard classification (with example materials)</b>				
Other Packing Group III materials – includes: <ul style="list-style-type: none"> <li>• sulphur</li> <li>• lean amine</li> <li>• calcium oxide</li> <li>• activated carbon</li> <li>• chloroform</li> <li>• some organic peroxides</li> <li>• sodium fluoride</li> <li>• sodium nitrate</li> </ul>	2,000 kg (4,400 lb) or 14 bbl (Cat.7)	1,000 kg (2,200 lb) or 7 bbl (Cat.7)	100 kg (220 lb) or 1 bbl (Cat.6)	50 kg (110 lb) or 0.5 bbl (Cat.6)
Strong Acids or Bases – includes: <ul style="list-style-type: none"> <li>• sulphuric acid, hydrochloric acid</li> <li>• sodium hydroxide (caustic)</li> <li>• calcium hydroxide (lime)</li> </ul>	2,000 kg (4,400 lb) or 14 bbl (Cat.7)	1,000 kg (2,200 lb) or 7 bbl (Cat.7)	100 kg (220 lb) or 1 bbl (Cat.6)	50 kg (110 lb) or 0.5 bbl (Cat.6)
Moderate Acids or Bases – includes: <ul style="list-style-type: none"> <li>• diethylamine (corrosion inhibitor)</li> </ul>	None	None	1,000 kg (2,200 lb) or 10 bbl (Cat.7)	500 kg (1,100 lb) or 5 bbl (Cat.7)

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**API 754 defines moderate and strong Acids and Bases as follows\*\*:**

**Moderate Acids/Bases:** Substances with a pH  $\geq 1$  and  $< 2$  or pH  $> 11.5$  and  $\leq 12.5$ .

**Strong Acids/Bases:** Substances with a pH  $< 1$  or  $> 12.5$

**Toxicity levels listed on the MSDS can also be reference to help determine the material packing group. \*\***

Packing Group	Oral toxicity	Dermal Toxicity	Inhalation Toxicity by Dusts and Mists
	LD50(mg/kg)	LD 50 (mg/kg)	LC50 (mg/L)
I	$< 5.0$	$< 50$	$< 0.2$
II	$> 5.0$ and $\leq 50$	$> 50$ and $\leq 200$	$> 0.2$ and $< 2.0$
III	$> 50$ and $\leq 300$	$> 200$ and $\leq 1000$	$> 2.0$ and $\leq 4.0$

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**For further assistance with Process Safety Event Classification**

Contact your local Gatekeeper or Subject Matter Expert. (SME)

Additionally, you may contact:

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## Document Control History

Date	Issue	Description	Author
Apr-12	1	<ul style="list-style-type: none"> <li>Document creation. The Global OGP/API 2012 Classification Guidance is derived from, and replaces, previous UA and UI classification guidance documents for global alignment.</li> </ul>	Sarah Davies
Nov 2012	2	<ul style="list-style-type: none"> <li>Added several materials for PT and Wells (eg. OBMs)</li> <li>Removed Note 10, Pg 3. <i>"Releases through properly designed and operated Pressure Relief Devices (PRDs) and downstream destructive devices (i.e. flare systems) per API 521 are not included."</i> This note is a carryover from an earlier edition of the API Guidance. The later guidance was redesigned and this earlier notation was causing confusion. Refer now to the Decision Logic Tree (Pg. 2) regarding PRD discharges whereby if the resulting release in the adverse consequence box, i.e. one of the four consequences listed, then it should be included for reporting purposes.</li> <li>Amended Note 1, 2 &amp; 8; Removed references to API to avoid confusion as Upstream reports against OGP. Both API/OGP guidance documents are used in making classifications and are referenced in this guide.</li> <li>Amended Note 8; updated definition of LOPC.</li> <li>Amended Note 7; updated wording to include Quick/Full Listings that are located within the document.</li> <li>Amended Definitions, Bullet 3, to include definition of 'Indoor'.</li> <li>Updated entire document where relevant to include 2013 – No changes to PMR from 2012.</li> <li>Updated several grammatical errors.</li> <li>Updated from "Restricted and Confidential" to "Restricted – Shell internal use only" so Contractors are able to use document accordingly.</li> </ul>	Sarah Norton  (previously Davies)
Dec 2013	3.0	<ul style="list-style-type: none"> <li>Added 'Applicability to Wells' Page 6</li> <li>Added "Applicability to Oilsands Mining Bitumen" Page 7</li> <li>Added "Applicability to Marine Transport" Page 8</li> <li>Removed Quick Reference material page – redundant</li> <li>Updated guide for 2014</li> <li>Added page on FIM entry and required fields Page 4</li> <li>Added Sulfinol</li> <li>Grammatical corrections</li> </ul>	Sarah Norton
April 2015	4.0	<ul style="list-style-type: none"> <li>Format change from PPT to WORD Doc.</li> <li>Added clarification on In and Out of Scope. Page 3</li> <li>Added Unit of measure to Required information for PSE. Page 8</li> <li>Added Injuries associated with LOPC to Required information PSE. Page 8</li> <li>Removed Best Practice Section as this is included in the FIM First Report Quick Ref. Guide.</li> <li>Modification to the Applicability to Wells to the details of reporting scope Page 9</li> <li>Definition of Direct cost to include that it is equally applicable to contracted units. Page 4</li> <li>Included footnote on Diluted Bitumen thresholds</li> <li>Included in note 11 "Consult Material Safety Data Sheet for specific Packing Group , PH, Flash Point, and Toxicity levels to assist in identifying the proper material category, and relevant threshold release quantities". Page 4</li> <li>Included Toxicity levels chart Page 18</li> <li>Included definition of strong/moderate acids and bases Page 18</li> </ul>	Andrea Garner