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1.0 INTRODUCTION

1.1 Purpose

The purpose of a Near Miss/Incident Reporting and Investigation Program is to prevent occurrence/ recurrence of events by establishing a sustainable system to:

- Capture incidents as defined in this procedure.
- Categorize and investigate incidents.
- Identify root causes.
- Identify and evaluate measures to prevent recurrence or reduce the probability and/or severity of similar or related incidents.
- Ensure timely issuance of incident reports.
- Provides timely and effective methods for effective follow-up to complete and/or review action items.
- Share learnings across the Marathon Anacortes Refinery and the company.
- Request legal advice when appropriate.

1.2 Scope

The scope of this document applies to all incidents, including Near Miss events occurring within the Anacortes refinery. It applies to MPC ANA personnel and contractor personnel performing work for MPC organizations at Anacortes.

Changes to this procedure, per WAC 296-67-363, are effective December 27, 2024.

Note: This document does not cover procedures for reporting of emergencies. The notification requirements in this procedure are in addition to, rather than in lieu of, any requirements in an organization's established emergency notification procedures.

This document does not cover reporting or investigating cyber incidents. See IT standard CS-067 for cyber incident criteria and investigation requirements.

2.0 REFERENCES

2.1 Marathon Standards, Policies & Procedures

- ENV-3007, Designated Environmental Incidents
- GEN-1001, MPC Standards Process
- GEN-1006, Incident Reporting and Investigation Standard
- GEN-1010, Risk Calibration Standard
- GEN-1015, HE&S Metric Reporting Standards
- MPC Policy #6003, Enterprise Records and Information Management
- MPC-QUA-00403-PRS, MPC-Quality Incident Reporting and Investigations

- PSM-1070, Process Safety Management
- PSM-1070 Appendix R, Process Safety Performance Indicators Guidance Document
- PSM-5008, EPA Risk Management Plan
- RSP-1308, PSM/RMP Mechanical Integrity
- RSP-1310, PSM/RMP Incident Investigation
- RSP-1503-050, Refining Product Quality Incident Supplement
- RSP-1600-000, Reliability Performance Monitoring
- RSP-1701-000, H_2S Exposure Control Program
- RSP-1704-000, Incident Investigation
- RRD-1300-001, Human and Organizational Performance
- RRD-1310-001, Public Meeting Guidance for EPA RMP Rule
- SAF-4001, Reporting Occupational Injury and Illness Incidents and Data

2.2 Government Regulations

- WAC 296-67-300, Safety Standards for Process Safety Management of Highly Hazardous Chemicals
- WAC 296-67-363 Incident Investigation-Root Cause Analysis
- OSHA 29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals
- EPA RMP 40, CFR Part 68 Accidental Release Prevention Requirements: Risk Management Programs
- Flare Consent Decree, Consent Decree in U.S. v. Marathon Petroleum Company LP, et ;a, E.D. Mich. Case No. 2.12-cv-11544-SML-MJH("Flare CD")
- 40 CFR 63 Subpart CC, NESHAP for Petroleum Refineries (Refinery MACT 1)
- 40 CFR 60 Subpart Ja, NSPS for Petroleum Refineries for Which Construction Reconstruction or Modification Commenced After May 14, 2007

3.0 DEFINITIONS

The following definitions are applicable to this procedure.

Table 1 Definitions

Term	Description
Assessment	The process of utilizing the results of an analysis to make judgments in decision-making or for making comparisons.
Catastrophic Release	A major, uncontrolled emission, fire, or explosion involving one or more highly hazardous chemicals that presents serious danger to employees in the workplace and/or presents imminent and substantial endangerment to public health and the environment.

Table 1 Definitions

Term	Description
Category 0 through 4	For definitions of Category 0 through 4 Incidents, refer to Attachment 1 Incident Categories.
Causal Factor	Condition, action or lack of action that must be present for the Incident to occur; removing a causal factor can benefit an outcome.
Causal Factor Charting	Causal Factor Charting arranges building blocks to graphically depict the timing of events and the cause-effect relationships between events and conditions.
Causes	Detailed Causes are specified in the TapRooT® Methodology.
CEM Excess Emissions	Emissions that are above a permit or regulatory limit during a specified averaging time as determined by a Continuous Emissions Monitor (CEM). The CEM may measure the emission directly as a concentration (ppm) or opacity (%), or as part of an Alternate Monitoring Plan (e.g., wet scrubber parameters).
CERT	Corporate Emergency Response Team
Days Away from Work Incident	Work-related incident resulting in an injury that causes an employee or contractor to be unable to perform any work beyond the date of the actual occurrence.
Designated Environmental Incident (DEI)	MPC defined environmental Tier 1-4 incident as specified in ENV-3007.
Direct Cost	Direct Cost is a term defined in API RP 754. It is the cost to repair the damage sustained from a process related fire or explosion. The direct cost is used as a criterion for classifying process safety events as PSE 1 or PSE 2 events. From API RP 754 - "Fire or explosion direct cost includes the material and labor cost of (1) in-kind repairs, replacement, or restoration of process and non-process equipment and tangible public or private property to pre-event condition whether completed or not, (2) aftermath cleanup, (3) material disposal, and (4) short-term cleanup and material disposal associated with fire/explosion emergency response efforts that result in off-site environmental impact (e.g. fire-fighting foam/water runoff). See RSP-1310 Appendix A for a complete definition and examples of included and excluded costs.
EPA Risk Management Plan (RMP) Incident	Event that resulted in, or could reasonably have resulted in a catastrophic release of a regulated substance [40 CFR Part 68.81 (a)]. A catastrophic release means a major uncontrolled emission, fire, or explosion, involving one or more regulated substances that presents imminent and substantial endangerment to public health and the environment. (40 CFR 68.3). See PSM-5008 for the definition of an RMP accident. Refer to flow chart in RSP-1310 Appendix B.

Table 1 Definitions

Term	Description
Flare Consent Decree (CD)/NSPS Ja Reportable Flaring Incident	Shall mean, for each of the following time periods, when any one of the following is flared within a 24-hour period: ≥ 500,000 scf vent gas above baseline defined in Flare Management Plan or ≥ 500 lb SO_2. This includes hydrocarbon or acid gas flaring events that exceed these limits. This requirement also addresses root cause analysis requirements for flaring events as defined in NSPS Subpart Ja (40 CFR 60.103a).
High Potential Consequence	Event that could have reasonably led to a high consequence event under slightly different uncontrolled circumstances.
High Potential Designation(Product Quality)	Refers to where some lower category incidents have the potential to become higher consequence incidents but didn't due to circumstances not managed by current processes, procedures, or engineering controls.
High Potential PSE Tier-3	Incidents that could have reasonably escalated to a PSE Tier - 1 or PSE Tier-2 event under slightly different uncontrolled circumstances.
Highly Hazardous Chemical (OSHA)/Regulated Substance (EPA)	Substance possessing toxic, reactive, flammable or explosive properties. OSHA defines highly hazardous chemicals as a chemical or mixture that is flammable (flash point less than 100°F) and present in the process greater or equal to 10,000 lbs., or any toxic chemical listed in 29 CFR 1910.119 or WAC 296-67-285 Appendix A of the Washington Administrative Codes (WAC)., Appendix A present is greater than the threshold quantity. EPA defined regulated substances with threshold quantities are provided in 40 CFR Part 68.130 Both and EPA exclude flammable substances used as fuel.
Human and Organizational Performance (HOP)	Human & Organizational Performance (HOP) refers to the way people, culture, equipment, work systems, and processes interact as a system. HOP, in most cases, has replaced terms such as Human Factors, Human Reliability, or Human Performance as it relates to Human Error. RRD-1300-001 provides additional information on the HOP philosophy and how to investigate human error through Learning Teams.

Table 1 Definitions

Term	Description
Human Error Incident/ Near Miss	Human Error Incident/Near Miss Is broadly defined as an incident/near miss that occurred because of a human error or mistake where it's determined or reasonably suspected that given the same situation, another individual would have made the same error or mistake leading to an equivalent outcome. Walk the Line incidents are a subset of incidents related to Human Error and should be classified as both. As we focus on errors the number of reported errors (incidents) is expected to increase, but as we learn the severity will decrease. Below are examples but classification should err on the side of over classifying. (a) Overfilling a vessel due to operator error (b) Leaving a bleeder open following equipment maintenance (c) PPE not used or used incorrectly leading to an injury (d) Procedure not used or not followed causing a mis-lineup and Product Quality event (e) Ineffective corrective actions from previous incidents, such as a corrective action relying on people not being utilized (f) A Walk the Line Incident as defined in RSP-1704-000 Appendix A.53
Incident	Incident is any unplanned event that negatively impacts or could have impacted personnel safety, the environment, process safety, product quality, or security of an asset.

Incident Types	Includes, but not limited to, the following: (a) Chemical Exposure – Personal and Fixed Area Alarms (b) Environmental – Designated Environmental Incident Tier 1 (DEI T-1) – Designated Environmental Incident Tier 2 (DEI T-2) – Designated Environmental Incident Tier 3 (DEI T-3) – Designated Environmental Incident Tier 4 (DEI T-4) – Environmental – Non-DEI, (c) Injury and Illness (Occupational Injury and Illness OI&I) (d) Process Safety – Process Safety Event Tier 1 (PSE1) – PSM Sites Only – Process Safety Event Tier 2 (PSE2) – PSM Sites Only – Process Safety Event Tier 3 (PSE3) – PSM Sites Only – Process Safety Event Tier 4 (PSE4) - PSM Sites Only – Risk Management Plan (RMP) – RMP Sites Only (e) Product Quality (f) Safety – Tier 1A, 1P, 2 or 3 – Life Critical Violations (g)Security (a) Transport – Vehicle Accident – Department of Transportation (DOT) – Vehicle Accident – Non-DOT (b) Release (c) Other Incident Types – Near Miss – Reliability – HOP (Human and Organizational Performance) – Fire/Explosion – Non Process Safety – Mechanical – Third Party – Walk the Line ▪ Misidentification of Equipment for Maintenance ▪ Incorrect Line-Up ▪ Open Ended Lines or Valves Left Open ▪ Energy Isolation Error ▪ Commissioning Equipment Not Ready for Service ▪ Incorrect Procedure Execution – Electrical, – Instrumentation – Lost Opportunity – Project

Table 1 Definitions

Term	Description
	– Personal Safety – Maintenance – Operational – Chemical/Materials – Biological/Radiation – Public Relations – Other (may be selected for incident types not listed else whereat such as): ▪ Traffic Citation (while on company business) ▪ Fatality ▪ Property Loss
Investigation	Process of using inquiry and examination to gather facts and information in order to determine the cause(s) of an Incident.
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 CO2 or compressed air).
Learning Team	One method of Operational Learning that includes a learning cycle to understand how work actually happens, defining problem statements form the learning cycle, and develop recommendations for improvement. The team consists of a group of people directly involved in the work activity, a trained facilitator, and a scribe. When used for an incident investigation the above methodology is used to facilitate discussion with people who perform the tasks involved in an incident to understand the context leading to that incident. The learning team also uncovers organizational weaknesses and works to build safeguards to prevent future incidents. RRD-1300-001 provides additional information on the HOP philosophy and how to investigate human error through Learning Teams.
Lost Capacity due to Internal Problems	Refers to refining Process Unit rate reductions or outages precipitated by equipment failures or process operating problems. Refer to RSP-1600-000.
MACT CC Atmospheric Pressure Relief Device (PRD) Event	Pressure Relief Devices (PRD) in organic HAP gas or light liquid service that are vented or potentially vented to the atmosphere.
MACT CC Benzene Fence Line Rolling Annual Average Event	Effective after March 17, 2019.The limit for the rolling annual average benzene fence line Δc is 9 micrograms per cubic meter (µg/m3) or approximately 2.82 parts per billion (ppb). If the rolling annual average Δc value for benzene is greater than 9 µg/m3, then a Category 2 Incident Investigation must be completed. Within 5 days of determining that the rolling annual average has been exceeded for any annual average Δc, a Category 2 incident investigation shall be initiated to determine the cause of such exceedances and determine the appropriate corrective action. The Category 2 incident investigation shall be completed no later than 45 days after determining there is an exceedance.

