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PETRONAS


PETRONAS GUIDELINE ON HSE KPI DEFINITION AND REPORTING

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EXECUTIVE SUMMARY

PETRONAS Guideline on HSE KPI DEFINITION AND REPORTING for PPGUA 4.1 has been developed in collaboration with PETRONAS Group, provides information and serves as a guidance for Petroleum Arrangement (PA) Contractors for HSE KPI definition and reporting. This document also forms an integral part of expectation requirement on Health, Safety and Environment (HSE) provision under PPGUA 4.1 Volume 3 (Health, Safety, Security and Environment)

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ACKNOWLEDGEMENT

Malaysia Petroleum Management, Health Safety & Environment (MPM HSE) would like to express our gratitude to Petroleum Arrangement Contractor (PAC), PETRONAS Group HSE and PETRONAS Upstream HSE for the development of this guideline.

LANGUAGE CONVENTIONS

In this document, the recommendations for a course of action are made with varying degrees of emphasis. As a rule:

- i. **'shall'** indicates a course of action with a required, mandatory status within the Business Units or Assets. The English language equivalent or interchangeable term of "shall" is "must."
- ii. **'should'** indicates a preferred course of action.
- iii. **'may'** indicates a possible course of action.

1.0 OBJECTIVE

- 1.1 The objective of this document is to standardize the definition of HSE KPIs and other reporting for reporting to MPM. The standardization is due to the increasing numbers of Petroleum Arrangement Contractors (PACs) in Malaysia where MPM experiences inconsistent practices by different contractors in defining the various HSE KPIs which may give impact to the statistics for upward reporting within and outside PETRONAS.
- 1.2 This guideline shall be read together with PETRONAS Procedures and Guidelines for Upstream Activities (PPGUA) Volume 3, latest Revision 4,

2.0 SCOPE OF DOCUMENT

- 2.1 The scope of this document covers all activities carried out by PACs under their contractual obligations to PETRONAS. This guideline shall apply to all PACs.
- 2.2 This document is divided into 5 sections which cover General, Occupational Safety and Health, Process Safety, Environment and Others. The new revision of this guideline not only provides clearer definition of each HSE KPI but also defines the method, unit, reporting level and applicability of each HSE KPIs.
- 2.3 Malaysia Petroleum Management (MPM) HSE will do the monitoring on PACs' HSE Performance submission in MyHSE.

3.0 CUSTODIAN

MPM HSE, PETRONAS is the custodian of this document and may revise and update the document and distribute the controlled copies to relevant parties as and when required.

4.0 PROCESS**4.1 HSE Performance Reporting Process**

- 4.1.1 PACs shall utilise the online reporting tool (i.e., Incident Management and HSSE Monitoring & Reporting) for reporting of HSSE performance.
- 4.1.2 In the event of an incident with impact to several consequences, all consequences will be counted in HSSE scorecard. For an incident with impact to more than one personnel, the total number of personnel impacted shall be counted in HSSE scorecard.
- 4.1.3 In cases where there is incident with multiple outcomes e.g. fire resulted from Lost of Primary Containment, each outcome should be reported and recorded individually for statistical purposes.

5.0 HSSE PERFORMANCE INDICATORS DEFINITION AND METHOD

Definition for each HSSE performance indicators and method for measurement and calculation is explained in detail as follows:

5.1 GENERAL**5.1.1 Man-Hours**

Classification	Not Applicable
Definition	<ul style="list-style-type: none"> Number of hours worked including overtime, training and other business activity but excluding leave sickness and other absences. The basic calculation on Man-Hours is shown in Table 1. Contractor's man-hours shall be based on the mode of the contract as shown in Table 2.
Unit	<ul style="list-style-type: none"> Number of Man-Hours
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	<ul style="list-style-type: none"> Refer to Table 1: The basic calculation of Man-Hours
Reference	-

Table 1: Basic calculation of Man-Hours

No.	Activities	Working hours	Number of working days per month	Total man-hours per month
1	Office Base	8 Hours + OT	22 Days	176 hours per person + OT
2	Production Operations	12 Hours + OT	14 Days	168 hours per person + OT
3	Drilling (Project Team at site)	12 Hours + OT	30 Days	360 hours per person + OT
4	Construction/fabrication (Project Team at site)	10 Hours + OT	26 Days	260 hours + OT per person + OT
5	Construction/fabrication (Project Management Team at site)	10 Hours + OT	22 Days	220 hours + OT per person + OT
6	Marine Operations, Seismic Operations, Installation and Hook-up & Commissioning (Project Team at site)	12 Hours + OT	30 Days	360 hours + OT per person + OT

Table 2: Definition of Modes of Contract

Mode of Contract	Details	Man-Hours Status
Mode 1	The contractor provides people, processes and tools for the execution of the contract under the supervision, instructions and HSE-MS of the PAC.	Contractor's Man-Hours shall be captured by PAC and all incident are classified as recordable
Mode 2	The contractor executes all aspects of the contract under its own HSE-MS, providing the necessary instructions and supervision and verifying the proper functioning of its HSE-MS. The PAC is responsible for verifying the overall effectiveness of the HSE management controls put in place by the contractor, including its interface with subcontractors, and assuring that both the client's and the contractor's HSE-MS are compatible.	Contractor's Man-Hours shall be captured by PAC and all incident are classified as recordable
Mode 3	Contractor operates within its own HSE-MS that has no interfaces with the PAC HSE-MS and is not required to report HSE performance data including incidents to the client.	Contractor's Man-Hours shall not be captured by PAC and all incidents are classified as non-recordable.

5.1.2 Near Miss

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> An undesired event which potentially could have caused Injury or Occupational Illness and / or damage (loss) to people, assets, the environment or reputation.
Unit	<ul style="list-style-type: none"> Number of Near Miss
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	-
Reference	-

5.1.3 High Potential Incident

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> An incident or near miss incident which the combination of potential consequences (People, Environment, Asset and/or Reputation) and likelihood is assessed to be in the red area of the Risk Assessment Matrix.
Unit	<ul style="list-style-type: none"> Number of High Potential Incident
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	<ul style="list-style-type: none"> PACs shall refer to PACs Risk Assessment Matrix
Reference	-

5.1.4 Unsafe Act / Unsafe Condition (UAUC)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<p>a. Unsafe Act</p> <ul style="list-style-type: none"> An action that increases the chance of injury to himself or others, property damage or environmental impact through deviation of established HSE Rules/Regulations, Procedures, Practices. <p>b. Unsafe Condition</p> <ul style="list-style-type: none"> Situations directly or indirectly caused by action or inaction of employee that may lead to an accident.
Unit	<ul style="list-style-type: none"> Number of UAUC Analysis of UAUC root causes
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Number of UAUC/Monthly To submit PAC Analysis of UAUC root causes/Quarterly
Method	-
Reference	-

5.1.5 Major Non-Process Fire/Explosion

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> A fire/explosion incident happened within the facility including office/accommodation area and <u>not</u> as a result from any LOPC from process equipment (no direct involvement with process equipment). Fire is defined as a result of combustion, ignition or heating which releases heat, light and or smoke and may accompanied by flame. This includes explosion due to the escalation of fire incident (as a result of heating), or sudden release of energy e.g., pressure, mechanical or chemical. Fires or explosions resulting in <u>greater than or equal</u> to USD 100,000 of direct cost to the company
Unit	<ul style="list-style-type: none"> Number of Major Non-Process Fire/Explosion
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	<ul style="list-style-type: none"> Estimate direct cost of fire or explosion and report the value if the cost is <u>greater than or equal</u> to USD 100,000. <p>Direct Cost:</p> <ul style="list-style-type: none"> Cost of repairs or replacement, clean up, material disposal, environmental remediation and emergency response. Direct cost does <u>not</u> include cost, for business opportunity, business interruption and feedstock/product

Classification	Key Performance Indicator (Lagging Indicator)
	<p>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.</p> <ul style="list-style-type: none"> ○ Direct cost does <u>not</u> include the cost of the failed component leading to LOPC, if the component is not further damaged by the fire or explosion.
Reference	<ul style="list-style-type: none"> • OGP Recommended Practice on Key Performance Indicators

5.1.6 Minor Non-Process Fire Explosion

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> A fire / explosion incident happened within the facility including office/accommodation area and <u>not</u> as a result from any LOPC from process equipment (no direct involvement with process equipment). Fire is defined as a result of combustion, ignition or heating which releases heat, light and or smoke and may accompanied by flame. This includes explosion due to the escalation of fire incident (as a result of heating), or sudden release of energy e.g., pressure, mechanical or chemical. Fires or explosions resulting in <u>less than</u> USD 100,000 of direct cost to the company
Unit	<ul style="list-style-type: none"> Number of Minor Non-Process Fire/Explosion
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	<ul style="list-style-type: none"> Estimate direct cost of fire or explosion and report the value if the cost is <u>less than</u> to USD 100,000. <p>Direct Cost:</p> <ul style="list-style-type: none"> Cost of repairs or replacement, clean-up, material disposal, environmental remediation and emergency response. Direct cost does <u>not</u> include cost, for business opportunity, business interruption and feedstock/product