Table 1 Definitions

Term	Description
MACT CC Reportable Flaring Event	Effective after January 30, 2019. a Category 2 Incident Investigation shall be completed for flaring events where: • smokeless capacity of the flare is exceeded, and visible emissions occur, or • smokeless capacity of the flare is exceeded, and the flare velocity exceeds 60 feet/second
Marathon Representative	Refers to any Marathon or Contractor employee whose primary responsibility is overseeing the completion of work being conducted by a contractor and/or interfacing with contractor supervision or contractor employees on a daily basis.
Near Miss	An unplanned event or sequence of events, which could have, but actually did not result in adverse consequences. Examples include, but are not limited to: • Construction equipment almost backs over pedestrian walking, • Employee working at elevation and drops a wrench to grade without striking anyone, • Employee walking through a unit without a calibrated H_2S monitor, and • Realizing piping lineup paperwork was wrong when in the field prior to opening a valve
NPDES Permit	National Pollutant Discharge Elimination System Permit
NSPS Ja Fuel Gas Combustion Device Reportable Event	Shall mean when fuel combustion discharges to atmosphere ≥ 500 lb SO_2 greater than the amount that would have been emitted if the emission limits had been met during one or more consecutive periods of excess emissions or any 24-hour period, whichever is shorter. [NSPS Subpart Ja (40CFR60.103a)].
NSPS Ja SRU Reportable Event	Shall mean when a sulfur recovery unit discharges to atmosphere ≥ 500 lb SO_2 greater than the amount that would have been emitted if the SO2 or reduced sulfur concentration was equal to the applicable NSPS Ja emission limits during one or more consecutive periods of excess emissions or any 24-hour period, whichever is shorter. [NSPS Subpart Ja (40CFR60.103a)].
Process Safety Advisory (PSA)	A document that consists of the incident facts, key lessons learned, and any global recommendations to prevent recurrence of a PSE 1 (or other significant process safety event) event that is circulated throughout the organization for information and action.
Process Safety Event (PSE) Tiers 1-3	For Process Safety Event (PSE) Tiers 1-3, see PSM-1070, Appendix R for complete definition. RSP-1310 provides additional requirements for reporting and investigating process safety incidents. Reference: For more information on the types of PSEs, see Attachment 6.
Process Safety Incident(Per WAC 296-67-307)	An event within or affecting a process that causes a fire, explosion or release of a highly hazardous chemical or material and has the potential to result in death or serious physical harm.
Product Quality (PQ) Incident Category 0-4	Marathon defined product quality category 0-4 incident as specified in RSP-1503-050, Appendix D and MPC-QUA-00403-PRS.

Table 1 Definitions

Term	Description
PRV	Pressure Relief Valve
PSV Failure to Operate on Demand	PSV Failure to Operate on Demand refers to any PRV that does fails to activate when the system reaches the set pressure of the PRV.
Recordable Injury or Illness	A work-related injury or illness that results in any of the following: • death, • days away from work, • restricted work activity or transfer to another job, • medical treatment beyond first aid, • loss of consciousness, or • a significant injury diagnosed by a physician or other licensed health care professional according to OSHA regulation **Note:** This is an abridged version of the OSHA definition.
Report Only	Report Only is a personal safety incident, which does not result in an OSHA Recordable Injury, and no First Aid treatment is administered. An example includes but is not limited to: Employee is hit by a dropped object and received a contusion, but no treatment is administered
Reportable Release	Any spill, release to the air, or water discharge permit exceedance that requires a notification to a regulatory agency(Federal, State or Local)
Risk Ranking	The result of applying a Risk's Frequency and Consequence category to a Risk Matrix table (Table 4 "Risk Matrix" of the Risk Calibration Standard GEN-1010) to produce an alphabetical grade of A-D, where A represents the highest level of Risk.
Root Cause	The most basic cause(s) that can reasonably be identified that management has control to fix and, when fixed, will prevent (or significantly reduce the likelihood of) reoccurrence. A Root Cause analysis is required for Category 2 or higher incidents listed in ***Note 1*** of RSP-1704-000 Section 2.6.3 and those requiring a TapRoot investigation.
Root Cause Analysis	The use of TapRooT® methodology to conduct formal Investigations.
Safety Systems	Equipment or instrumentation designed to be activated during abnormal circumstances which bring a process to a safe condition or to mitigate a release. Systems can be manually or automatically activated. Systems include, but are not limited to: • Pressure relief/Flares • Safety Instrumented Systems • Shutdown systems (except those designed only to protect machinery) • Water spray mitigation systems

Table 1 Definitions

Term	Description
Significant, Acute Environmental Impacts	Include but are not limited to: • major uncontained release requiring significant clean-up and remediation, • widespread or permanent ecological damage, • releases to particularly sensitive environments (wetland sanctuary, etc.), and • wildlife kill involving endangered, threatened or other protected species (fish, birds, migratory birds and/or mammals, etc.
SIS	Safety Instrumented System
SIS Fail to Activate on Demand	Any SIS system that fails to properly activate when the process variable of interest has exceeded a predetermined set point, which results in, or should have resulted in, a call for the safety system to activate.
SIS Failure on Test	Any SIS proof test failures identified during SIS functional testing that would have resulted in an SIS failure to activate on demand.
TapRoot Investigator	An individual who has at a minimum completed the 2-day TapRooT® training or equivalent who leads a Category 2 or 3 investigation where the TapRooT® Investigation methodology is used.
TapRoot Investigation Team Leader for Category 4 Incidents	TapRooT® Investigation Team Leader for Category 4 Incidents is an individual who has at a minimum completed the TapRoot Overview Training or equivalent, and is a Grade 16 Manager or higher assigned by the law organization, corporate HES&S and Corporate Emergency Response Group.
TapRooT® Methodology	The use of TapRooT® Methodology to conduct formal Investigations and includes the use of the TapRooT® SnapCharT™ or an Events & Causal Factors Chart and the TapRooT® Root Cause Tree®, and TapRooT® Root Cause Tree® Dictionary. Use of the TapRooT® methodology or Root Cause Tree requires a TapRooT® Investigator.
Tier 1A Injury	Tier 1A Injury is an actual serious injury, resulting in a; fatality, hospitalization, amputation, permanent organ damage, or other life-altering event. As defined by the "AFPM Personal Safety Incident Matrix".
Tier 1P Injury	Tier 1P Injury is an incident with the potential to be high severity (Tier 1A) with a less than serious outcome (not life altering/threatening injury that resulted in a first aid or more severe injury). A Tier 1P could have resulted in a Tier 1A if circumstances of the incident would have been slightly different. As defined by the "AFPM Personal Safety Incident Matrix".
Tier 1P Near Miss	Tier 1P Near Miss is an incident with the potential to be high severity (Tier 1A) with a less than serious outcome (not life altering/threatening that did not result in an actual injury). A Tier 1P could have resulted in a Tier 1A if circumstances of the incident would have been slightly different. As defined by the "AFPM Personal Safety Incident Matrix".
Tier 2 Injury	Tier 2 Injury is an injury with moderate severity, either actual or potential. As defined by the "AFPM Personal Safety Incident Matrix".
Tier 3 Injury	Tier 3 Injury is an injury with low severity or potential, minor or no outcome. As defined by the "AFPM Personal Safety Incident Matrix".

Table 1 Definitions

Term	Description
Walk the Line (WTL) Incident / Near Miss	Walk the Line (WTL) Incident/Near Miss is defined as an incident that led or could have reasonably led to a Loss of Primary Containment (LOPC), Product Quality (PQ) or Operational Upset event due to: (a) Misidentification of Equipment for Maintenance: Occurred when any equipment other than the specified equipment or piping was opened, cut, or energized/deenergized. (b) Incorrect Line-Up: Occurred when valves were not properly aligned according to procedure and process fluid was directed away from the intended destination or was released to the atmosphere. Includes loading into or loading from the wrong location, equipment, and transport/barge/ship compartment. (c) Open Ended Lines or Valves Left Open: Occurred when the process piping had a path to atmosphere that did not terminate at a blind or blind flange or closed valve which resulted in a release/LOPC. – Includes valve leaking (partially open) – Includes plug not installed (d) Energy Isolation Error: Occurred when equipment was made available for maintenance, but an energy or material hazard was still present due to inadequate verification of zero energy (by opening and verifying drains/vents or trying switches). (e) Commissioning Equipment Not Ready for Service: Occurred when equipment or piping was energized or returned to service and process fluid was released to atmosphere at un-torqued flanges or manways, air still existed in the system, temporary blinds were still in place, or other reasons equipment or piping was not ready. (f) Incorrect Procedure Execution: Occurred when a procedure was not followed step-by-step, when a procedure was deviated from without having been approved by three knowledgeable people, or when an error occurred due to lack of maintaining one master copy during execution.

4.0 INVESTIGATION GUIDELINES

Table 2 Investigation Guidelines by Category of Incident

Category 0 Incidents
(a) Incident report or equivalent form should be complete within 24 hours but no later than 48 hours of occurrence. (b) No formal investigation required.
Category 1 Incidents
(a) Incident report or equivalent form should be complete within 24 hours but no later than 48 hours of occurrence. The submission of the Incident report form shall constitute the initiation of the investigation. (b) Incident investigation report complete within 30 days of occurrence, unless extended per RSP-1704-000 Section 2.6.7. (c) Investigation is required.

Table 2 Investigation Guidelines by Category of Incident

(d) Team Requirements at a minimum:

- One (1) category 0-1 Investigation Leader
- One (1) person knowledgeable in the process or work scope of the associated incident (could be hourly or salary)
- One person can fill multiple roles in a category 1 investigation
- If a contractor is involved with the incident, a contractor representative will participate in the investigation. For a Category 1 investigation, participate means the contractor will provide access to their employees for interviews, samples, paperwork, etc.

Category 2 Incidents

(a) Incident report or equivalent form should be complete within 24 hours but no later than 48 hours of occurrence. The submission of the Incident report form shall constitute the initiation of the investigation.

(b) Investigation must be conducted using the TapRooT® or Learning Team which is an approved alternative investigation method as noted in RSP-1704-000 Section 2.6.3. Except for where prohibited per ***Note 1*** in RSP-1704-000 Section 2.6.3, which must use the TapRoot® methodology:

- OSHA PSM Incidents in California and Washington
- Flare CD/NSPS Ja Reportable Flaring incident
- NSPS Ja Fuel Gas Combustion Device Reportable Events
- NSPS Ja Sulfur Recover Unit (SRU) Reportable Events
- MACT CC Atmospheric PRD Events
- MACT CC Reportable Flaring Events
- MACT CC Benzene Fence Line Rolling Annual Average

(c) Investigation must be complete within 60 days, unless extended per RSP-1704-000 Section 2.6.7, except for the following events which shall have completed investigations no later than 45 days following the event:

- Flare CD/NSPS Ja Reportable Flaring incident
- NSPS Ja Fuel Gas Combustion Device Reportable Events
- NSPS Ja Sulfur Recover Unit (SRU) Reportable Events
- MACT CC Atmospheric PRD Events
- MACT CC Reportable Flaring Events
- MACT CC Benzene Fence Line Rolling Annual Average

Note: Flare CD Reportable Flaring incident investigations not completed within 45 days are subject to stipulated penalties per day.

(d) Team Requirements at a minimum:

- One (1) Category 2 Investigation Team Leader
- One (1) person knowledgeable in the process or work scope of the associated incident (could be hourly or salaried)
- If a contractor is involved with the incident, a contractor representative will participate in the investigation
- One person can fill multiple roles in a Category 2 investigation

Category 3 Incidents
(a) Incident report or equivalent form should be complete within 24 hours but no later than 48 hours of occurrence. The submission of the Incident report form shall constitute the initiation of the investigation.
(b) TapRooT® or Learning Team except where prohibited per ***Note 1*** of RSP-1704-000 Section 2.6.3 and complete within 60 days, unless extended per RSP-1704-000 Section 2.6.7.
(c) Team Requirements at a minimum: – One (1) Category 3 Investigation Team Leader – One (1) person knowledgeable in the process or work scope of the associated incident (could be hourly or salaried) – If a contractor is involved with the incident, a contractor representative will participate in the investigation – One person can fill multiple roles in a Category 3 investigation
(d) Site visit required.
(e) The results of the investigation must be presented to the Executive Vice President of Refining
Category 4 Incidents
(a) Incident report or equivalent form should be complete within 24 hours but no later than 48 hours of occurrence. . The submission of the Incident report shall constitute the initiation of the investigation.
(b) TapRooT® or Learning Team except where prohibited per Note 1 of RSP-1704-000 Section 2.6.3 and complete within 60 days, unless extended per RSP-1704-000 Section 2.6.
(c) Category 4 Investigation Team Leader assigned by law organization, EPG (Corporate Emergency Preparedness Group) and component management.
(d) Grade 16 manager or above outside the effected business group.
(e) Minimum Team Requirements: – One (1) Category 4 Investigation Team Leader – Two (2) people trained in the in the investigation method to be used (TapRooT® or approved alternative investigation method) – One (1) person knowledgeable in the process or work scope of the associated incident (could be salaried or hourly) – If a contractor is involved with the incident, a contractor representative will participate in the investigation.
(f) Site visit required.
(g) Incident investigation shall be approved by the Executive Vice President of Refining and the incident summary and recommendations be presented to the HES&S Management Committee.
Table Notes
(a) For Cat 2+ Investigations, TapRoot investigation leaders will be assigned from the list of individuals with current TapRoot training. The leaders will normally be from outside the Operations Team where the incident occurred.
(b) Contractor representation on the Incident Investigation is required if a Contract employee was directly involved or material to the Incident. This applies to PSE Tier 1, 2 and high potential Tier 3 incident types.
(c) An hourly representative is required on all Category 2-4 investigations.
(d) A PSM department representative is required on all Category 3 and 4 incident investigation teams for PSE 1 incident types.
(e) An extension of an investigation due date requires approvals as defined in the table of this document.
(f) Reference RSP-1310 section 2.0 for additional guidance on roles and responsibilities.

5.0 REPORT THE INCIDENT

A. Immediate verbal notice of all Incidents will be made per established notification procedures.

- Notify Supervision immediately
- Complete an Occupational Injury & Illness Report for work related injuries and illnesses. (responsibility: Safety Supervisor)
- Certain security incidents are not entered in Intelex or must be secured within Intelex. Consult with Security before entering a security incident in Intelex.

B. All incidents shall be reported to management using an approved electronic reporting and tracking system, such as Intelex (or equivalent). MPC Personnel or Coordinator responsible for the work that requires the incident report will submit the incident report into Intelex (or equivalent) by the end of the work-day or shift. During Turnarounds, the incident report form in Intelex (or equivalent) shall be completed for any incidents/injuries/H_2S that occurred in the unit(s) that turnaround is taking place and submitted to by the end of the work-day or shift.

C. All incidents must be documented within 48 hours of knowledge of occurrence.

D. For injuries, the name of the MPC Representative that was notified of the incident shall be documented.

E. Supervisors may request that personnel (employees or contractors) involved or in the area of an incident complete their own witness statement (Initial Witness Statement Form 307.3721) immediately. At a minimum, the witness statement should include:

- witnesses name, title and company,
- date, time and location of incident,
- people involved,
- incident description with details, and
- witness signature and date.

F. The completion of the initial incident report form, or equivalent, shall constitute the initiation of the investigation. The date of the initiation of the investigation must be documented in the incident report.

6.0 PRELIMINARY INVESTIGATION

Apply the following for the preliminary investigation:

A. When an incident occurs that results in a potential for significant or unusual legal liabilities, the applicable manager will contact MPC's Law Organization for legal advice. **The Law organization may be contacted by calling 1-877-MAPLINE (1-877-627-5463) and asking to be connected to a HESS&PQ attorney.**. The Law Organization will provide legal guidance, and a privileged and confidential investigation of the incident, or specific aspects of the incident, may be initiated under the direction of an attorney separate from this standard. These incidents may include, but are not limited to:

- Personal injury to a resident or damage to a residence outside the fence line as a result of a facility incident,

- An abnormal number (10 or more) community complaint about the facility from residents around the facility,
- An investigation request from an elected official,
- A fish or migratory bird kill adjacent to or at the facility,
- A Grand Jury subpoena resulting from an incident,
- An agency inspection conducted by or accompanied by law enforcement officials (Police, FBI, Justice Department, USEPA Criminal Investigation Division),
- An agency inspection conducted by an agency joint task force (USEPA NEIC) or pursuant to a published agency priority or emphasis program,
- An agency inquiry that involves any warrant or subpoena of any kind,
- An agency inspection as a result of an incident,
- A security breach that result in a response by a federal agency (FBI, DHS, etc.),
- A spill or release that mobilizes CERT, and
- Intentional employee misconduct that: (1) causes an event that requires government notification, (2) could result in a material misrepresentation of fact to the government or (3) that results in or occurs during a government investigation

B. The initial on-site investigation should be both thorough and timely to preserve evidence that may not be available later. Evidence may consist of equipment, hardcopy or electronically stored records, maps, photographs, video, eyewitness accounts/statements, etc.

C. Evidence must be maintained consistent with the company's records retention policy and any applicable orders or hold orders. Evidence may consist of physical equipment, hardcopy or electronically stored records, maps, photographs, video, etc.

D. The preliminary investigation must document if a contractor was involved, and information about the contractor and contractor company.

7.0 IMMEDIATE CORRECTIVE ACTION

For a PSE "any PSM Incident or Near Miss", an evaluation must determine if immediate corrective actions are required to ensure safe operation prior to resuming normal operations.

Examples of such immediate corrective actions are:

- initiating emergency response actions,
- changing operating procedures,
- changing instrument alarm set points,
- inspecting equipment to verify that it is safe to operate (e.g. inspecting a vessel critical process variable "not-to-exceed" (NTE) limit), and
- notify government or outside agencies if necessary, for notification purposes or to gain approval prior to start up.

Note: These changes often require Management of Change and/or Pre-Startup Safety Review, which should also be referenced as part of the Immediate Corrective Action.

8.0 CLASSIFY INCIDENT

Apply the following to classify incident:

A. Incidents will be categorized as either a Category 0, 1, 2, 3, or 4 according to RSP-1310

B. Incident investigations may be elevated to a higher category.

C. If elevated, the time frame for completion shall be changed to the new category (for example, if after occurrence of an incident there is new information received that requires either the incident be re-categorized, the requirements for completing the incident investigation and completing the Risk Assessment start from the day it was re-categorized. The site shall document the date of the change and Category change within the incident management system).

D. If an event meets the definition of an Incident Category 0 -1 but the Management Team would like to raise the level of investigation to a Category 2 investigation:

- It shall be completed with the requirements of a Category 2 Investigation per Table 2.1.
- It should be indicated in the incident management system that this was "a Category 0 or 1 investigation that elevated to a Category 2 or higher investigation?"

E. There may be limited situations where an incident may be investigated at a lower level. In those cases, the request shall be approved by the Refining General Manager on an individual incident basis. The date of this decision, the approver and the justification must be documented. The refinery will retain the documentation.

Note: Events may NOT be investigated at a lower level include:

- RMP,
- OSHA PSM and Near Misses (PSE 1, PSE 2, and High Potential PSE 3),
- Flare CD/NSPS Ja Reportable Flaring incidents,
- NSPS Ja Fuel Gas Combustion Device Reportable Events,
- NSPS Ja SRU Reportable Events,
- MACT CC Atmospheric PRD Events,
- MACT CC Reportable Flaring Events, and
- MACT CC Benzene Fence line Rolling Annual Average.

F. An incident number will be assigned for each incident.

G. The incident type(s) will be documented. An incident can have more than one type.

H. Evaluate the incident utilizing the matrix in Attachment 4 Serious Injury or Fatality (SIF) Flowchart to determine if it was a 1A or had 1P potential and designate it accordingly in an approved electronic reporting and tracking systems such as Intelex. Also, determine if it is necessary to investigate significant "near miss" or "report only" incidents.

9.0 INVESTIGATE

Apply the following to investigate:

A. Assemble a Team per RSP-1704-000 Section 2.5.

B. Category 1 incidents require an investigation; however, a root cause methodology does not have to be utilized. The Anacortes Refinery default methodology is the 5 Why methodology. The investigation and recommendations will be documented in Intelex (or equivalent).

C. The TapRooT® incident investigation methodology is the default methodology for Category 2-4 investigations.

D. A Learning Team may be used as an approved alternative investigation method for Category 2-4 investigations in of with approval of the site General Manager (except where not allowed per Note 1 below).

Notes:

1. Exceptions requiring TapRooT® investigations include:
   - OSHA PSM Incidents in California and Washington
   - Flare CD/NSPS Ja Reportable Flaring incident
   - NSPS Ja Fuel Gas Combustion Device Reportable Events
   - NSPS Ja Sulfur Recover Unit (SRU) Reportable Events
   - MACT CC Atmospheric PRD Events
   - MACT CC Reportable Flaring Events
   - MACT CC Benzene Fence Line Rolling Annual Average
2. Use of the Learning Team alternative investigation methodology for Category 2-4 investigations must be approved by the site General Manager. The site shall maintain documentation of who approved the alternative method and the date of the approval.

Additional tools and techniques may be applied, in addition to TapRooT® or Learning Team at the discretion of the investigator.

E. It is also permissible to complete a Learning Team in conjunction with a TapRooT® as long as all the requirements of TapRooT® are met. A TapRooT® or Learning Team investigation method shall be used for Category 3 and 4 incidents (and others upon request) unless otherwise directed by an attorney directing a privileged and confidential investigation.

F. Application of the TapRooT® incident investigation methodology requires the use of the TapRooT® SnapChart™ or an Events & Causal Factors Chart and the TapRooT® Root Cause Tree®. Application of the Learning Team methodology requires the participation of those doing the work and identification of problem statements. If a PSE1 or PSE2 has occurred, in addition to the investigation, a PSE Data Sheet must be completed and forwarded to MPC Corporate Safety and Security.

- In Refining, the PSE Data Sheet requirement is fulfilled by completing the PSE sub-incident within Intelex.
- Annually Refining PSM will provide a report compiling the datasheets to MPC Corporate Safety and Security.

G. Except where excluded by the Note below, when the incident cause is directly the result of a natural event (i.e., flood, tornado, hurricane, and earthquake) neither a TapRooT® nor Learning Team alternative investigation method is required to be documented. Instead, an incident preparedness and improvement critique will be conducted, documented and recommendations for improvement developed. Critique recommendation will be handled in the same manner as incident investigation recommendations. The root cause is known therefore, the best utilization of the investigation resources is to determine how to better prepare in the future for such events (response critique).

Note: The following events must still have a TapRooT® or Learning Team alternative investigation method investigation in the event of a natural event (see Note 1 of RSP-1704-000 Section 2.6.3 for allowed investigation methodology):

1. RMP,
2. OSHA PSM and Near Misses (PSE1, PSE2, high potential PSE3 events),
3. Flare CD/NSPS Ja Reportable Flaring incidents,
4. NSPS Ja Fuel Gas Combustion Device Reportable Events,
5. NSPS Ja SRU Reportable Events,
6. MACT CC Atmospheric PRD Events,
7. MACT CC Reportable Flaring Events, and
8. MACT CC Benzene Fence Line Rolling Annual Average Events.

H. If the investigation team is unable to meet the time requirements of an investigation per this procedure, incremental extension of the original category duration can be granted with approval according to the table below. The date of decision, approver, and the justification shall be documented. Documentation is to be maintained within the investigation report.

Incident Severity	First Extension (Length/Approver)	Any Subsequent Extensions (Length/Approver)
Category 3 and 4	Up to 60 days/General Manager	Not limited/General Manager
Category 2	Up to 60 days/Direct report to General Manager	Not limited/General Manager
Category 0 and 1	Up to 30 days/Direct report to General Manager	Not limited/Direct report to General Manager

Note: Certain environmental investigations may not be extended beyond 45 days (Flare CD/NSPS Ja Reportable Flaring incidents, NSPS Ja Fuel Gas Combustion Device Reportable Events, NSPS Ja SRU Reportable Events, MACT CC Atmospheric PRD events, MACT CC Reportable Flaring Events, and MACT CC Benzene Fence line Rolling Annual Average).

10.0 RISK ASSESSMENT AND RANKING

A risk assessment and ranking shall be completed once the incident investigation facts are determined and prior to recommendation development. The Risk Calibration Standard (GEN-1010) outlines the risk assessment and ranking procedure to be used for any Category 2-4 incident investigation.

The required incident risk assessment and ranking shall be applied to the incident under investigation. The risk ranking for the incident will then apply to root cause recommendations from the incident. Recommendations not directly related to the root cause(s) of the event will not be risk ranked.

If a Risk Rank A is discovered and applies to the incident under investigation, the risk shall be reported to the Refinery Manager as soon as possible.

The risk assessment and ranking results (consequence and frequency categories and risk rank) shall be tracked and retained in the site or organizational recommendation management system.

11.0 DEVELOP EFFECTIVE RECOMMENDATIONS

The investigation team, working in conjunction with appropriate subject matter experts or process owners, will develop a recommendation(s) or corrective action(s) directly related to the incident's root-cause(s). For Category 2-4 incidents, each recommendation(s) will carry the same pre-risk ranking as the incident. Each recommendation will have a post risk ranking reflecting the residual risk rank once the recommendation is complete.

Recommendations not directly associated with the incident's root cause do NOT require a risk ranking.

Note: For example, recommendations considered as "opportunity for improvements" or "lessons learned" and not directly related to preventing the incident do NOT require a risk ranking

Recommendations are to be clear and specific, including equipment names and numbers, along with reason for the action.

12.0 INCIDENT REPORT DEVELOPMENT

Apply the following for document results:

A. If an attorney's privileged and confidential investigation has been initiated, all reports, correspondence and other writings from the privileged and confidential investigation must be labeled and further managed as directed by the supervising attorney.

B. Details of the incident investigation must be documented. The report remains in draft form until approved.

C. When the TapRooT® methodology is used, the TapRooT® SnapChart™ or an Events & Causal Factors Chart including causal factors and the TapRooT® Root Cause(s) should be attached to the final report. Root causes for each recommendation will be documented in Intelex or equivalent Incident Investigator module when appropriate.

Note: The TapRoot SnapChart will be reviewed by the RLT before completion of the recommendations and final report.

Note: The Refining PSM Coordinator will review the draft Final Summary Report for PSE Tier 1 incidents.

D. The HES&S Leadership Committee must approve any equivalent investigation summary report forms. Approved forms include Intelex.

E. At a minimum, Category 1 incident investigation reports shall include:

- Site name,
- Location of the incident,
- Incident title and/or identifier,
- Company involved (Contractor),
- Date and time of the incident,
- Date and time the investigation started (see RSP-1704-000 Section 2.2.4),
- Incident type and category,
- Incident summary,
- Immediate corrective actions (as needed),
- What caused the incident including the initiating event, direct and indirect contributing factors,
- Recommendations (as needed) and schedule for addressing the recommendations and responsible person,
- Lessons learned (as needed),
- Investigation team (as needed), and
- Final report date.