Classification	Key Performance Indicator (Lagging Indicator)
	<p>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.</p> <ul style="list-style-type: none"> ○ Direct cost does <u>not</u> include the cost of the failed component leading to LOPC, if the component is not further damaged by the fire or explosion.
Reference	<ul style="list-style-type: none"> • OGP Recommended Practice on Key Performance Indicators

5.1.7 Major Property Damage

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> An incident that caused damage to property and the total direct cost incurred to the company is or more than USD 25,000.
Unit	<ul style="list-style-type: none"> Number of Major Property Damage
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	<u>Direct Cost:</u> <ul style="list-style-type: none"> Cost of repairs or replacement, clean-up, material disposal, environmental remediation and emergency response. Direct cost does <u>not</u> include cost, for 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.
Reference	-

5.1.8 Minor Property Damage

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> An incident that caused damage to property and the total direct cost incurred to the company is less than USD 25,000.
Unit	<ul style="list-style-type: none"> Number of Minor Property Damage
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	<u>Direct Cost:</u> <ul style="list-style-type: none"> Cost of repairs or replacement clean up, material disposal, environmental remediation, and emergency response. Direct cost does <u>not</u> include cost, for 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.
Reference	-

Note:

In cases where there is incident with multiple outcomes e.g., fire resulted to injuries/property damage, each individual outcome should be reported and recorded individually for statistical purposes.

5.2 OCCUPATIONAL SAFETY AND HEALTH**5.2.1 Fatality**

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> A death due to work related injury or occupational illness, regardless of the time intervening between the incident causing the injury or exposure or causing illness and the death.
Unit	<ul style="list-style-type: none"> Number of Fatality (injury) Number of Fatality (illness)
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	-
Reference	<ul style="list-style-type: none"> Guidelines on Safety and Health (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease) Regulations 2004 [NADOPOD]

5.2.2 Permanent Total/ Partial Disability (PTD/PPD)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<p>a. Permanent Total Disability (PTD)</p> <ul style="list-style-type: none"> A work-related injury or illness which incapacitates a person permanently and results in termination of employment. <p>b. Permanent Partial Disability (PPD)</p> <ul style="list-style-type: none"> A work-related injury or illness which results in the complete loss or permanent loss of use of any member or part of the body or any permanent impairment of functions of parts of the body, regardless of any pre-existing disability of the injured member or impaired body function.
Unit	<ul style="list-style-type: none"> Number of PTD (injury) Number of PTD (illness) Number of PPD (injury) Number of PPD (illness)
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	-
Reference	Guidelines on Safety and Health (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease) Regulations 2004 [NADOPOD]

5.2.3 Lost Workday Case (LWC)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> A work-related injury or illness which renders the injured person temporarily unable to perform any Regular Job or Restricted Work on any day after the day on which the injury was received. In this case "any day" includes rest day, weekend day, scheduled holiday, public holiday or subsequent day after ceasing employment.
Unit	<ul style="list-style-type: none"> Number of cases <ul style="list-style-type: none"> Number of LWC (injury) Number of LWC (illness) Number of lost workdays (for each LWC) e.g. <ul style="list-style-type: none"> LWC#1 (dd/mm/yy): <i>a</i> lost workdays LWC#2 (dd/mm/yy): <i>b</i> lost workdays
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	-
Reference	Guidelines on Safety and Health (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease) Regulations 2004 [NADOPOD]

5.2.4 Restricted Workday Case (RWC)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> A work-related injury or illness that results in the person being incapable to perform all of the normal duties of the person's regular job on any day/shift subsequent to the day of the injury or illness occurring.
Unit	<ul style="list-style-type: none"> Number of RWC (injury) Number of RWC (illness)
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	-
Reference	Guidelines on Safety and Health (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease) Regulations 2004 [NADOPOD]

5.2.5 Medical Treatment Case (MTC)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> A work-related injury or illness that involves neither Lost Workdays nor Restricted Workdays, but which requires treatment by, or under the specific order of, a physician or could be considered as being in the province of a physician.
Unit	<ul style="list-style-type: none"> Number of MTC (injury) Number of MTC (illness)
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	-
Reference	Guidelines on Safety and Health (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease) Regulations 2004 [NADOPOD]

5.2.6 First Aid Case (FAC)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> • A one-time treatment and subsequent observation of minor scratches, cuts, burns, splinters, and so forth, which do not ordinarily require medical care. Such treatment and observation are considered first aid even though provided by registered medical personnel. • Examples of first aid cases are, but not limited to tetanus immunization, cleaning, flushing, soaking surface wounds, wound covering, hot or cold therapy, non-rigid support, eye patches, drilling fingernail or toenail, draining fluid from blister, massages, non-prescription medication at non-prescription strength and preventive administration of oxygen in the absence of symptom.
Unit	<ul style="list-style-type: none"> • Number of FAC (injury) • Number of FAC (Illness)
Applicability	<ul style="list-style-type: none"> • All PACs
Frequency	<ul style="list-style-type: none"> • Monthly
Method	-
Reference	<ul style="list-style-type: none"> • OGP Recommended Practice on Key Performance Indicators • Guidelines on Safety and Health (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease) Regulations 2004 [NADOPOD]

5.2.7 Lost Time Injury (LTI)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> The sum of Fatality, Permanent Partial Disability, Permanent Total Disability and Lost Workday Case but excluding Restricted Work Case and Medical Treatment Case. <p>Note:</p> <ul style="list-style-type: none"> LTI will be monitored by injury and illness separately. LTI (Injury) will maintain as PAC Limit.
Unit	<ul style="list-style-type: none"> Number of LTI
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	<p>LTI (injury) = Fatality + PPD + PTD + LWC</p> <p>LTI (illness) = Fatality + PPD + PTD + LWC</p>
Reference	<ul style="list-style-type: none"> OGP Recommended Practice on Key Performance Indicators Guidelines on Safety and Health (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease) Regulations 2004 [NADOPOD]

5.2.8 Total Recordable Case (TRC)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> The sum of Fatality, Permanent Partial Disability, Permanent Total Disability, Lost Workday Case, Restricted Work Case and Medical Treatment Case.
Unit	<ul style="list-style-type: none"> Number of TRC (injury)
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	$\text{TRC (injury)} = \text{Fatality} + \text{PPD} + \text{PTD} + \text{LWC} + \text{RWC} + \text{MTC}$
Reference	OGP Recommended Practice on Key Performance Indicators

5.2.9 Total Recordable Occupational Illness (TROI)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> • An occupational illness identified or suspected or diagnosed by the Occupational Health Doctor (OHD) in a given period of time. • Occupational illness: An abnormal health condition or disorder (physical or mental) that is caused by aggravated exposure to environmental factors assisted.
Unit	<ul style="list-style-type: none"> • Number of TROI
Applicability	<ul style="list-style-type: none"> • Producing PACs & Contractors
Frequency	<ul style="list-style-type: none"> • Monthly
Method	<ul style="list-style-type: none"> • Count the total number of Total Recordable Occupational Illness
Reference	-

5.2.10 Fatality Accident Rate (FAR)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> Rate of total number of recordable fatalities (staff, contractor and third party) from all incidents per one hundred million man-hours.
Unit	<ul style="list-style-type: none"> Value of FAR
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> PACs to monitor internally. MPM will verify during audit or request as and when required.
Method	<ul style="list-style-type: none"> $\text{FAR} = \frac{(\text{Fatality} \times 100,000,000)}{\text{Total Exposure Work Hours}}$
Reference	-

5.2.11 Lost Time Injury Frequency (LTIF)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	Calculated based on number of LTI injuries/illness (Fatality + PPD + PTD+ LWC) and exposure work hour (Employee, Contractor or both)
Unit	<ul style="list-style-type: none"> Value of LTIF (Injury)
Applicability	<ul style="list-style-type: none"> Value of LTIF (Illness)
Frequency	<ul style="list-style-type: none"> PACs to monitor internally. MPM will verify during audit or request as and when required.
Method	<ul style="list-style-type: none"> $LTIF = \frac{LTI \times 1,000,000}{\text{Total Exposure Work Hours}}$
Reference	-