F. At a minimum, category 2 and higher incident investigation reports mustl include the above reporting requirements plus the following:

- The name and amount of the regulated substance involved in the release or near miss, and the duration of the incident,
- Description of the incident in chronological order, providing all relevant facts,
- Factors that contributed to the incident including initiating event, root cause(s) and direct or indirect contributing factors,
- Consequences, if any of the incident including, but not limited to: injuries, fatalities, the number of people evacuated, the number of people sheltered in place and the impact to the environment,
- Emergency response actions taken,
- An assessment of risk,
- RMP Incident (yes or no), PSM Incident (yes or no) (PSE-1, PSE-2 or High Potential PSE-3),
- Documentation of the Investigation Methodology,
- Appropriate root cause analysis documentation, including:

- For TapRoot®
  a. Entry of causal factors is required.
  b. Entry of Basic, Near and Root Causes associated with each causal factor using the imbedded selection in the electronic incident management system is required.
  c. Snap Chart showing sequence of events and relevant facts is required.
- For Learning Team (alternative investigation methodology)
  a. Entry of Problem Statements (in place of causal factors) is required.
  b. Documentation from the Learning Team methodology.
  c. Entry of Error Types and Error Traps using the imbedded selection is recommended to facilitate future data mining efforts.
- For both TapRoot and Learning Team (alternative investigation methodology)
  a. Linking of Causal factors (problem statements for learning teams) to the associated corrective recommendation in the electronic incident tracking system
- Identification of Root Cause Corrective Actions (recommendations)
- Pictures, drawings, third party analysis or any other relevant supporting documentation, and
- Approver of final report.

G. If a contractor was directly involved or material to the incident, the following additional information is required:
- The name of the contactor company involved,
- The date and time that notification to MPC was made, and
- For a Category 1 incident, the cause and recommendations must be documented.

H. For incidents classified as WAC 296-67-363"process safety incident", refer to R-12-020, Process Safety Incident Investigation Guidelines.

I. If the event was (also) categorized as a Flare CD/NSPS Ja Reportable Flaring incident MACT CC Atmospheric PRD event, or and MACT CC Benzene Fence line Rolling Annual Average events please see RSP RSP-1704-000 for additional report requirements.

Note: Incident investigations for Flare CD/NSPS Ja Reportable Flaring incidents, NSPS Ja Fuel Gas Combustion Device Reportable Events, NSPS Ja SRU Reportable Events, MACT CC Atmospheric PRD, MACT CC Flaring Events, and MACT CC Benzene Fence line Rolling Annual Average events must be complete within 45 days

13.0 REVIEW FINDINGS AND APPROVE RECOMMENDATIONS

Apply the following for reviewing findings and approving recommendations:

A. Upon completion of investigation, the investigation findings and recommendations will be presented to the appropriate managers to ensure there is a complete understanding of the basis of all recommendations or corrective actions.

Note: At the discretion of the Refinery Management, Category 1 investigation reports and recommendations may be reviewed and approved by the Refinery Management or by individuals designated by the Refinery Management.

B. Category 2-4 investigation reports and recommendations will be reviewed and approved by Refinery Management. Additionally, PSE1 investigations must be approved by the Refining Process Safety and Risk Manager. Additionally, Category 4 investigations must be approved by the Senior Executive Vice President of Refining. Appropriate managers will evaluate the recommendations or corrective actions based on effectiveness. Management approval is required for implementation of the recommendations or corrective actions.

Notes:

1. Recommendations must be addressed and documented in a timely manner, and in accordance with the Risk Calibration Standard where applicable.
2. The review will result in assignment of a responsible individual and due date for completion for each approved recommendation or corrective action.
3. Once a recommendation has been approved by management, rejection of the recommendation or otherwise deciding not to adopt the recommendation must be justified and documented. Documentation as to why a recommendation was rejected must be included with the closure of the recommendation item.
4. Rejection of recommendations for Category 2 causal factors and higher events require RLT approval. Rejection of recommendations from PSE investigations must be based on criteria listed in Section 14 and communicated per RSP-1310 Section 5.3.2.

14.0 CORRECTIVE ACTION MANAGEMENT

Apply the following for assigning, implementing and tracking recommendations:

A. Each responsible individual must be notified of the assigned recommendation or corrective action and due date.

B. Approved recommendations or corrective actions will be tracked to closure using a system that meets RSP-1310 Section 5.4. Periodic reminders will be sent to assigned responsible individuals for all incomplete recommendations.

C. The responsible individual must communicate and document the action taken and date of completion for each assigned recommendation or corrective action for closure. Recommendations or corrective actions cannot be resolved using promissory or future action.

D. A recommendation to evaluate (or investigate) options should result in one of two things:

1. When an evaluation results in a recommendation to make a change, a second action item is to be opened in Intelex (or equivalent) to install the change. The item is to remain open in Intelex (or equivalent) until the change is implemented.
2. Evaluations that require no further action can be closed upon issuance of appropriate documentation.

E. OSHA lists the following four reasons acceptable for not implementing a recommendation:

1. The analysis upon which the recommendation is based contains material factual errors.

2. The recommendation is not needed to protect the health and safety of employees, contractors, or "offsite receptors".
3. An alternative measure provides a sufficient level of protection.
4. The recommendation is infeasible.

F. Any change to the recommendation target due date must be approved by a Manager or designee and communicated to affected personnel, periodically. Reference PSM Related Recommendation Management Site Plan PS-05.

15.0 COMMUNICATION AND INFORMATION SHARING

Incident investigation lessons learned, recommendations, and other relevant information must be communicated with affected employees and contractors. Applicable findings may be shared with appropriate contractors and other MPC organizations as determined by management.

The Law Organization will determine what information can be communicated if a privileged investigation has begun.

Category 2-4 incident summaries and recommendations for OSHA PSM (PSE 1, 2, and high potential PSE 3's) will be covered in the Safety Meetings. Please see RSP-1310 Section 4.6 for other communication plan requirements for PSM Incident or Near Miss.

All RMP events with known offsite impacts (death, injury, evacuation, shelter in place, property damage, or environmental damage) (see RSP-1310 App. B.2) require a public meeting to be held within 90 days of the event per 40 CFR 68.210. Refer to RRD-1310-001 Public Meeting Guidance for information on holding public meetings.

Summary reports and recommendations will be available through Intelex (or equivalent).

External site incident communication per below:

A. Table 3 outlines the requirements for communication of an incident outside the site and within the MPC Organizations.

1. There is a two-phase communication system and is based on the significant learning potential of the incident. When an Incident with significant learning potential occurs, Refining shall send a post-investigation learning communication to the Corporate HESS&PQ Event Learning SME for distribution at a minimum to the Incident Learning Communication Network members who are not part of the Organization where the incident occurred. If there is significant learning potential immediately after an Incident, Refining should send an event learning flash to the Corporate HESS&PQ Event Learning SME for distribution to other parts of MPC. When evaluating learning potential, consider applicability to other parts of MPC. Consult with the Law Organization as appropriate before sending an event learning communication.

   Note: An event learning flash is a simple communication that an event has occurred. Basic facts are provided such as but not limited to site, location, severity of injury and immediate learnings. The incident flash must be sent from the site to Corporate Refining HESS&PQ. The target time frame is 7 days of the incident being recognized as having significant immediate learning potential. Incidents categorized as a 3 or 4 should be considered to have significant immediate learning potential unless Corporate Refining HESS&PQ provides other direction.

2. Incidents with significant learning potential will be investigated per the time requirements of this procedure.
3. Post-investigation learning communications shall be issued no more than 8 weeks from the completion of the investigation. The post-investigation learning communication shall include what caused the Incident and the recommendations to prevent reoccurrence.
4. The Law Organization will determine what information can be communicated from an attorney's privileged and confidential investigation.

B. Once the Incident communication has been approved, Corporate HESS&PQ and/or Communications will distribute the Incident communication, according to Table 3 below. If the incident is classified as WAC 296-67-363 "process safety incident" refer to R-12-020, Process Safety Incident Investigation Guidelines.

Table 3 Communication Requirements

Incident Category	Minimum Requirements	Event Learning Flash	Post Investigation Learning
1 & 2**	Time	Refinery Management to determine if outside communication is necessary	
	Responsible		
	Approval	Refinery Management	
	Distribution	Site	
3	Time	Approximately 7 days	8 weeks after the investigation is complete
	Responsible	Site and Communications	
	Approval	Refining and Communications, Law	
	Distribution	Site, Refining* & MPC*	
4	Time	Approximately 7 days	8 weeks after the investigation is complete
	Responsible	Site and Communications	
	Approval	Refining, Communications, Law	
	Distribution	Site, Refining* & MPC*	
Approval		Group(s) that must approve the communication	
Distribution		Minimum distribution requirements	
Law		Legal Department	
MPC		Marathon Petroleum Corporation	
Responsible		The group responsible for drafting the communication	
Site		Location in which the Incident occurred	
*		Distribution of Incident Flashes and Incident Findings beyond the site is limited to incidents with significant learning potential. Refining Directors will make final determination if significant learning potential is present.	

Table 3 Communication Requirements

Incident Category	Minimum Requirements	Event Learning Flash	Post Investigation Learning
**		Follow communication requirements for Incident Category 3 if significant learning potential or significant immediate learning potential is identified.	

16.0 RECORD RETENTION

All Investigation reports and data must be provided to the appropriate custodian and retained as specified by MPC's Record Retention Policy (MPC Policy #6003).

Note: PSE 1, 2 and High Potential 3 Incident, and PSM Incident or Near Miss investigation reports on RMP covered process shall be retained for five years.

17.0 CONTINUOUS SYSTEM IMPROVEMENT

Apply the following for trending, process measures and continuous improvement:

A. Overall, incident data should be analyzed and trended to alert management to chronic or systemic problems, to see if recommendation or corrective actions are effective, and to help measure change. The PSM Coordinator or designee will have this responsibility.

B. Process effectiveness will be periodically monitored through organization and corporate auditing.

C. Conduct periodic site Self Audits on incident investigations and the investigation process.

D. The following performance metrics shall be tracked by each Site and made available for reporting to Refining HES&S on a weekly basis as specified in GEN-1015. This is accomplished by maintaining the data within the system of record (e.g., Intelex).

1. Number of Occupational Safety, Process Safety, Designated Environmental incidents and Product Quality Incidents.

E. The following performance indicators shall be tracked by each Site within Intelex and available for performance monitoring at the site and by Refining HES&S.

1. Number of incidents by category type,
2. Number of incidents by type, including:
   - Number of Walk the Line Incidents (WTL), and
   - Number of Human Error Incidents, and Near Misses
3. Number of incident investigations past due (the clock starts the following day after the incident report is submitted and ends upon approval of the incident by the management team and indicated by submission of the incident report to Final Approval within Intelex).

18.0 TRAINING

Personnel who lead or facilitate the Incident/Near Miss Investigation Process shall be trained as outlined below.

A. Category 2 or 3 Investigation Team Leaders must be trained in the investigation method employed. Meeting the requirements of a TapRooT® investigator satisfies this requirement if the TapRooT® Methodology is employed.

B. TapRooT® investigators assigned as a Category 2 or Category 3 Investigation Team Leader OR to a Category 4 incident must successfully complete the 2-day TapRooT® incident investigation and Root Cause Analysis Training (either an in-house or public course) or equivalent.

C. Grade 16 or above Managers assigned to a Category 4 incident must successfully complete the TapRoot Overview training or equivalent if leading a TapRoot investigation, or the REF PSM HOP Overview or equivalent if leading a Learning Team Investigation (alternative investigation method). The Grade 16 manager or above is assigned by the Law organization, Environmental , Safety, & Security (ES&S) Group and Component Management. The investigation leader must be training in the methodology to be employed.

D. Learning Team Facilitators assigned as a Category 2-4 incident investigator must have successfully completed the PSM Ref Learning Team Facilitator training.

- Category 0-1 Investigators leading Category 1 investigations require investigation training to be competent in the investigation methodology employed. Root Cause Investigation Training (SFYGEN011), "Two Box", Five WHYs", Learning Team and/or KUBO-TEPA are examples of methodologies that satisfy this requirement.

19.0 REVIEW AND REVISION HISTORY

Revision #	Preparer	Date	Description
0	Evan Slodysko	3/15/2022	Edited Sections 3.0, 24.0, 24.1, and 24.2 Reformatted and Numbered per Document Control Policy, R-63-001.
1	Evan Slodysko	2/22/2023	Updated Section 24 to include details from RSP-1310 Rev 12 (clarifications around PSE 3 vs PSE 4 related to spurious trips) in fulfillment of self-audit recommendation #290512.
2	Diane Rusher	10/2/2024	Line-by-line review. Per Revision 10 of RSP-1704(1-4) and Revision 14 of RSP-1310(5-8) 1. Align with Gen-1006 to allow use of Learning Team investigation method and external event communication to be only required for events with significant learning 2. Updated incident classification in Appendix C: Gen - 1006 alignment; AFPM Personal Safety Classification; Align PRV and SIS failure investigation levels with RSP-1308 3. Clarified incident types including AFPM 1A/1P, WTL, Human Error 4. Clarified expectations on documentation within Intelex

			5. Updated PSE 1, PSE 2 definitions to align with API 754 3rd edition 6. Clarified PSE 3 definitions and added/updated examples including classification of Low-Low heater O2 events 7. Updated PSE 4 definitions including clarifying PSE 4-Fires, PSE 4- Spurious or Inadvertent Activation of a Safety System, defining Mechanical Integrity, DCS and other PSE 4 examples 8. Updated and clarified H_2S E tagging requirements 9. Revisions Per WAC 296-67-300-Requirements for Petroleum Refineries to reduce the risk of process safety incidents by eliminating or minimizing process safety hazards to which employees may be exposed are effective December 27, 2024.

20.0 ATTACHMENT 1 – INCIDENT CATEGORIES

Incident Category	Safety	Environmental	Health	Process Safety	Product Quality	Security	Other
0	(1) Near Miss or First Aid that is not an AFPM matrix Tier 1P (2) Report Only Incident	DEI T-1	Personal Alarm Monitor (PAM) false alarms (interference, cross sensitivity, dropped instrument) or alarm events which occur when proper respiratory protection is worn.	PSE T-3 PSE T-4 if management system failure	PQ-0	Any security related incident that may affect the site but does not include an actual breach of physical security of the site.	Non-accident related traffic citations while conducting company business
1	(1) AFPM matrix Tier 2 or AFPM Tier 3 Recordables (2) AFPM matrix Tier 1P near miss	DEI T-2	Personal Exposures to airborne toxins (includes PAMs alarm events and industrial hygiene monitoring results) without appropriate level of respiratory protection above the Occupational Exposure Limit and below the Immediately Dangerous to Life and Health (IDLH) or H_2S Acceptable Maximum Peak Limit (<50 ppm). For H_2S with use of Air Purifying Respirator, this includes alarm events >100 ppm and <200 ppm.	PSE T-3 SIS Failure on Test (see RSP-1704-000 Appendix A.44)* *See RSP-1308 for additional maintenance reporting requirements. Visible HF vapor leaks including smoking or dripping, HF exposures** or potentially serious HF incidents per **API RP 751**. **HF Exposures follow classification based on AFPM matrix in safety column	PQ-1 and PQ-2* *See **RSP-1503-050** for Investigation Requirements	Any security related incident that directly affects the site, in which an actual breach of physical security has occurred at the site.	(1) Notice of Violation (Not otherwise specified in another column) other than roadside NOV (2) Accident related traffic citation while conducting company business (3) Public complaint of noise, odor, etc. (4) Preventable motor vehicle accident that resulted in an event that could be categorized as an Incident Category 2, 3, or 4
2	AFPM matrix 1P with injury or first aid	(1) DEI T-3 (2) Flare CD/NSPS Ja Reportable Incidents* (3) MACT CC Atmospheric PRD Events* (4) MACT CC Reportable Flaring Incidents* (5) MACT CC Benzene Fence line Rolling Annual Average Events* (6) NSPS Ja Fuel Gas Combustion Device Reportable Events* (7) NSPS Ja SRU Reportable Events* *See body of document, must have TapRooT® with 45-day completion, cannot be downgraded	Personal Exposures to airborne toxins (includes PAMs alarm events and industrial hygiene monitoring results) without appropriate level of respiratory protection above the IDLH limits for chemicals other than H_2S. For or H_2S, this includes any personal alarm event that is greater than the Acceptable Maximum Peak Limit (>50 ppm). For H_2S with use of an Air Purifying Respirator, this includes personal alarm events >200ppm.	PSE T-2 β, Ω High Potential PSE T-3 β, Ω SIS Fail to Activate on Demand (See RSP-1704-000 Appendix A.43)* PRV Fail to Operate on Demand (see RSP-1704-000 Appendix A.34)* *See RSP-1308 for additional maintenance reporting requirements. βSee body of document for details, cannot be downgraded. ΩCalifornia and Washington Sites, see body of document, must have TapRooT®	PQ- 3	Any security related incident in which an actual breach of physical security has occurred at the site and results in an injury to an employee, contractor or member of the general public.	(1) DOT reportable spills, releases, and or incidents which (a) are DEI-2's or greater and (b) require a PHMSA F7000-1 or a 5800.1 incident form (2) EPA RMP Accidents that are classified per **PSM-5008** (3) Consent Decree Flaring- Acid gas or hydrocarbon

Incident Category	Safety	Environmental	Health	Process Safety	Product Quality	Security	Other
3	(1) Non-Fatality AFPM matrix Tier 1A Incident (2) Incidents resulting in multiple injuries to members of the general public (i.e., multiple OSHA Recordable Injuries). (3) If such an incident occurs. The decision to elevate to a category 4 investigation will be made in accordance with RSP-1704-000 Section 2.3.1.	(1) DEI T-4 (2) In the event of a release or series of releases with the potential to cause Significant, Acute Environmental Impacts, a category 4-incident investigation may be warranted. The decision to elevate to a category 4 investigation will be made in accordance with RSP-1704-000 Section 2.3.1.	(1) Personal exposure to toxins above the IDLH that results in a 1A injury or hospitalization of multiple employees, contractors and/or members of the general public. (2) If such an incident results in hospitalization of 3 or more employees, contractors and/or members of the general public, a category 4 incident investigation may be warranted. The decision to elevate to a category 4 investigation will be made in accordance with RSP-1704-000 Section 2.3.1.	PSE T-1 [β, Ω] If such an incident occurs, the decision to elevate to a category 4 investigation will be made in accordance with RSP-1704-000 Section 2.3.1. [β]See body of document for details, cannot be downgraded. [Ω]California and Washington Sites, see body of document must have TapRooT®	N/A	(1) Any security related incident in which an actual breach of physical security has occurred at the site and results in multiple injuries to contractors, employees and/or members of the general public. (2) If such an incident results in hospitalization of 3 or more employees, contractors and/or members of the general public, a category 4 incident investigation may be warranted. The decision to elevate to a category 4 investigation will be made in accordance with RSP-1704-000 Section 2.3.1.	Mobilization of CERT with an assigned strike team
4	(1) AFPM matrix 1A fatality (2) Fatality involving members of the general public related to the incident.	Fatality involving employees, contractors and/or members of the general public related to the incident.	Fatality involving employees, contractors and/or members of the general public related to the incident.	Fatality involving employees, contractors and/or members of the general public related to the incident.	PQ-4	Fatality involving employees, contractors and/or members of the general public related to the incident.	(1) Suspected employee misconduct that may result in criminal liability for the company and/or for individual employees. (2) The decision to handle such an event as a category 4 investigation will be made in accordance with RSP-1704-000 Section 2.3.1.

21.0 ATTACHMENT 2 – RISK RANKING

Category 2 and higher incidents must be risk ranked. The following stepwise approach should be used for risk ranking incidents. For examples on risk ranking reference RSP 1704 Appendix B.

Category 2-4 Incident Identified
Step 1: Determine Consequence – Assume preventative safeguards fail Consider all four consequence types Determine most credible worst-case consequence category
Step 2: Determine Frequency – Assume both preventative and mitigative safeguards function as intended Select corresponding frequency category for reaching the credible worst-case consequence
Step 3: Determine Risk Rank - Locate consequence and frequency categories Determine risk from where they intersect A risk of A, requires immediate management notification
Step 4: Determine Response Criteria – Locate the determined risk in left column Locate associated response criteria in right column.

22.0 ATTACHMENT 3 – PRODUCT QUALITY CATEGORY DEFINITION

The following table is to be used to classify any Product Quality (PQ) incidents. The categories in Attachment 1 are taken from RSP-1503-050 and are to be applied to Refining. Refer to GEN-1006 for corporate definition and categorization.

Product Quality Incident Type Classification		
Refining PQ Incident Category	**Definition**	**Examples/Supplements**
PQ-4	Fatality involving employees, contractors, and/or members of the public related to the incident.	PQ incident resulting in a fatality.
PQ-3	Out-of-pocket costs to mitigate third-party business partner claims associated with the incident are greater than $100,000.	
	A voluntary media advisory is issued.	Corporate directed.
	Extenuating circumstances are deemed to be of such severity that Corporate Product Quality (a non-operating component) will elevate Category 0, 1, or 2 to a higher incident category. Challenges to the incident classification can be resolved through the Dispute Resolution Committee process.	**Note:** Refining PQ may also elevate any incident to a higher level or mandate a more thorough investigation if deemed appropriate.
PQ-2	Off-specification product is released from Refinery Control that is not pre-authorized by Product Quality, or a regulatory agency issues a written notice indicating a finding of off-specification product with tests that are irrefutable. **Note:** Although this falls under the Corporate Incident Investigation Category 1, for Refining PQ incidents, this will require a Tap Root investigation.	☐ **For Live Gasoline Shipments:** Release of product before all testing is completed that subsequently fails testing regardless of whether or not procedural controls allowing shipment had been established and followed. **Note:** Releases of off-specification product that fails to follow all previously approved protocols, procedures, and notifications for live release products is an automatic Category 2 Incident. ☐ Chemical Treatment above EPA registration level.
	Extenuating circumstances are deemed to be of such severity that Corporate Product Quality (a non-operating component) will elevate Category 0, 1, or 2 to a higher incident category. Challenges to the incident classification can be resolved through the Dispute Resolution Committee process.	**Note:** Refining PQ may also elevate any incident to a higher level or mandate a more thorough investigation if deemed appropriate.

Refining PQ Incident Category	Definition	Examples/Supplements
PQ-1	Quality is impacted but no off-specification product is released, or off-specification product is received unknowingly from another MPC component or third-party, but not released.	☐ Breakdown in product release procedures even if product is subsequently found to be on specification. ☐ Confirmed erroneous laboratory result on finished product, including wrong Vapor Pressure equation, falsification of test results, and using an instrument that had previously failed its quality check prior to taking appropriate action to resolve performance issues. ☐ Any PQ issues that result in missed/delayed pipeline, barge, or vessel shipments, or local rack sales being curtailed. ☐ Any parameter subject to statistical testing on releases that fails test when a check sample is pulled. ☐ Accidental chemical treatment above maximum dosage on Approved Additive list but below EPA registration limit. ☐ Marine vessels with off-specification product that have not reached their destination that can be managed.
	Release of off-specification product during "Live" shipments, where release is acknowledged by appropriate stakeholders, pre-authorized by Product Quality, and all release procedures are followed.	Products that are "Live" or "on-line" released products and are off specification when released to a customer, and all previously approved protocols, procedures, and notifications were followed to reduce impact. **Example:** Live shipments of LPG
	Extenuating circumstances are deemed to be of such severity that Corporate Product Quality (a non-operating component) will elevate Category 0, 1, or 2 to a higher incident category. Challenges to the incident classification can be resolved through the Dispute Resolution Committee process.	**Note:** Refining PQ may also elevate any incident to a higher level or mandate a more thorough investigation if deemed appropriate.

Refining PQ Incident Category	Definition	Examples/Supplements
PQ-0	Quality was not impacted, but there was a potential to have done so.	• Unplanned off-specification rundown streams that must be slopped. • Product downgrades caused by a PQ issue. • Re-blends of gasoline, distillates or black oils that do not result in a missed pipeline shipment or local rack sales being curtailed. • Cross-contamination of product that does not impact properties such that the product remains
	A waiver is granted by Product Quality.	– All products.
	Extenuating circumstances are deemed to be of such severity that Corporate Product Quality (a non-operating component) will elevate Category 0, 1, or 2 to a higher incident category. Challenges to the incident classification can be resolved through the Dispute Resolution Committee process.	– **Note:** Refining PQ may also elevate any incident to a higher level or mandate a more thorough investigation if deemed appropriate.
PQ-High Potential Designation	Some lower category incidents have the potential to become higher consequence incidents but didn't due to circumstances not managed by current processes, procedures, or engineered controls.	**High Potential Designation** incidents such as these will be investigated using TapRoot® or similar techniques and will be led by Corporate PQ or its designee. Refining may designate an incident in their organization as **High Potential**. Corporate Product Quality may also designate an incident as **High Potential** with approval from the Product Quality Committee. **Examples:** 1. Compromised jet fuel released to an airport but contained before it is used in flight. 2. Release of off-spec product where wider distribution (higher volumes or multiple distribution points) would incur claims >$100M or generate media exposure. 3. Release of off-spec product posing health or fitness for use concerns but contained prior to reaching the end user. 4. Notice of violation or enforcement action with potential for total fines >$100M. 5. Release of product containing unexpected levels of H_2S with the potential to expose personnel or public but is detected and recalled prior to exposure.