5.2.12 Total Recordable Case Frequency (TRCF)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> Calculated based on number of total recordable injury cases (Fatality, PPD, PTD, LWC, RWC & MTC) and exposure work hour (Employee, Contractor or both)
Unit	<ul style="list-style-type: none"> Value of TRCF (Injury)
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> PACs to monitor internally. MPM will verify during audit or request as and when required.
Method	$\text{TRCF} = \frac{(\text{TRC} \times 1,000,000)}{\text{Total Exposure Work Hours}}$
Reference	-

**5.2.13 Total Recordable Occupational Illness Frequency
(TROIF)**

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> Calculated based on number Occupational Illnesses per million man-hours
Unit	<ul style="list-style-type: none"> Value of TROIF
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> PACs to monitor internally. MPM will verify during audit or request as and when required.
Method	$\text{TROIF} = \frac{\text{TROI} \times 1,000,000}{\text{Total Exposure Work Hours}}$
Reference	-

5.3 Industrial Hygiene and Occupational Health**5.3.1 Completion of Planned HRA versus Actual**

Classification	Performance Indicator (Leading Indicator)
Definition	<ul style="list-style-type: none"> Number of HRA completed versus the number of planned HRA in the year The HRA is defined as an assessment of health risk from chemical, physical, biological, ergonomic and psychosocial hazards in accordance to the industry recognized risk assessment methodology.
Unit	<ul style="list-style-type: none"> Percentage of completed HRA versus planned HRA in the year.
Applicability	<ul style="list-style-type: none"> Producing PACs
Frequency	<ul style="list-style-type: none"> Quarterly
Method	<ul style="list-style-type: none"> $(\text{No. of completed HRA} / \text{No. Planned HRA}) \times 100\%$ <p>Note:</p> <ul style="list-style-type: none"> Planned HRA inclusive of new HRA and HRA that will expire within the same year of the Petroleum Arrangement Contractors (PACs) facilities.
Reference	-

**5.3.2 Completion of Planned Annual Exposure Monitoring
(include all health hazard)**

Classification	Performance Indicator (Leading Indicator)
Definition	<ul style="list-style-type: none"> Number of annual exposure monitoring completed versus the number of planned annual exposure monitoring in the year. The exposure monitoring is defined as a validated quantitative measurement of exposure to health hazards such as chemical, physical and biological based on outcome of risk assessment and regulatory requirement.
Unit	<ul style="list-style-type: none"> Percentage of completed annual exposure monitoring conducted versus planned annual exposure monitoring in the year.
Applicability	<ul style="list-style-type: none"> Producing PACs
Frequency	<ul style="list-style-type: none"> Quarterly
Method	<ul style="list-style-type: none"> (No. of completed annual exposure monitoring/ No. of planned annual exposure monitoring) x 100% <p>Note:</p> <ul style="list-style-type: none"> The annual exposure monitoring is based on all the identified exposure monitoring in HRA in that year of PACs facilities.
Reference	-

5.3.3 Medical Surveillance

Classification	Performance Indicator (Leading Indicator)
Definition	<ul style="list-style-type: none"> Percentage of Medical Surveillance testing done among at-risk staff versus planned for the reporting period. Medical Surveillance: The periodic screening of a defined population for a specific disease or for biological markers of exposure for which the population is, or may be, at risk from their exposure to specific health hazards (e.g. noise, benzene, mercury, radiation etc.).
Unit	<ul style="list-style-type: none"> Number of completed Medical Surveillance conducted Number of planned Medical Surveillance testing in the year Percentage of completed Medical Surveillance conducted in versus the number of planned Medical Surveillance testing in the year
Applicability	<ul style="list-style-type: none"> Producing PACs Employee ONLY However, PAC are required to provide the numbers of workers who is exposed to the significant hazards individually to MPM if required.
Frequency	<ul style="list-style-type: none"> Yearly
Method	<ul style="list-style-type: none"> Count all at-risk staff identified to undergo medical surveillance for the reporting period. Count actual medical surveillance done and planned for the reporting period
Reference	-

5.3.4 Positive Medical Surveillance Results

Classification	Performance Indicator (Leading Indicator)
Definition	<ul style="list-style-type: none"> Percentage of new cases with positive biological/biological effect monitoring results among at-risk staff identified in the surveillance program for the reporting period. Medical Surveillance: The periodic screening of a defined population for a specific disease or for biological markers of exposure for which the population is, or may be, at risk from their exposure to specific health hazards (e.g. noise, benzene, mercury, etc.). New cases: Positive lab results for biological/biological effect monitoring. This excludes subsequent positive results obtained from monitoring of the same case related to original exposure in particular employee.
Unit	$\left(\frac{\text{Number of positives medical surveillance cases}}{\text{Number of medical surveillance done}} \right) \times 100\%$ <ul style="list-style-type: none"> Number of positive medical surveillance case Number of medical surveillances done
Applicability	<ul style="list-style-type: none"> Producing PACs Employee ONLY However, PAC are required to provide the numbers of workers who is exposed to the significant hazards individually to MPM if required. Provide details such as Medical Removal Protection or Permanent Threshold Shift.
Frequency	<ul style="list-style-type: none"> Yearly
Method	<ul style="list-style-type: none"> Count all at-risk staff identified to undergo medical surveillance for the reporting period.

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Classification	Performance Indicator (Leading Indicator)
	<ul style="list-style-type: none">Count actual medical surveillance done and planned for the reporting period
Reference	-

5.3.5 Substance Misuse Control Programme

Classification	Performance Indicator (Leading Indicator)
Definition	<ul style="list-style-type: none"> Percentage of employees/contractors undergoing random/mass screening in relation to the target population for the year.
Unit	<ul style="list-style-type: none"> Target population = Minimum 5% of PAC employees contributing to annual total reportable manhours.
Applicability	<ul style="list-style-type: none"> Producing PACs
Frequency	<ul style="list-style-type: none"> Quarterly
Method	<ul style="list-style-type: none"> Number of tests conducted the test (test can be employee/contractors) Number of target population for the year
Reference	-

5.4 Environment**5.4.1 Major Spill**

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> The number of any unplanned or uncontrolled releases of Hydrocarbon (crude oil, diesel, condensate) or Chemical (excluding gaseous releases) in the form of liquids or solids, associated with current operations, from primary or secondary containment, into the environment: <ul style="list-style-type: none"> that is more than or equals 5bbls; OR with volume less than 5bbls, but resulted in major environmental impact or happens within environmentally sensitive area. Refer to Appendix 5. (Note: Environment in this context refers to soil and any water body) The corresponding volume of the individual major spill
Unit	<ul style="list-style-type: none"> Number of Major Spill of Hydrocarbon (crude oil, diesel, condensate) or Chemical Volume of Major Spill in bbl(s) (for each incident)
Applicability	<ul style="list-style-type: none"> Monthly

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Classification	Key Performance Indicator (Lagging Indicator)
Frequency	<ul style="list-style-type: none">• All PACs
Method	<ul style="list-style-type: none">• Count and report number of major spills as defined above• Calculate total volume of the individual spill
Reference	-

5.4.2 Minor Spill

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> The number of any unplanned or uncontrolled releases of hydrocarbon (crude oil, diesel, condensate) or Chemical (excluding gaseous releases) in the form of liquids or solids, associated with current operations, from primary or secondary containment, into the environment with volume less than 5 bbls, unless it resulted in major environmental impact or happens within environmentally sensitive area (Note: Environment in this context refers to soil and any water body.) The corresponding volume of the individual minor spill
Unit	<ul style="list-style-type: none"> Number of Minor Spill of hydrocarbon (crude oil, diesel, condensate) or Chemical Volume of Minor Spill in bbl(s) (for each incident)
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	<ul style="list-style-type: none"> Count and report number of minor spill(s) as defined above Calculate total volume of the individual spill(s)
Reference	-

5.4.3 Produced Water Discharge Volume and Quality (Oil and Grease and Mercury*)

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> Produced Water Discharged Volume: The total volume of produced water being discharged. Oil and Grease: Averaged concentration of oil and grease content in the produced water discharged *Mercury: Averaged concentration of mercury content in the produced water discharged, only applicable for facilities with Mercury in production stream
Unit	<ul style="list-style-type: none"> Produced Water Discharged Volume: m³ Averaged Oil and Grease in Water content: mg/l Averaged Mercury content: mg/l
Applicability	<ul style="list-style-type: none"> Producing PACs with produced water discharged facilities
Frequency	<ul style="list-style-type: none"> Monthly
Method	<p>Averaged Concentration:</p> <ul style="list-style-type: none"> Determine the averaged oil and grease in water concentration and mercury concentration (unit: mg/l) in the produced water sample (via laboratory analysis). $\text{Averaged Concentration} = \left(\frac{\text{total } (C_{OIW \text{ or } Hg} \times V_{PW})}{\text{total } V_{PW}} \right)$ <p>COIW or Hg = Concentration of Oil in Water or Mercury from the individual produced water discharged facilities</p> <p>V_{PW} = Volume of Produced Water Discharged</p> <p>Volume of Produced Water Discharged</p>

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Classification	Key Performance Indicator (Lagging Indicator)
	<ul style="list-style-type: none">Summation of daily volume of produced water discharged for 1 month
Reference	PETRONAS E&P Minimum Environmental Specification, Rev 3, October 2019.

5.4.4 Quantities of Greenhouse Gas (GHG) Emission

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> • Flaring Volume • Venting Volume • Total Production • Quantities of Greenhouse Gas Emissions from the following sources: <ol style="list-style-type: none"> 1. Scope 1 Direct Emissions: <ul style="list-style-type: none"> ○ Flaring ○ Venting ○ Combustion – Diesel ○ Combustion – Fuel Gas ○ Acid Gas Removal Unit ○ Glycol Dehydrator ○ Fugitive Emissions ○ Mobile and Transportation ○ Other GHGs 2. Scope 2 Indirect Emissions: <ul style="list-style-type: none"> ○ Emissions from Purchased /sale of Energy (Electricity & Steam) <p>Definitions:</p> <ol style="list-style-type: none"> a. Total Production Volume - To be consistent with International Association of Oil & Gas Producers (IOGP), total production for oil and gas refers to gross hydrocarbon production at the wellhead. b. Flaring – Combustion of unrecoverable gas in a flare stack. c. Venting – Release of unrecoverable gas through a vent. It excludes

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Classification	Key Performance Indicator (Lagging Indicator)
	<p>venting of exhaust gases from combustion.</p> <p>d. Combustion – Emission from stationary combustion sources using fuels i.e., diesel or fuel gas (other than flaring and venting)</p> <p>e. Acid Gas Removal Unit – Emission from treatment of gas to remove acid gases (CO₂ and H₂S)</p> <p>f. Glycol Dehydrator - Emissions of methane resulting from the treatment of gas to remove moisture</p> <p>g. Fugitive Emissions – Emissions from leaks, for example valves, flanges, connectors, open ended lines, etc</p> <p>h. Mobile & Transportation – Emissions from company owned or operated vehicles</p> <p>i. Other GHGs – Emissions of Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur Hexafluoride (SF₆) or Nitrogen Trifluoride (NF₃)</p>
Unit	<ul style="list-style-type: none"> • Flaring Volume - MMscf • Venting Volume - MMscf • Total Production – kBOE (Thousand Barrel of Oil Equivalent) • GHG Emissions - MT CO_{2e} (Metric Tonne)
Applicability	<ul style="list-style-type: none"> • Producing PACs
Frequency	<ul style="list-style-type: none"> • Monthly (By Field)
Method	<ul style="list-style-type: none"> • Flaring volume – Summation of flared gas for 1 month

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Classification	Key Performance Indicator (Lagging Indicator)
	<ul style="list-style-type: none"> • Venting volume – Summation of vented gas for 1 month • Total Production – Summation of gross hydrocarbon production @ well head for 1 month <ul style="list-style-type: none"> ○ 6 MMscf = 1 kBOE ○ 1 kbbl Condensate = 1 kBOE • GHG Emissions - Report the total GHG emitted to the environment. <ul style="list-style-type: none"> ○ Use SANGIA software or other equivalent GHG calculation software. The calculations should be according to the methodologies stipulated in American Petroleum Institute (API) Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry.
Reference	-

5.4.5 Amount of Scheduled Wastes (SW) Generated, Disposed and managed by 3R*

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> Generated: Amount of SW generated for the month per SW code Disposed: Amount of SW disposed for the month per SW code 3R: Amount of SW sent for offsite recovery, reused or recycled for the month per SW code
Unit	<ul style="list-style-type: none"> Metric Tonne (MT)
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	<ul style="list-style-type: none"> Calculate and report the amount of Scheduled Waste generated, disposed and managed by 3R* according to SW code
Reference	<ul style="list-style-type: none"> PETRONAS E&P Minimum Environmental Specifications, Rev 3, October 2019. Environmental Quality (Scheduled Waste) Regulations 2005

**5.4.6 Amount of Technologically Enhanced Naturally Occurred
Radioactive Materials (TENORM) Waste Generated**

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<ul style="list-style-type: none"> Amount of TENORM waste generated for the month
Unit	<ul style="list-style-type: none"> Metric Tonne (MT)
Applicability	<ul style="list-style-type: none"> All PACs
Frequency	<ul style="list-style-type: none"> Monthly
Method	<ul style="list-style-type: none"> Calculate and report amount of waste classified under TENORM waste.
Reference	-

5.5 Process Safety**5.5.1 Major Loss of Primary Containment (LOPC) – Tier 1**

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<p>Major LOPC is an unplanned or uncontrolled release of any material from primary containment, including non-toxic and non-flammable materials (e.g., steam, hot water, nitrogen, compressed CO₂, or compressed air), that resulted in one or more of the consequences listed below:</p> <ul style="list-style-type: none"> • An employee, contractor or subcontractor “days away from work” injury and/or fatality. • A hospital admission and/or fatality of a third-party. • An officially declared community evacuation or community shelter-in-place including precautionary community evacuation or community shelter-in-place. • An engineered pressure relief (e.g., PRD, SIS, or manually initiated emergency depressure) discharge, of a quantity greater than or equal to the Tier 1 threshold quantities in Table 1 of API 754 2nd Edition (see Appendix ii) in any one-hour period, to atmosphere whether directly or via a downstream destructive device that results in one or more of the following four consequences: <ul style="list-style-type: none"> – rainout; – discharge to a potentially unsafe location;

Classification	Key Performance Indicator (Lagging Indicator)
	<ul style="list-style-type: none"> - 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. <ul style="list-style-type: none"> • An upset emission from a permitted or regulated source, of a quantity greater than or equal to the Tier 1 threshold quantities in Table 1 of API 754 2nd Edition (see Appendix ii) in any one-hour period, that results in one or more of the following four consequences: <ul style="list-style-type: none"> - 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. • A release of material greater than or equal to the Tier 1 threshold quantities described in in Table 1 of API 754 2nd Edition (see Appendix ii) in any one-hour period.

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Classification	Key Performance Indicator (Lagging Indicator)
	This KPI includes LOPC from process and wells at any phases of operation, e.g., drilling, production, decommissioning, etc.
Unit	Number of major LOPC
Applicability	All PACs
Frequency	Monthly with LOPC supplementary form
Method	<ol style="list-style-type: none"> Count the number of occurrences in the month. Fill up the LOPC supplementary form in Appendix 2 and submit to MPM HSE. <p>Refer to Appendix 3 for the Tier 1/ Tier 2 determination decision logic tree.</p>
Notes	<p>Additional definition of key terms:</p> <ol style="list-style-type: none"> <u>Material</u>. Substance with the potential to cause harm due to its chemical (e.g., flammable, toxic, corrosive, reactive, asphyxiate) or physical (e.g., thermal, pressure) properties. <u>Shelter-in-place</u>. The use of a structure and its indoor atmosphere to temporarily separate individuals from a potentially hazardous outdoor atmosphere. <u>Rainout</u>. Two-phase relief (vapor and entrained liquid) from a vent or relief device with the vapor phase dispersion to the atmosphere and the remaining liquid failing to grade or ground. <u>Destructive device</u>. A flare, scrubber, incinerator, quench drum, or other similar device used to mitigate the potential consequences of an engineered pressure relief (e.g., PRD, SIS or

Classification	Key Performance Indicator (Lagging Indicator)
	<p>manually initiated emergency depressure) device release.</p> <p>e) <u>Process</u>. Production, distribution, storage, utilities or pilot plant facilities used in the manufacture of petrochemical and petroleum refining products. This includes process equipment (e.g., reactors, vessels, piping, furnaces, boilers, pump, compressors, exchangers, cooling towers, refrigeration systems, etc.), storage tanks, active warehouses, ancillary support areas (e.g., boiler houses and waste water treatment plants), on-site remediation facilities, and distribution piping under control of the PAC.</p>
Reference	<ol style="list-style-type: none"> 1. API Recommended Practice 754: Process Safety Performance Indicators for the Refining and Petrochemical Industries, Second Edition, April 2016. 2. Appendix 1: Table 1 – Tier 1 Material Release Threshold Quantities from API Recommended Practice 754, 2nd Edition 3. Appendix 2: LOPC supplementary form 4. Appendix 3: Tier 1/ Tier 2 Determination Decision Logic Tree

5.5.2 Minor Loss of Primary Containment (LOPC) – Tier 2

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<p>Minor LOPC is an unplanned or uncontrolled release of any material from primary containment, including non-toxic and non-flammable materials (e.g., steam, hot water, nitrogen, compressed CO₂, or compressed air), that resulted in one or more of the consequences listed below:</p> <ul style="list-style-type: none"> • An employee, contractor or subcontractor recordable injury. • An engineered pressure relief (PRD, SIS, or manually initiated emergency depressure) device discharge, of a quantity greater than or equal to the Tier 2 threshold quantities in Table 2 of API 754 2nd Edition (see Appendix v) in any one-hour period, to atmosphere whether directly or via a downstream destructive device that results in one or more of the following four consequences: <ul style="list-style-type: none"> - 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.