23.0 ATTACHMENT 4 – SERIOUS INJURY OR FATALITY (SIF) FLOWCHART

The following matrix is taken from the AFPM Occupational Safety Incident Classification Data Reporting spreadsheet. [AFPM Matrix]

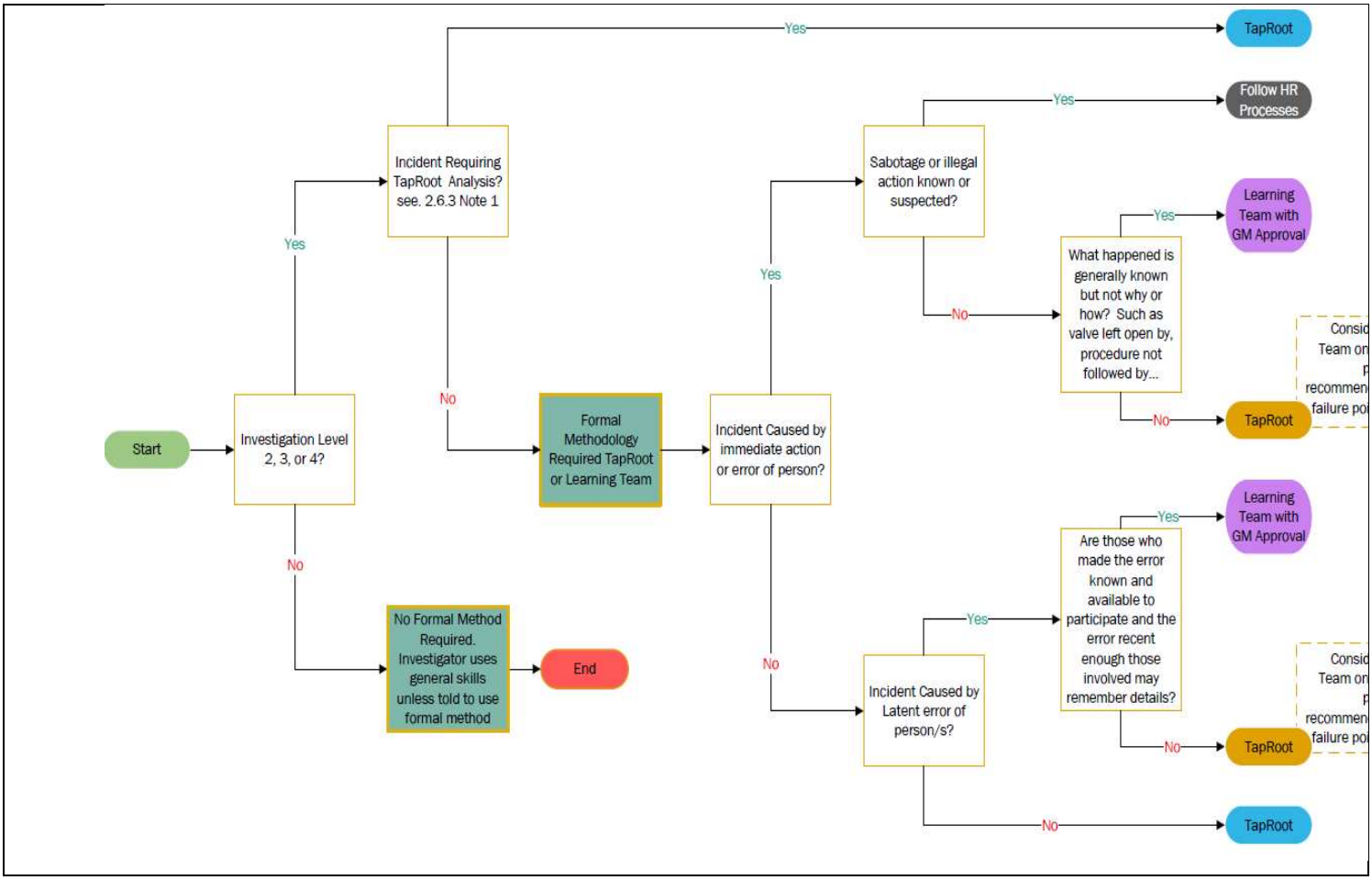
AFPM Personal Safety Incident Matrix

Outcome / Exposure		Tier 1a - Actual Serious Injury Occurred (Resulting in: Fatality, Hospitalization*, Amputation, Permanent Organ Damage, or Other Life Altering Event***)	# of Tier IA Incidents	# of Recordable Injuries		Tier 1p - High Potential Incident Occurred: High Potential With Less Than Serious Outcome (Not Life Altering/Threatening Injuries). (Potential for Fatality, Hospitalization*, Amputation or Other Life Altering Event***)	# of Tier IP Incidents	# of Recordable Injuries		Tier 2- Moderate Potential: Less Than Serious Outcome (Actual and Potential)	Tier II Metrics		Tier 3 - Low Potential: Minor or No Outcome	Tier III Metrics
Top Section: Injury Type/Consequence														
Injury/Exposure Type		Please enter 1 for each incident in the best/appropriate metrics box. If more than 1 type of injury, pick the most significant.												
H_2S Exposure	1	An Unprotected H2S exposure event			52	An unprotected H2S exposure event greater than IDLH or causing acute exposure symptoms or medical treatment.			106	Unprotected H2S exposure above > 50 and <100 ppm		151	Unprotected H2S exposure below 50 ppm	
HF Exposure	2	An HF exposure event			53	Any visual, or detected HF vapor/liquid release (except Wisp or flange discoloration). Any medical treatment related to HF contact. Note: presence of personnel not required.			107	Any minor (wisp or flange discoloration) loss of HF containment - no potential contact with personnel		152	Improper class of PPE used in HF alkylation unit.	
Exposure to Other Toxic Chemicals (not H2S or HF) /Biological agents/Radiation.	3	Any acute or chronic toxic chemical exposure event or asphyxiation.			54	Unprotected exposure event to chemicals greater than IDLH, or causing loss of consciousness.			108	Hazardous Materials Exposure exceeding OEL, PEL, TLV. Dizziness, nausea or other medical treatment for exposures not exceeding IDLH.		153	Improper removal of ACM (>1 linear foot) without enclosures, respirators, etc. Fallen insulation material	
	4	An exposure to radiation or biological materials event, bloodborne pathogens			55	An acute radiation exposure above the annual limit			109	Ionizing radiation exposure above acceptable limit, welding arc flash event		154	Radiation barrier not in place or compromised. Chemical barricade not in place or compromised.	
	5	Exposure/contact with animals, poisonous plants,			56	Any potential asphyxiation or unconsciousness (workers unprotected in an inert or low oxygen environment)			110	ACM exposure		155	Non-compliant lead abatement	
	6	Biological materials event, bloodborne pathogens, legionella, other infections			57	Dangerous/venomous animal, Snake, alligator, rabid animal, stinging/biting insect contact resulting in medical treatment. Other high potential biological exposure/event requiring treatment (example legionella exposure).			111	Dangerous/venomous animal: Snake, alligator, rabid animal biting/stinging insect, contact / near miss incident. Other biological exposure event.		156	Bloodborne pathogens exposure. Report of dangerous animal on premises. No reaction to sting/bite.	
Contact with Electricity	7	An Electrical shock, or arc flash event.			58	Any actual or potential electrical shock to50 volts or greater. Any arc flash incident.			112	Exposure to low voltage, low amperage electricity, no potential for serious injury.		157	Electrical procedural issue - no potential for injury	
Burns	8	Any burn event from hot materials (steam, condensate, hot hydrocarbons), or corrosives (caustics, acids), or contact with hot surfaces.			59	Any exposure to hot materials (steam, condensate, hot hydrocarbons), or corrosives (caustics, acids) where there was a potential for significant burns. Any 3rd degree burns or small 2nd degree burn > 3% of body area.			113	Minor injury from thermal or chemical burns		158	Thermal burns – First Aid	
Overpressure, Loss of Containment, Mechanical Equipment Damage Exposure to Energy not otherwise mentioned	9	Energy control failure causing fatality or hospitalization from exposure to process energy, toxic materials, hot materials. Significant fire. Overpressure event.			60	Energy isolation failure with potential for serious injury from exposure to hazardous energy, toxic materials, hot materials.			114	Energy Isolation Procedural Issue, no potential for serious injury		159	Energy Isolation Procedural Issue, no potential for injury	
	10	Energy control failure causing fatality or hospitalization from mechanical energy			61	Energy isolation failure with potential for serious injury from exposure to mechanical energy.								
Amputation Fracture Laceration Concussion Overextertion/Strain	11	Any concussion, amputation, fracture, laceration, joint or ligament damage from multiple sources such: Falling objects, struck by objects, overpressure events, caught in machinery, poor rigging, crane failures, equipment failures, etc.			62	Any significant or potentially significant laceration (large # of sutures, dangerous location, jagged cut).			115	Chipped Tooth, hairline finger/toe dislocation, minor bone fracture (finger, tooth).		160	Bruise/contusion	
					63	Any concussion or potential serious head injury			116	Minor laceration outpatient treatment, no potential for hospitalization. Use of glue or steri-strips in lieu of sutures.		161	Minor cut, first aid treatment.	
					64	Potential for serious injury from falling object(s) or potential fall from height that could cause fractures, lacerations, internal organ damage, fatality.			117	Overexertion, strain, repetitive ergonomic issue, carpal tunnel syndrome, requiring medical treatment**		162	Minor overexertion, strain, pain, numbness, repetitive ergonomic issue	
					65	Any potential for significant bone fracture, ligament/soft tissue damage, or potential for crushing type incident (not finger, toe).			118	An event causing back strain or knee injury that may even require medical treatment or even minor surgery.				
Eye Injury	12	Loss of eye(s), severe vision loss or blindness.			66	Incident involving the eye(s) with potential for severe vision loss, blindness, or loss of eye(s).			119	Foreign object embedded, or other eye injury requiring treatment.		163	Eye irritation	
Hearing Loss	13	Severe to complete noise induced hearing loss or deafness in one or more ears.			67	Acute incident or chronic exposure with potential to cause severe noise induced hearing loss or deafness in one or more ears.			120	>25db audiometric threshold shift.		164	>10 dB threshold shift	
Thermal related illness	14	Heat stroke, hypothermia, or frostbite event.			68	Heat related illness or frostbite with potential for serious injury/amputation.			121	Thermal related illness requiring medical treatment**		165	Heat Stress, Consuming fluids, Dizziness/nausea	
Other (only use as a last resort)	15	Any significant incident not categorized above			69	Any potential significant injury not categorized above.			122	Miscellaneous injury requiring medical treatment** that did not present potential risk of serious injury		166	Minor miscellaneous injury, low potential	

Bottom Section: Activity/Cause Contributing Factor of Injury: Enter 1 in the best/appropriate metrics box that represents the activity related to the injury in the above section. Note: Stay in Same Column!															
Working at Height, Slips, Trips, Falls	16	Any fall above grade			70	Any actual fall of 4 or more; or a worker exposed to a potential 10' fall (not tied off, no guardrails, etc.).			123	Unprotected fall from height less than 4'. Broken bone from fall on same level or uneven surface.			167	Slip/fall or mis-step on same level or proper stairway, sprained/rolled ankle. Housekeeping issue. Musculoskeletal issue.	
	17	Any failure/collapse of structure, elevated walkway, platform, ladder, or scaffold			71	Potential fall from structural failure of an elevated platform, stairway, scaffold or ladder. Missing or failed elevated walkways.			124	Protected fall from >4 ft., including fall down a stairway			168	Fall on proper stairway with handrails, using handrails –	
Struck By/Caught By	18	Worker caught by machinery, struck by debris or equipment. Shrapnel. Failure to manage mechanical energy (not related to energy isolation)			72	Worker caught by, or potentially caught by machinery, struck by debris or equipment. Shrapnel. Failure to manage mechanical energy (not related to energy isolation)			125	Incident where employees caught by rotating equipment or struck by object - no potential for serious injury			169	Non-compliant machine guarding	
Working At Height: Dropped Objects/Equipment	19	17. Any dropped object striking worker(s), or striking process equipment with loss of containment.			73	Dropped object into unprotected area with potential for fatality/serious injury (per Drops Calculator).			126	Dropped object with slight or minor potential as determined by Drops Calculator			170	Falling object, no personnel at risk (barricaded/controlled area)	
Energy Isolation and Control	20	Failure to verify absence of energy			74	Failure to verify absence of energy			127	Energy isolation administrative procedure or paperwork issue. No energy released or potentially released.			171	Inadequate or nonconformance with Energy Isolation procedure.	
	21	Failure to isolate energy			75	Failure to isolate energy									
	22	Valves not verified closed before startup			76	Valves not verified closed before startup									
	23	Open wrong line/equipment			77	Open wrong line/equipment									
	24	Control devices: locks/tags not used or improperly used.			78	Control devices: locks/tags not used or improperly used.									
	25	Blinding error: Wrong location, remove wrong blind			79	Blinding error: Wrong location, remove wrong blind									
	26	Work performed on equipment without proper assessment or safeguards			80	Opening equipment without proper assessment or safeguards									
	27	Improper isolation plan. Missing independent verifications of isolation plan.			81	Improper isolation plan. Missing independent verifications of isolation plan.									
Electrical Work, or Hot Work	28	Electrical Work, or Hot Work (welding, cutting or grinding on equipment that is not hydrocarbon free. Failure to atmosphere test.			82	Electrical Work, or Hot Work (welding, cutting grinding on equipment that is no hydrocarbon free. Failure to atmosphere test.			128	Hot Work administrative procedure or paperwork issue			172	Inadequate procedure or nonconformance with procedure.	
Weather, Environment, Hot/Cold Surfaces	29	Inadequate work/rest regimen, missing thermal awareness/protection, contact with hot/cold surfaces			83	Inadequate work/rest regimen, missing thermal awareness/protection, contact with hot/cold surfaces			129	Inadequate procedures			173	Inadequate procedure or nonconformance with procedure.	
Confined Spaces	30	Poor Job Planning			84	Any Confined Space incident			130	Confined Space entry administrative procedure or paperwork issue			174	Inadequate procedure or nonconformance with procedure.	
	31	Poor Space Hazard Assessment			85	Poor Space Hazard Assessment			131	Poor Space Hazard Assessment					
	32	Inadequate Ventilation			86	Inadequate Ventilation			132	Inadequate Ventilation					
	33	Inadequate toxics/flammables monitoring			87	Inadequate toxics/flammables monitoring			133	Inadequate toxics/flammables monitoring					
	34	Procedure non-compliance			88	Procedure non-compliance			134	Procedure non-compliance					

24.0 ATTACHMENT 5: TAPROOT VS. LEARNING TEAM SELECTION GUIDANCE

The following flowchart is available in full size as RSP-1704-000-ATT1.