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Classification	Key Performance Indicator (Lagging Indicator)
	<ul style="list-style-type: none"> • An upset emission from a permitted or regulated source, of a quantity greater than or equal to the Tier 2 threshold quantities in Table 2 of API 754 2nd Edition (see Appendix 4) in any one-hour period, that results in one or more of the following four consequences: <ul style="list-style-type: none"> – 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. • A release of material greater than or equal to the Tier 2 threshold quantities described in in Table 2 of API 754 2nd Edition (see Appendix 4) in any one-hour period. <p>This KPI includes LOPC from process and wells at any phases of operation, e.g., drilling, production, decommissioning, etc.</p>
Unit	Number of minor LOPC
Applicability	All PACs
Frequency	Monthly with LOPC supplementary form

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Classification	Key Performance Indicator (Lagging Indicator)
Method	<ol style="list-style-type: none"> 1. Count the number of occurrences in the month. 2. Fill up the LOPC supplementary form in Appendix 2 and submit to MPM HSE. <p>Refer to Appendix 3 for the Tier 1/ Tier 2 determination decision logic tree.</p>
Notes	<p>Additional definition of key terms:</p> <ol style="list-style-type: none"> a) <u>Material</u>. Substance with the potential to cause harm due to its chemical (e.g., flammable, toxic, corrosive, reactive, asphyxiate) or physical (e.g., thermal, pressure) properties. b) <u>Shelter-in-place</u>. The use of a structure and its indoor atmosphere to temporarily separate individuals from a potentially hazardous outdoor atmosphere. c) <u>Rainout</u>. Two-phase relief (vapor and entrained liquid) from a vent or relief device with the vapor phase dispersion to the atmosphere and the remaining liquid failing to grade or ground. d) <u>Destructive device</u>. A flare, scrubber, incinerator, quench drum, or other similar device used to mitigate the potential consequences of an engineered pressure relief (e.g., PRD, SIS or manually initiated emergency depressure) device release. e) <u>Process</u>. Production, distribution, storage, utilities or pilot plant facilities used in the manufacture of

Classification	Key Performance Indicator (Lagging Indicator)
	<p>petrochemical and petroleum refining products. This includes process equipment (e.g., reactors, vessels, piping, furnaces, boilers, pump, compressors, exchangers, cooling towers, refrigeration systems, etc.), storage tanks, active warehouses, ancillary support areas (e.g., boiler houses and waste water treatment plants), on-site remediation facilities, and distribution piping under control of the PAC.</p>
Reference	<ol style="list-style-type: none"> 1. API Recommended Practice 754: Process Safety Performance Indicators for the Refining and Petrochemical Industries, Second Edition, April 2016. 2. Appendix 4: Table 2 – Tier 2 Material Release Threshold Quantities from API Recommended Practice 754, 2nd Edition 3. Appendix 2: LOPC supplementary form 4. Appendix 3: Tier 1/ Tier 2 Determination Decision Logic Tree

5.5.3 Other Loss of Primary Containment (LOPC)

Classification	Key Performance Indicator (Leading Indicator)
Definition	Other LOPC is an unplanned or uncontrolled release of flammable or toxic material from primary containment that resulted in: <ul style="list-style-type: none"> A release of material below the Tier 2 threshold quantities described in in Table 2 of API 754 2nd Edition (see Appendix v) in any one-hour period.
Unit	Number of other LOPC
Applicability	All PACs
Frequency	1. Quarterly: Number of Other LOPC 2. Quarterly: Analysis of Other LOPC (Tier 3) incidences including breakdown by asset, cause and site of release e.g., valve, flange, etc.
Method	<p>Quarterly: Number of Other LOPC Count the number of occurrences in the quarter.</p> <p>Quarterly: Relevant analysis of Other LOPC incidences PACs to submit the analysis of the Other LOPC incidences. The analysis shall include breakdown by asset, cause and site of release e.g., valve, flange, etc. as a minimum.</p>
Notes	-
Reference	-

5.5.4 Major Process Fire/Explosion – Tier 1

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<p>A major process fire/ explosion is an event that caused damage greater than or equal to USD100,000 of direct cost.</p> <p>Any ignition of cold vent (including due to lightning strike) shall be reported as a major process fire if the occurrence caused damage greater than or equal to USD100,000 of direct cost.</p>
Unit	Number of major process fire/ explosion
Applicability	All PACs
Frequency	Monthly
Method	<ol style="list-style-type: none"> 1. Estimate cost of damage due to the fire/ explosion. 2. Count and report the number of major fire/ explosion if the damage caused is greater than or equal to USD100,000 of direct cost.
Notes	<p>Additional definition of key terms:</p> <p>a) <u>Fire</u>. Any combustion resulting from a LOPC, regardless of the presence of flame. This includes smouldering, charring, smoking, singeing, scorching, carbonizing or the evidence that any of these have occurred.</p> <p>b) <u>Explosion</u>. A release of energy that causes a pressure discontinuity or blast wave (e.g., detonations, deflagrations, and rapid releases of</p>

Classification	Key Performance Indicator (Lagging Indicator)
	<p>high pressure caused by rupture or equipment or piping).</p> <p>c) <u>Direct cost</u>. Cost of repairs or replacement, clean up, material disposal, and acute environmental cost associated with a fire or explosion. 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 repairing or replacing the failed component leading to LOPC if the component is not further damaged by the fire or explosion. Direct cost does include the cost of repairing or replacing the failed component leading to LOPC if the component failed due to internal or external explosion or overpressure.</p>
Reference	<ol style="list-style-type: none"> 1. API Recommended Practice 754: Process Safety Performance Indicators for the Refining and Petrochemical Industries, Second Edition, April 2016. 2. Appendix 3: Tier 1/ Tier 2 Determination Decision Logic Tree

5.5.5 Minor Process Fire/Explosion – Tier 2

Classification	Key Performance Indicator (Lagging Indicator)
Definition	<p>A minor process fire/ explosion is an event that caused damage greater than or equal to USD2,500 and below USD100,000 of direct cost.</p> <p>Any ignition of cold vent (including due to lightning strike) shall be reported as a major process fire if the occurrence caused damage greater than or equal to USD2,500 and below USD100,000 of direct cost.</p>
Unit	Number of minor process fire/ explosion
Applicability	All PACs
Frequency	Monthly
Method	<ol style="list-style-type: none"> 1. Estimate cost of damage due to the fire/ explosion. 2. Count and report total number of minor fire/ explosion if the damage caused is greater than or equal to USD2,500 and below USD100,000 of direct cost.
Notes	<p>Additional definition of key terms:</p> <p>a) <u>Fire</u>. Any combustion resulting from a LOPC, regardless of the presence of flame. This includes smouldering, charring, smoking, singeing, scorching, carbonizing or the evidence that any of these have occurred.</p> <p>b) <u>Explosion</u>. A release of energy that causes a pressure discontinuity or blast wave (e.g., detonations,</p>

Classification	Key Performance Indicator (Lagging Indicator)
	<p>deflagrations, and rapid releases of high pressure caused by rupture or equipment or piping).</p> <p>c) <u>Direct cost</u>. Cost of repairs or replacement, clean up, material disposal, and acute environmental cost associated with a fire or explosion. 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 repairing or replacing the failed component leading to LOPC if the component is not further damaged by the fire or explosion. Direct cost does include the cost of repairing or replacing the failed component leading to LOPC if the component failed due to internal or external explosion or overpressure.</p>
References	<ol style="list-style-type: none"> 1. API Recommended Practice 754: Process Safety Performance Indicators for the Refining and Petrochemical Industries, Second Edition, April 2016. 2. Appendix 3: Tier 1/ Tier 2 Determination Decision Logic Tree