The following table provides example scenarios based on this appendix

Example Scenarios based on Flowchart above.	
Scenario	**Suggested Resolution**
This chart says TapRooT is required but there are Human and organizational performance issues that are better suited for a Learning Team?	Do the TapRooT but incorporate the helpful practices of a Learning Team. Include those doing the work and those involved, use learning team style sessions to conduct group interviews, ask open ended non-leading questions, let the group develop problem statements then look for causal factors they might just line up.
The investigation was started as a TapRooT but then discovered a human and organizational performance issue that the root cause is not getting us to the root or a workable solution?	Hopefully a work process was identified that the team has more questions about. Do a learning team on that work process to dig deeper into the root cause
We did the learning team but we have a bunch of problem statements and associated solutions but how do we identify which ones are root causes and which are lessons learned or OFIs?	Use your best judgment. If the problem statement had direct influence on the incident and the recommendation eliminates or significantly reduces the likelihood of the problem call it a root cause and identify the recommendation as a Root Cause. If it is tangential issues identified in the problem statement or the recommendations might help, treat them as lessons learned or OFIs
All the problem statements and/or recommendations from the learning team appear tangential to the incident what do we do?	1. Engage the team to better understand how they arrived at their recommendations; they may not be tangential. 2. Learning teams recognize the complexity that is generated by humans so there might not be a clear solution to generate. Tri-storm, if the incident was significant or had significant risk include a recommendation to assess effectiveness of tri-storm recommendations after they have been implemented and create additional recommendations if necessary if the initial recommendations were not effective. 3. Sometimes this happens in all investigation methodologies. It is part of the learning.

25.0 ATTACHMENT 6 – PSE CATEGORIZATION GUIDE

The following table is a summarized PSE 1-3 Categorization Guide (RSP-1310-Att2). For the full version of the table, refer to API RP 754 Table 1 and Table 2

Incident	PSE 1	PSE 2	PSE 3	
Investigation Category	3	2	2	1-0
Injury (due to LOPC)*	fatality/lost time	recordable	--	--
3rd party hospitalization (due to LOPC)*	any	--	--	--
Community Evac. or Shelter in Place (due to LOPC), including precautionary Evacs. or SIPs.	any	--	--	--
Fire/Explosion (due to LOPC)*(1)(2)	>$100,000	>$2,500	HP	LP
Failure of safety system on demand	--	--	HP	LP
Exceed Safe Operating Limit "NTE"	--	--	HP	LP
Activation of ESD or relief systems	--	--	HP	LP

An outdoor LOPC in one hour or less exceeds a threshold below (Values to be 1/10th of listed quantity for PSE 1 and 1/2 for PSE 2 if release is indoors); or When an engineered pressure relief (e.g., PRD) discharge, or upset emission from a permitted or regulated source, above these amounts to atm or flare results in:

- *liquid carry over or rainout,*
- *discharge to an unsafe location,*
- *an on-site shelter in place or on-site evacuation (excluding precautionary on-site evac or SIP), or*
- *public protective measures including precautionary measures.*

Incident	PSE 1		PSE 2		PSE 3	
	Outdoor	Indoor	Outdoor	Indoor		
Flammable Liquid - TRC6	7 bbl	0.7 bbl	0.7 bbl	0.35 bbl	--	RM
Light Combustible Liquid - TRC7	14 bbl	1.4 bbl	1.4 bbl	0.7 bbl	--	RM
Heavy Combustible Liquid - TRC8	--	--	7 bbl	3.5 bbl	--	RM
Flammable Gas/Vapor or Low Boiling Liquid - TRC5	1100 lbs	110 lbs	110 lbs	55 lbs	--	RM
TIH A Material (Ozone, Bromine) - TRC1	11 lbs	1.1 lbs	1.1 lbs	0.55 lbs	--	RM
TIH B Materials (H_2S) - TRC2	55 lbs	5.5 lbs	5.5 lbs	2.75 lbs	--	RM
TIH C Materials (HF, SO_2) - TRC3	220 lbs	22 lbs	22 lbs	11 lbs	--	RM
TIH D Materials (NH_3) - TRC4	440 lbs	44 lbs	44 lbs	22 lbs	--	RM
PG I Materials (excluding acids/bases#) - TRC5	1100 lbs	110 lbs	110 lbs	55 lbs	--	RM
PG II Materials (excluding acids/bases#) - TRC6	7 bbl	0.7 bbl	0.7 bbl	0.35 bbl	--	RM
PG III Materials (excluding acids/bases#) - TRC7	14 bbl	1.4 bbl	1.4 bbl	0.7 bbl	--	RM
UNDG 2.2 Asphyxiant Gases (N_2, Argon, CO_2)& - TRC7	--	440 lbs	--	220 lbs	--	RM
UNDG 2.2 Oxidizing Gases (O_2, NO_x) - TRC7	4400 lbs	440 lbs	440 lbs	220 lbs	--	RM
Strong Acids/bases - TRC8	--	--	7 bbl	3.5 bbl	--	RM

Process Safety Related Incidents

PSE 1, 2, or 3 Process Safety Event as defined in **API RP 754**

MPC will report vapor and low boiling liquids (TRC5) releases in pounds (lbs.) and other liquid releases in barrels (bbl.).

HP: High Potential Consequence or High Potential to Escalate to PSE 1 or PSE 2

LP: Low Potential Consequence and Low Potential to Escalate to PSE 1 or PSE 2

LOPC: Loss of Primary Containment

TIH: Toxic Inhalation Hazard (Transportation Security Administration)

PG: Packing Group (UN Dangerous Goods List)

(#): Excluding acids/bases and excluding UNDG Class 1; Class 2.2; Class 4.2; Class 4.3; Class 7; and Class 9 materials

ESD: Emergency Shut Down

PRD: Process Relief Device

RM: A LOPC below PSE 1 and 2 levels that requires a Reactive Measure due to presence of a hazard.

TRC: Threshold Release Category from **API RP 754, *3rd Edition***

Flammable Liquid: A liquid with a flash point < 73°F and normal boiling point > 95°F. Crude oil ≥ 15 API Gravity (unless actual flash point is available)

Light Combustible Liquid: A liquid with a flashpoint ≥ 73° but ≤ 140°F or, a higher flash point liquid released at or above its flash point temperature. Crude oil < 15 API Gravity (unless actual flash point is available)

Heavy Combustible Liquid: A liquid with a flash point > 140° and ≤ 200°F released below its flash point temperature.

Process Safety Related Incidents
Low Boiling Liquid: A liquid with a flash point < 73°F and normal boiling point ≤ 95°F.
UNDG Class 2.2: Non-Flammable, Non-Toxic Gas excluding air. Includes compressed gas, liquefied gas, pressurized cryogenic gas, compressed gas in solution, asphyxiant gas and oxidizing gas.
(&): Excluding UNDG 2.2 Asphyxiant Gas releases outdoors.
Strong Acid/Base: Substances with a GHS Skin Corrosion Category 1A or pH < 1 or > 12.5 If GHS classification is available use it first for classification.
(*): Injuries or Explosions from LOPCs of utilities or other non-toxic materials are included.
(1): LP designation can only be used for fire, may not be used for explosions.
(2): Direct costs: (1) In-kind repair or replacement, (2) aftermath cleanup, (3) material disposal, (4) short term cleanup and short-term cleanup and material disposal associated with emergency response that result in off-site environmental impact (see ***Appendix A.1*** of **RSP-1310**)

25.1 PSE 1 Process Safety Event

PSE 1 Process Safety Event (PSE 1) is an LOPC with the greatest consequence as defined by **API RP 754**. A PSE 1 is an unplanned or uncontrolled release of any material, including non-toxic and nonflammable materials (e.g., steam, hot condensate, nitrogen, compressed CO2 or compressed air), from a process that results in one or more of the consequences listed below:

1. employee, contractor, or subcontractor "days away from work" injury and/or fatality,
2. hospital admission and/or fatality of a third-party,
3. officially declared community evacuation or community shelter-in-place including precautionary community evacuation or community shelter-in-place,
4. fire or explosion resulting in greater than or equal to $100,000 of direct cost,
5. an engineered pressure relief device (PRD, SIS, or manually initiated emergency depressure) discharge, of a quantity greater than or equal to the threshold quantities in Table 1 of API RP 754 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. The threshold quantity determination is made at the discharge of the engineered PRD, while the consequence is determined when the material reaches atmosphere whether directly or via a downstream destructive device.
   - rainout,
   - discharge to a potentially unsafe location,
   - an onsite shelter-in-place excluding precautionary onsite shelter-in-place or onsite evacuation, or
   - public protective measures (e.g., road closure) including precautionary public protective measures.
6. an upset emission from a permitted or regulated source, of a quantity greater than or equal to the threshold quantities in Table 1 of API RP 754 in any one-hour period, that results in one or more of the following consequences:
   - rainout,
   - discharge to a potentially unsafe location,

- an onsite shelter-in-place or onsite evacuation excluding precautionary onsite shelter-in-place or onsite evacuation, or
- public protective measures (e.g., road closure) including precautionary public protective measures.

7. an unignited release of material greater than or equal to the threshold quantities described in Table 1 of API RP 754 in any one-hour period, excluding engineered pressure-relief discharges and upset emissions from permitted or regulated sources.

Notes:

1. Some non-toxic and non-flammable materials (e.g., steam, hot water, or compressed air) have no threshold quantities and are only included in this definition as a result of their potential to result in one of the other consequences.
2. An internal fire or explosion that causes a LOPC from a process triggers an evaluation of the PSE 1consequences. The LOPC does not have to occur first.
3. MPC will report vapor and low boiling liquids (TRC5) releases in pounds (lbs.) and other liquid releases in barrels (bbl.).
4. MPC will report based upon API RP 754 Material Hazard Classification Option 1 unless otherwise noted.
5. MPC will not report outdoor releases of UNDG 2.2 Asphyxiant Gas based on outdoor threshold release (TRC).

25.2 PSE2 Process Safety Event

A PSE 2 Process Safety Event (PSE 2) is a LOPC with lesser consequence as defined by API RP 754. A PSE 2 is an unplanned or uncontrolled release of any material, including non-toxic and non-flammable materials (e.g., steam, hot condensate, nitrogen, compressed CO2 or compressed air), from a process that results in one or more of the consequences listed below and is not reported as a PSE 1:

1. employee, contractor or subcontractor recordable injury,
2. fire or explosion resulting in greater than or equal to $2,500 of direct cost to the Company,
3. an engineered pressure relief device (PRD, SIS or manually initiated emergency depressure) discharge, of a quantity greater than or equal to the threshold quantities described in Table 1 of API RP 754 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. The threshold quantity determination is made at the discharge of the engineered PRD, while the consequence is determined when the material reaches the atmosphere whether directly or via downstream destructive device.
   - rainout,
   - discharge to a potentially unsafe location,
   - an onsite shelter-in-place or onsite evacuation excluding precautionary onsite shelter-in-place or onsite evacuation, or

- public protective measures (e.g., road closure) including precautionary public protective measures.

4. an upset emission from a permitted or regulated source, of a quantity greater than or equal to the threshold quantities in Table 1 of API RP 754 in any one-hour period, that results in one or more of the following four consequences:
   - rainout,
   - discharge to a potentially unsafe location,
   - an onsite shelter-in-place or onsite evacuation excluding precautionary on-site shelter-in-place or onsite evacuation, or
   - public protective measures (e.g., road closure) including precautionary public protective measures.
5. an unignited release of material greater than or equal to the threshold quantities described in Table 1 of API RP 754 in any one-hour period, excluding engineered pressure-relief discharges and upset emissions from permitted or regulated sources.