**5.5.6 Safety Critical Element Corrective Maintenance (SCE CM)
Overdue**

Classification	Key Performance Indicator (Leading Indicator)
Definition	<p>The total number of Safety Critical Element Corrective Maintenance (SCE CM) work orders outstanding beyond Original Latest Allowed Finish Date (OLAFD) at the end of the quarter.</p> <p>If deviation is applied and approved for the work orders, it is still reported as overdue SCE CM.</p>
Unit	Number of SCE CM overdue.
Applicability	Producing PACs
Frequency	Quarterly
Method	Count the number of occurrences in the quarter without carry-over from previous quarters.
Notes	-
References	-

5.5.7 Safety Critical Element Preventive Maintenance (SCE PM) Overdue

Classification	Performance Indicator (Leading Indicator)
Definition	<p>The total number of Safety Critical Element Preventive Maintenance (SCE PM) work orders outstanding beyond Original Latest Allowed Finish Date (OLAFD) at the end of the quarter.</p> <p>If deviation is applied and approved for the work orders, it is still reported as overdue SCE PM.</p>
Unit	Number of SCE PM overdue
Applicability	Producing PACs
Frequency	Quarterly
Method	Count the number of occurrences in the quarter without carry-over from previous quarters.
Notes	-
References	-

5.5.8 Alarm Per Hour Per Operator

Classification	Performance Indicator (Leading Indicator)
Definition	<p>The number of alarms per hour per operator. The intent of monitoring the alarm rate is to manage human factor intervention to ensure it is within the operator's control.</p> <p>This KPI is applicable to facilities with Distributed Control Systems (DCS) or any equivalent system with alarm tracking functionality.</p>
Unit	Number of alarms per hour per operator
Applicability	Producing PACs
Frequency	PACs to monitor internally. MPM will verify during audit or request as and when required.
Method	Facilities that have DCS or any equivalent system with alarm tracking functionality shall monitor the average number of alarms per hour per operator.
Notes	-
Reference	-

5.5.9 Overdue Temporary MOC

Classification	Performance Indicator (Leading Indicator)
Definition	A temporary management of change (MOC) that had passed its expiry date. A temporary MOC, e.g., temporary connections, additions, deletions, rearrangements of hardware or software in a process facility, non-standard repairs like clamping, changes to manning philosophy, chemical injection rate, pump configuration, etc.
Unit	Number of occurrences.
Applicability	Producing PACs
Frequency	PACs to monitor internally. MPM will verify during audit or request as and when required.
Method	Count the number of occurrences in the month.
Notes	-
Reference	-

5.5.10 Safety Critical Element (SCE) more than 7 days

Classification	Performance Indicator
Definition	The total number of Safety Critical Element (SCE) bypassed of more than seven (7) days.
Unit	Number of occurrences
Frequency	PACs to monitor internally. MPM will verify during audit or request as and when required.
Applicability	Producing PACs
Method	Count the number of occurrences in the quarter.
Notes	-

5.5.11 Instrumented Protective Function (IPF) Failed on Demand

Classification	Performance Indicator (Leading Indicator)
Definition	The number of occurrences when IPF system that is not activated on actual demand.
Unit	Number of occurrences in the month
Applicability	Producing PACs
Frequency	PACs to monitor internally. MPM will verify during audit or request as and when required.
Method	Count the number of occurrences in the month.
Notes	<p>Additional definition of key term:</p> <p>a) <u>Instrumented Protective Function (IPF)</u>. A function comprising one or more Sensors, a Logic Solver and one or more Final Elements whose purpose is to prevent or mitigate hazardous situations. An IPF is intended to achieve or maintain a safe state for the process, in respect of a specific hazardous event. In IEC 61508 and IEC 61511, an IPF is referred to as a Safety Instrumented Function (SIF).</p>
Reference	-

5.5.12 Pressure Relief Devices (PRD) Failed on Demand

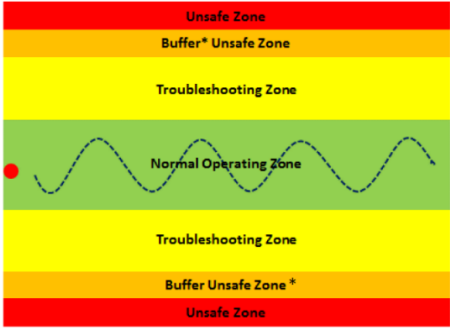
Classification	Performance Indicator (Leading Indicator)
Definition	<p>The total number of PRD that are not activated at the set pressure as required by design in case of any emergency or abnormal process conditions, which includes:</p> <ul style="list-style-type: none"> • Pressure relief valve (PRV). Count each time PRV is not activated at the set pressure during normal operation or in case of emergency/ abnormal process conditions as per design. Activation of thermal relief valves are excluded. • Rupture disc. Count each time the disc is replaced excluding preventive maintenance. • Rupture pin device. Count each time a pin is replaced excluding preventive maintenance. • Deflagration vent. Count each time the vent must be reseated excluding preventive maintenance. • Pressure vacuum (PV) vents (e.g., on tanks). Count only events in which the PV vent fails to function on demand. This is typically indicated by damage to the tank.
Unit	Number of occurrences in the month.
Applicability	Producing PACs
Frequency	PACs to monitor internally. MPM will verify during audit or request as and when required.
Method	Count the total number of occurrences in the month.
Reference	-

**5.5.13 Critical Operating Parameters Never Exceed Limit
(COPNEL) excursion**

Classification	Performance Indicator (Leading Indicator)
Definition	<p>The number of critical operating parameters (COP) excursions beyond the never exceed limit (NEL) in the month.</p> <p>A single initiating event may result in multiple NEL and each excursion should be counted separately. A process condition that hovers near the NEL value may result in multiple excursions, which should be counted as a single excursion.</p>
Unit	Number of occurrences in the month.
Applicability	Producing PACs
Frequency	PACs to monitor internally. MPM will verify during audit or request as and when required.
Method	Count the total number of occurrences in the month.
Notes	<p>Additional definition of key terms:</p> <p>a) <u>Never exceed limit (NEL)</u>. NEL is the high high (HH) or low low (LL) limit of the troubleshooting zone. A process or equipment shall not be intentionally operated beyond these limits due to the risk of Major Accident Hazard resulting in:</p> <ul style="list-style-type: none"> • Larger and/or quicker loss of containment; • A catastrophic release of hydrocarbons or other hazardous fluids; • Emergency or rapid non-orderly shutdown; • Significant environmental risk; • Excessive financial risk; or • Other unacceptable risk.

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Classification	Performance Indicator (Leading Indicator)
	 <p>b) <u>Critical operating parameter (COP)</u>. COP is defined as the process and equipment parameters that at some measurable level indicates an approach to Major Accident Hazard (MAH). The COPs should be identified based on:</p> <ul style="list-style-type: none"> • Recommendations by process licensor or original equipment manufacturer (OEM). • Major risks as identified in hazards and effects register (HER). • Parameters that lead to MAH that solely depend on human intervention to bring it back to safe operation and without any automatic protective system, e.g., instrumented protective function (IPF), pressure relief device (PRD), etc.
Reference	-

5.6 Other Reporting**5.6.1 Regulatory Non-Compliance Related to HSE Management**

Classification	Others
Definition	<ul style="list-style-type: none"> • A regulatory non-compliance resulting in fines or compounds that related to HSE management. • An official notification from regulatory bodies related to non-compliance to HSE Management which includes NOI, NOP, etc. • An official notification to regulatory bodies on relaxation/unable to comply to Malaysia's Law and regulations.
Unit	Number Regulatory Non-Compliance Related to HSE Management
Applicability	All PACs
Frequency	Monthly
Method	-
Reference	-

5.6.2 Encroachment

Classification	Others
Definition	<ul style="list-style-type: none"> An unauthorized approached of unwanted vessel/people into the area gazetted as protected area protected place (500 meters radius)
Unit	Number of Vessel/People
Applicability	All PACs
Frequency	Monthly
Method	-
Reference	-

5.6.3 MEDEVAC

Classification	Others
Definition	<p>Emergency</p> <ul style="list-style-type: none"> A process of evacuating personnel with emergency medical case (injury or illness) from a *workplace to external medical facilities by any non-scheduled mode of transport. <p>Non-emergency</p> <ul style="list-style-type: none"> A process of evacuating personnel with emergency medical case (injury or illness) from a *workplace to external medical facilities by any scheduled mode of transport. <p>Note:</p> <p>Contractor(s) shall submit the reporting of all MEDEVAC cases related to illnesses, work and non-work related. Contractor(s) also shall report death case(s) on monthly basis on tenth (10th) of each month following the format in PPGUA, Volume 3, Appendix 12.</p> <p>Workplace scope: Offshore and onshore remote location</p>
Unit	<p>Number of MEDEVAC</p> <p>a) Emergency</p> <p>b) Non-emergency</p>
Applicability	All PACs
Frequency	Monthly
Method	-
Reference	-

APPENDICES**Appendix 1: Table 1 – Tier 1 Material Release Threshold Quantities from API
Recommended Practice 754, 2nd Edition**

Threshold Release Category	Material Hazard Classification ^{a,c,d,e,f}	Threshold Quantity (outdoor release)	Threshold Quantity (indoor ^b release)
T1-1	TIH Zone A Materials	≥5 kg (11 lb)	≥0.5 kg (1.1 lb)
T1-2	TIH Zone B Materials	≥25 kg (55 lb)	≥2.5 kg (5.5 lb)
T1-3	TIH Zone C Materials	≥100 kg (220 lb)	≥10 kg (22 lb)
T1-4	TIH Zone D Materials	≥200 kg (440 lb)	≥20 kg (44 lb)
T1-5	Flammable Gases or Liquids with Normal Boiling Point ≤35 °C (95 °F) and Flash Point <23 °C (73 °F) or Other Packing Group I Materials (excluding acids/bases)	≥500 kg (1100 lb)	≥50 kg (110 lb)
T1-6	Liquids with Normal Boiling Point >35 °C (95 °F) and Flash Point <23 °C (73 °F) or Other Packing Group II Materials (excluding acids/bases)	≥1000 kg (2200 lb) or ≥7 bbl	≥100 kg (220 lb) or ≥0.7 bbl
T1-7	Liquids with Flash Point ≥23 °C (73 °F) and ≤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 (see definition 3.1.2) or UNDG Class 2, Division 2.2 (non-flammable, non-toxic gases) excluding air or Other Packing Group III Materials	≥2000 kg (4400 lb) or ≥14 bbl	≥200 kg (440 lb) or ≥1.4 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.			
In determining the Threshold Release Category for a material, one should first use the toxic (TIH Zone) or flammability (Flash Point and Boiling Point) or corrosiveness (Strong Acid or Base vs. Moderate Acid or Base) characteristics. Only when the hazard of the material is not expressed by those simple characteristics (e.g. reacts violently with water) is the UNGL Packing Group used.			
^a Many materials exhibit more than one hazard. [22] Correct placement in Hazard Zone or Packing Group shall follow the rules of DOT 49 CFR 173.2a [22] or UN Recommendations on the Transportation of Dangerous Goods, Section 2. [18] See Annex F.			
^b A structure composed of four complete (floor to ceiling) walls, floor, and roof.			
^c 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.			
^d 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 E, PSE Examples and Questions 49 through 53.			
^e A LOPC of Liquids with Flash Point >60 °C (140 °F) and ≤93 °C (200 °F) released at a temperature below Flash Point cannot be Tier 1 PSE based upon quantity released no matter the volume.			
^f A LOPC of a moderate acid/base cannot be Tier 1 PSE based upon quantity released no matter the volume.			

Appendix 2: LOPC Supplementary Form

MPM HSE	TECHNICAL – REVIEW COVERAGE	
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This LOPC supplementary form shall be filled for each major/ minor LOPC incidents including incidents that escalated to fire and spills and submitted to MPM HSE as an attachment as part of the monthly HSE reporting in MyHSE 2.0. For major LOPCs, detailed incident investigation report shall still be submitted as per PPGUA requirement.

The information provided in this form may be based on the initial incident assessment while pending the final incident investigation report. As such, multiple possible causes/ failures may be identified.

Incident Date:		
Description of incident including field and asset name:		
Material released:	Amount leaked per hour (kg/ hr or bbl/hr):	LOPC Category (MINOR/MAJOR based on API RP 754):

Please tick (✓) any relevant boxes for the LOPC case.

1. Site of release
 - ☐ Pipe work
 - ☐ Process vessels
 - ☐ Valve
 - ☐ Storage tanks
 - ☐ Flexible hose
 - ☐ Rotating equipment (e.g., pump, compressor, turbine, etc.)
 - ☐ Wellhead
 - ☐ Other equipment: _____
2. Affected Part
 - ☐ Flange
 - ☐ Body
 - ☐ Weld
 - ☐ Opening
 - ☐ Vent/drain
 - ☐ Small bore connection
 - ☐ Other: _____

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3. Operation mode
 - ☐ Start-up
 - ☐ Shutdown
 - ☐ Normal operation
 - ☐ Maintenance (e.g., pigging, flushing, testing, etc.)
 - ☐ Simultaneous operation
 - ☐ Drilling & well interventions

 4. Direct cause
 - ☐ Internal corrosion
 - ☐ External corrosion
 - ☐ Erosion
 - ☐ Stress /Fatigue /Vibration
 - ☐ Wrong or defective equipment or tools
 - ☐ Runaway chemical reaction
 - ☐ Overflow
 - ☐ Wear & tear
 - ☐ Inadequate/ incorrect isolation
 - ☐ Human mistakes, slips or lapse of attention
 - ☐ Miscommunication or lack of information
 - ☐ Intoxication (e.g., drugs or alcohols)
 - ☐ Violation of procedures
 - ☐ Wrong or inadequate procedures
 - ☐ Blockages
 - ☐ Environmental factors (e.g., weather, floods)
 - ☐ Overpressure
 - ☐ Dropped objects
 - ☐ Left open
 - ☐ Others: _____

 5. Failed risk control system (underlying cause)
 - ☐ Planned preventive maintenance
 - ☐ Corrective maintenance
 - ☐ Plant & process design
 - ☐ Planned plant inspection
 - ☐ PTW
 - ☐ Energy isolation
 - ☐ Contractor management
 - ☐ Competency
 - ☐ Installation/Sequence/Arrangements
 - ☐ Management of Change (including Bypass of Safety Critical Equipment)
 - ☐ Operating Procedures
 - ☐ Plant commissioning
 - ☐ Hazard analysis/ risk assessment
 - ☐ Handover/ communication
 - ☐ QA/QC
 - ☐ Others: _____

POSSIBLE GENERAL FAILURE TYPE (UNDERLYING CAUSES)

The Tripod methodology uses 11 General Failure Types (also known as Basic Risk Factors) to categorize latent failures (or underlying cause) of incidents. Using the guide words, identify the possible General Failure Types of each LOPC incident, including those escalated to fire and spills.

No	General Failure Types / Basic Risk Factors	Guide Words	Possible? (May tick more than one)	Description
1	Hardware (HW)	Failures due to inadequate quality of materials or construction, non-availability of hardware and failures due to ageing (position in the life-cycle). The basic risk factor (BRF) does not include error-generating mechanisms due to poorly designed equipment (Design BRF) and hardware failures caused by inadequate maintenance (Maintenance management BRF).		
2	Design (DE)	Deficiencies in layout or design of facilities, plant, equipment or tools that lead to misuse or substandard acts, increasing the chance of particular types of errors and violations.		
3	Maintenance management (MM)	Failures in the systems for ensuring technical integrity of facilities, plant, equipment and tools, e.g., condition surveys, corrosion barriers and function testing of safety and emergency equipment. Issues relevant to the execution aspects of maintenance are considered in the BRFs Error-enforcing conditions, Procedures, Design, Hardware, and Communication.		

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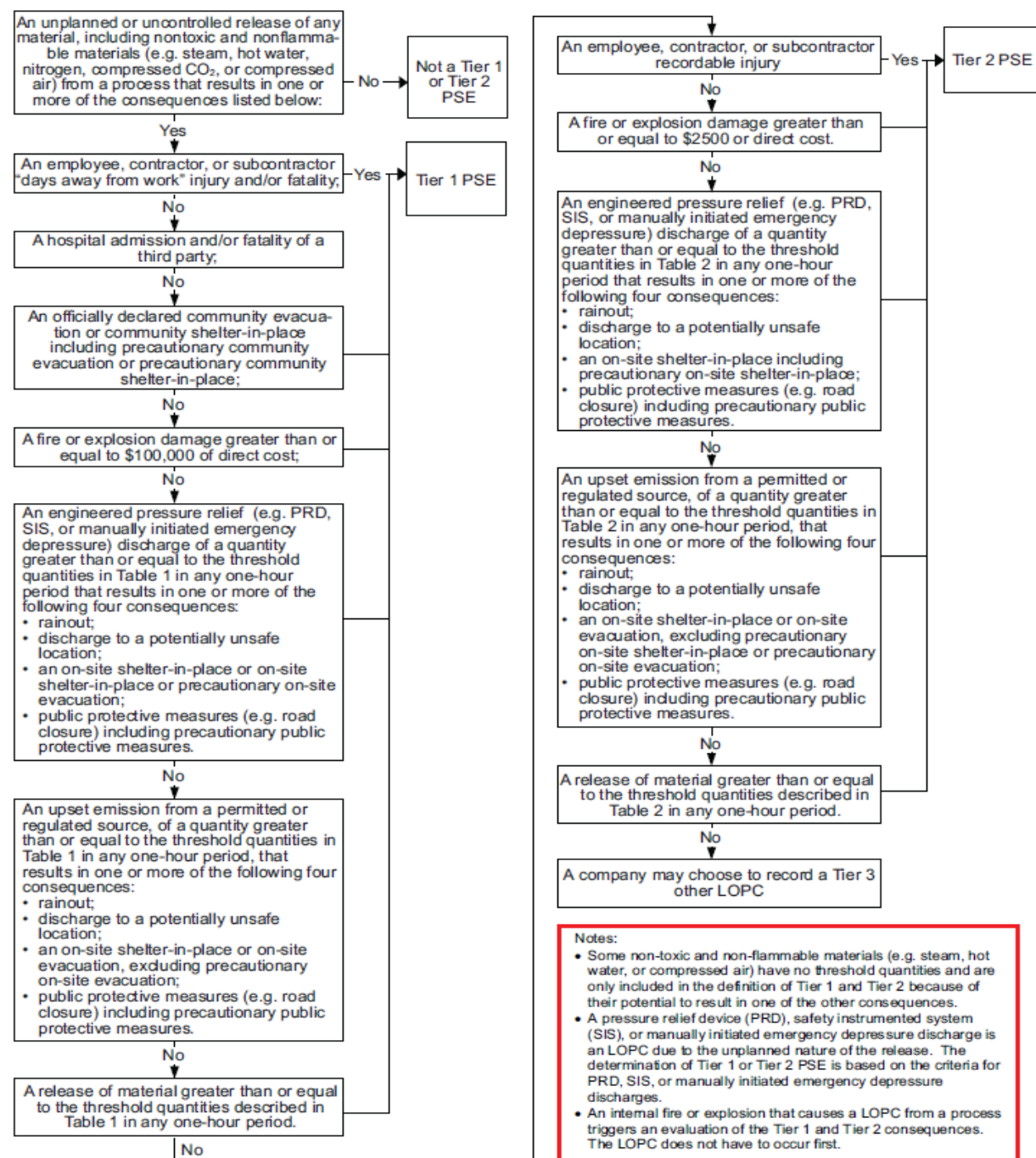
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No	General Failure Types / Basic Risk Factors	Guide Words	Possible? (May tick more than one)	Description
4	Procedures (PR)	Unclear, unavailable, incorrect or otherwise unusable standardised task information that has been established to achieve a desired result.		
5	Error-enforcing conditions (EC)	Factors such as time pressures, changes in work patterns, physical working conditions (hot, cold, noisy), etc. acting on the individual or in the workplace that promote the performance of substandard acts – including errors or violations.		
6	Housekeeping (HK)	Tolerance of deficiencies in conditions of tidiness and cleanliness of facilities and work spaces or in the provision of adequate resources for cleaning and waste removal.		
7	Incompatible goals (IG)	Failure to manage conflict; between organisational goals, such as safety and production; between formal rules such as company written procedures and the rules generated informally by a work group; between the demands of individuals' tasks and their personal preoccupations or distractions.		
8	Communication (CO)	Failure in transmitting information necessary for the safe and effective functioning of the organisation to the appropriate recipients in a clear, unambiguous or intelligible form.		

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No	General Failure Types / Basic Risk Factors	Guide Words	Possible? (May tick more than one)	Description
9	Organisation (OR)	Deficiencies in either the structure of a company or the way it conducts its business that allow responsibilities to become ill-defined and warning signs to be overlooked.		
10	Training (TR)	Deficiencies in the system for providing the necessary awareness, knowledge or skill to an individual or individuals in the organisation. In this context, training includes on the job coaching by mentors and supervisors as well as formal courses.		
11	Defences (DF)	Failures in the systems, facilities and equipment for control or containment of source of harm or for the mitigation of the consequences of either human or component failures.		

Appendix 3: Tier 1/ Tier 2 Determination Decision Logic Tree

**Appendix 4: Table 2 – Tier 2 Material Release Threshold Quantities from API
Recommended Practice 754, 2nd Edition**

Threshold Release Category	Material Hazard Classification ^{a,c,d,e,f}	Threshold Quantity (outdoor release)	Threshold Quantity (indoor ^b release)
T2-1	TIH Zone A Materials	≥0.5 kg (1.1 lb)	≥0.25 kg (0.55 lb)
T2-2	TIH Zone B Materials	≥2.5 kg (5.5 lb)	≥1.25 kg (2.75 lb)
T2-3	TIH Zone C Materials	≥10 kg (22 lb)	≥5 kg (11 lb)
T2-4	TIH Zone D Materials	≥20 kg (44 lb)	≥10 kg (22 lb)
T2-5	Flammable Gases or Liquids with Normal Boiling Point ≤35 °C (95 °F) and Flash Point <23 °C (73 °F) or Other Packing Group I Materials (excluding acids/bases)	≥50 kg (110 lb)	≥25 kg (55 lb)
T2-6	Liquids with Normal Boiling Point >35 °C (95 °F) and Flash Point <23 °C (73 °F) or Other Packing Group II Materials (excluding acids/bases)	≥100 kg (220 lb) or ≥0.7 bbl	≥50 kg (110 lb) or ≥0.35 bbl
T2-7	Liquids with Flash Point ≥23 °C (73 °F) and ≤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 (see definition 3.1.2) or UNDG Class 2, Division 2.2 (non-flammable, non-toxic gases) excluding air or Other Packing Group III Materials	≥200 kg (440 lb) or ≥1.4 bbl	≥100 kg (220 lb) or ≥0.7 bbl
T2-8	Liquids with Flash Point >60 °C (140 °F) and ≤93 °C (200 °F) released at a temperature below Flash Point or Moderate acids/bases (see definition 3.1.1)	≥1000 kg (2200 lb) or ≥7 bbl	≥500 kg (1100 lb) or ≥3.5 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.

In determining the Threshold Release Category for a material, one should first use the toxic (TIH Zone) or flammability (Flash Point and Boiling Point) or corrosiveness (Strong Acid or Base vs. Moderate Acid or Base) characteristics. Only when the hazard of the material is not expressed by those simple characteristics (e.g. reacts violently with water) is the UNGL Packing Group used.

^a 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 [22] or UN Recommendations on the Transportation of Dangerous Goods, Section 2 [18]. See Annex F.

^b A structure composed of four complete (floor to ceiling) walls, floor and roof.

^c 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.

^d 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 E, PSE Examples and Questions 49 through 53.

^e A LOPC of Liquids with Flash Point >60 °C (140 °F) and ≤93 °C (200 °F) released at a temperature below Flash Point cannot be Tier 1 PSE based upon quantity released no matter the volume.

^f A LOPC of a moderate acid/base cannot be Tier 1 PSE based upon quantity released no matter the volume.

Appendix 5: Major Environmental Impact

- Release that comes into contact with soil or surface water, that is:
- no longer confined to the company site; (description applicable to onshore facilities only)
- resulting in disruption to the beneficial use of the environment. Evidence of off-site environmental effect or damage (e.g., vegetation damage, fish kill, groundwater contamination, widespread and detectable for some distance; becomes sub-standard or unfit for one or more purposes including supporting normal wildlife populations; interference with other users causing loss of earnings, public health impact or claims; require extensive measures effort to restore the contaminated environment to its original state or risk-based approach acceptable level).

Environment in this context covers soil and surface water whereby:

- Soil – Includes surfaces (e.g., soil, sand, silts, shells, gravel) not designated as impermeable secondary containment, as well as the underlying sediments and groundwater resources; and
- Surface water – Includes creeks, rivers, ponds, seas, oceans, etc. but excludes ponds, pits, basins, etc. in place on company property for purposes of hydrocarbon or chemical containment or treatment.
- Spill to standing rainwater is classified as a spill to soil.
- From an environmental point of view, secondary containment refers to an impermeable, non-leaking physical barrier specifically designed and maintained to keep spilled materials from contacting the soil or water (e.g., geo-membrane liners, engineered clay liners, asphalt, and concrete). Earthen berms do not count as secondary containment unless they are engineered to be sufficiently impermeable to prevent spilled liquid from contaminating underlying soil and/or groundwater.
- Environmentally sensitive area – natural environment/habitats which has a high level of vulnerability e.g., marine park, mangrove, residential area, nesting area, coral reef, etc. (as per MPM MES).