Notes:

1. Some non-toxic and non-flammable materials (e.g., steam, hot water, or compressed air) have no threshold quantities and are only included in this definition as a result of their potential to result in one of the other consequences.
2. An internal fire or explosion that causes a LOPC from a process triggers an evaluation of the PSE 2 consequences. The LOPC does not have to occur first.
3. MPC will report vapor and low boiling liquids (TRC5) releases in pounds (lbs.) and other liquid releases in barrels (bbl.).
4. MPC will report based upon API RP 754 Material Hazard Classification Option 1 unless otherwise noted.
5. MPC will not report outdoor releases of UNDG 2.2 Asphyxiant Gas based on outdoor threshold release (TRC).

25.3 PSE3 Process Safety Event

A PSE 3 Process Safety Event (PSE 3) typically represents a challenge to the barrier system that progressed along the path to harm, but is stopped short of a PSE 1 or PSE 2 consequence. Indicators at this level provide an additional opportunity to identify and correct weaknesses within the barrier system. PSE 3 indicators are intended for internal Company use and can be used for local (site) public reporting. The Refining Organization will use the PSE 3 indicators below:

A. Demands on Safety Systems (Groups 1-4 below),

B. Loss of Primary Containment (Groups 5-8 below),

C. Process Deviations or Excursions (Group 9 below), and

D. Other (Group 10 below).

Group	Description
Group 1 - Safety System Failed to Perform on Demand	Group 1 represents safety systems that failed to perform on demand. To be classified in this group, the following must apply: (a) Definition of a safety system must be met. (See **RSP-1302** Safety Systems) (b) There was a demand on the safety system. *A demand on a safety system is when a process variable of interest has exceeded a predetermined set point, resulting in the call for the safety system to activate. Failure identified during SIS functional testing is **NOT** considered a PSE 3 group 1 event, since there was no actual demand on the system (PSE 4).*
Group 2 - Hydrocarbon Relief to Atmosphere	Group 2 represents incidents that resulted in activating a relief device to the atmosphere. This includes any relief device flow where there was a demand on the relief device with a release quantity not classified as a PSE 1 or PSE 2. This group does not include relief devices which leak through or relieve below their design set point. These are captured in Group 8
Group 3 - Hydrocarbon Relief to Flare or a Utility Relief to Atmosphere	Group 3 represents hydrocarbon relief to a flare system or a utility relief to atmosphere or closed system. Any relief device flow where there was a demand on the relief device and did not result in a PSE 1 or PSE 2. If activation is known it should be counted. This group does not include: (a) When the safety valve in hydrocarbon service, lifts early or leaks through to atmosphere when the pressure is below the set point of the safety valve or has a release through the valve body to atmosphere (i.e., releases from a location other than the designed discharge nozzle) (Group 8). (b) Pressure/Vacuum (PV) Vents with routine emissions from a permitted or regulated source – Categorize only events in which the PV vent fails to function (Group 1). (c) Operational control venting such as pad/de-pad control valves to the flare.
Group 4 - SIS/ESD Initiated	Group 4 represents events where a safety instrumented system or emergency shutdown device was initiated. To fall within this grouping the following criteria there must be a demand on the Safety System. A demand on a safety system is when there is a valid signal that the process variable of interest has exceeded a predetermined set point, resulting in the call for the safety system to activate. This group does not include: (a) Safety System activation used to mitigate a PSE 1 or PSE 2. (b) Safety system activation with no demand for activation, for example: – Testing remote operability of systems, such as fire water pumps, or remote fire monitors, etc. (No group assignment) – Safety system testing that caused the system to activate due to a management system failure. (Error in or error in execution of testing procedure) (PSE 4) – Inadvertent or unintentional activations during normal operation, where there is no actual demand on the safety system. (PSE 4) – Spurious activations due to a failure or malfunction of an input instrument. These are not demands, because the process variable was not actually outside of a safe range and was therefore not a valid signal. (PSE 4) – Mechanical shutdown system activation configured for equipment protection with no related LOPC protection.

Group	Description
Group 5 - Loss of Primary Containment resulting in a Fire with a damage cost <$2,500	Group 5 represents loss of primary containment resulting in fire damage less than $2,500. This grouping includes any LOPC resulting in a fire or any fire which resulted from lack of or poor housekeeping of a previous LOPC which is not classified as a PSE 1 or PSE 2. This does not include trash or poor placement of ignitable materials around hot work. (PSE 4)
Group 6 - Loss of Primary Containment Resulting in Emergency Response	Group 6 represents any LOPC resulting in emergency response not classified as a PSE 1 or PSE 2.
Group 7 - H_2S Personal or Fixed Monitor Alarm	Group 7 represents LOPC resulting in activation of a personal or fixed H_2S alarm. This grouping includes, but is not limited to: Personal or fixed H_2S detection alarms ≥ 50 PPM H_2S: (a) Alarms where the source cannot be identified, but there is no evidence of a faulty monitor. (b) Alarms where the source cannot be identified and there is no evidence of interference from another gas (i.e., H2, SO2, Steam, etc.). (c) Alarms during maintenance work where it is found that isolation has leaked through. (d) Alarms during maintenance work where it is found that the equipment was not isolated adequately resulting in a LOPC. (e) Alarms where there is an unidentifiable source and there is no evidence of a faulty monitor. This group does not include: (a) Personal or fixed gas detection alarms which are not H_2S. (Group 8) (b) Alarms where the monitor is found to be faulty or malfunctioning. (No group assignment) (c) Personal detector alarms while wearing appropriate PPE (Usually respiratory protection) due to anticipation of the exposure. (No group assignment) (d) Alarms where the source cannot be identified, and there is evidence of interference from another gas (i.e., H2, SO2, Steam, etc.). (May be a Group 8 depending on material) (e) Alarms during maintenance work and it is found that the equipment was not adequately cleaned. (PSE 4) (f) Maintenance job or similar activity conducted in PPE (respiratory protection), where a bystander outside of the "hot zone" not in appropriate PPE is exposed or has an alarm. (PSE 4) (g) H_2S alarms in the laboratory or other locations obviously removed from live process. (PSE 4) Refer to Appendix 7 on how H_2S alarm events will be tagged.

Group	Description
Group 8 - Other Loss of Primary Containment below PSE 2 Quantities	Group 8 defined as "see it, hear it, smell it" LOPC below PSE 2 quantities that requires a reactive measure. Where a reactive measure is defined as an action taken to stop the release. This grouping includes but is not limited to the following: (a) H_2S Alarms where there is evidence of interference from another gas (i.e., H2, SO2, Steam, etc.) (Group 8 or PSE 4). (b) LOPC during maintenance work due to inadequate isolation of that equipment. (c) LOPC during maintenance work where it is found that isolation has leaked through. (d) HF indication paint indicates a leak and a reactive measure is taken or evidence of an observable leak (i.e., oil build up, drip, visible vapors, HF fumes, or odors of HF downwind). This is after the area was cleaned and repainted and the repainted area changes color for a second time, requiring bolt replacement and bolt tightening. If HF is visible or detected via odor with or without the change in paint color- it is a PSE event. (e) Uncontrolled sewer back up which contains a hydrocarbon or HHC and is not classified as a PSE 1 or PSE 2 PSE. (f) Small leaks below a PSE 2 threshold quantity, that can be detected by sight, sound, or smell, and require a reactive measure. (g) Flanges which have oil, tar or coke visibly collected on the flange or surroundings. (h) Tubing which has visible vapors leaving a connection, where the union tightened stops the leak. (i) A valve is left open or leaks through, and must be closed or the bull plug tightened to stop the leak. (j) Utilities (Air, Nitrogen, CW, BFW, Steam, Condensate, etc.) where a near miss or first aid occurs (k) Nitrogen or other asphyxiant LOPC below PSE 2 threshold quantity released indoors. (l) Process water leaks (where the water has been in contact with process materials and not yet undergone treatment. For the purpose of PSE3s, water is considered treated if it has gone thru a sour water stripper or a waste water flotation unit (air or nitrogen operated). (m) Leak that pulls air into equipment (vacuum service, flare recovery system, etc.). (n) Rotating Equipment (i.e., Pumps, compressors, etc.). (o) Relief devices in hydrocarbon service which leak through or relieve below their design set point discharging to atmosphere, or releasing to atmosphere through the valve body (i.e., releases from a location other than the designed discharge nozzle). This group does not include: (a) On dual sealed equipment, a primary seal leak which is directed to the flare is considered planned and controlled. (b) A "wet seal" or a seal with an occasional drip may not be considered a PSE3. The reason for this is that mechanical seals are different than other types of equipment. Mechanical seals depend on a small amount of liquid migrating through the seal, to provide lubrication for the seal, which may produce an occasional drip during normal operation. Any pump seal leak beyond an occasional drip would be considered a PSE3 Group 8 event. (c) Personal or fixed H_2S detection alarms. (Possible Group 7). (d) Emissions detectable only by specialized testing equipment (e.g., LDAR gas tester) (e) Alarms where the monitor is found to be faulty or malfunctioning. (Not a PSE 3). (f) Personal detector alarms while wearing appropriate PPE (respiratory protection) due to anticipation of the exposure. (Not a PSE 3). (g) Alarms during maintenance work and it is found that the equipment was not adequately cleaned. (Possible PSE 4). (h) Maintenance job or similar activity conducted in PPE (usually respiratory protection), where a bystander outside of the "hot zone" not in appropriate PPE is exposed or has an alarm. (Possible PSE 4). (i) LOPC's from rail cars or other transportation vehicles which are not connected to the process and are not being used for storage. (j) HF indication paint indicates a possible leak and verified not to be a leak and requires no further action after cleaning/repainting. (Not a PSE 3).

Group	Description
Group 8 - Continued	(k) Utilities (Air, Nitrogen, CW, BFW, Steam, Condensate, etc.) where no near miss or first aid occurs and has not been in contact with any process material. (Not a PSE 3) (l) Nitrogen or other asphyxiant LOPC released outside, where no near miss or first aid occurs. (Not a PSE 3)
Group 9 - Safe Operating Limit Exceeded	Group 9 represents safe operating limits that were exceeded. This grouping includes but is not limited to the following: (a) Excursions of process parameters beyond pre-established Critical Process Variable Not to Exceeds or those which emergency shutdown or intervention is indicated or prescribed. (b) Operation outside of equipment design parameters. (c) O2 incidents where Low-Low Alarm setpoint is reached as defined in RSP-1139-010. This grouping does not include the following: (a) Safe operating limit exceedances where a safety system (as defined in RSP-1302) has initiated (Possible Group 4- these would be captured as only group 4 to avoid double counting). (b) Safe operating limit exceedances where there are no hazards associated with the exceedances (e.g., a low flow NTE on a heater where the ESD has already initiated, high/low fuel gas pressure NTE when no fire is in the heater, etc.). (c) Situations where a safe operating limit alarms without actually exceeding a safe operating limit. For example, false instrument readings, maintenance, etc. (d) Safe operating limits exceedances that are approved in an operating procedure. Note: Some of these scenarios may be classified in other PSE-3 categories such as SIS/ESD initiated or hydrocarbon relief to flare.
Group 10 - Other Minor Process Safety Related Event Not Fitting in Group 1 through 9.	Group 10 represents any other minor process safety related events that does not fit in groups 1 through 9. Sites should consider developing local criteria for PSE 3 Group 10s to facilitate consistent tracking and benchmarking at the site level of Group 10s. Items below are examples that a site may elect to classify as a PSE 3 Group 10: (a) Equipment trip not considered a SIS/ESD (Group 4) and caused a potential PSE (high temp/press/loss of flow/etc.). (b) Power failure, freeze-up, or malfunctioning instrument that does not result in another PSE 3 Group but required correction to prevent a potential PSE. (c) Tube leaks contained within other equipment that require correction to prevent a PSE (exchange tube leaks, boiler tube leaks, etc.). (d) Other LOPCs with no impact or near miss (e.g., catalyst dust, other non-covered chemicals) that require correction to prevent a PSE. (e) Arc flash events or sparking from equipment power supplies – PSE 3 Group 10 if it resulted in shutdown of equipment or response to unit upset; PSE 4 if there was no impact other than evaluation. (f) Internal fire/smoldering/smoking where there is no LOPC due to process related residue (e.g., sulfur pit, pyrophoric material in ducts/towers).

25.4 PSE4 Process Safety Event

A PSE 4 Process Safety Event (PSE 4) typically represents a management system failure that did not result in a PSE 1, PSE 2 or PSE 3. . These are indicators of process safety system weaknesses that may contribute to future PSE 1 and PSE 2 Events Includes, but is not limited to:

A. H_2S Alarms: Personal or fixed gas detection alarms ≥50 ppm during a management system failure:

- During maintenance work where it is found that, the equipment was not adequately cleaned.
- Personal or fixed gas detection alarms ≥ 50 ppm while purging, steaming draining, or sampling where no unintentional loss of primary containment occurred.

B. Safety System Bypass: Safety system was bypassed or defeated without proper management approvals.

C. House Keeping: A fire or other incident occurs due to failure to properly clean up a previous LOPC, or from failure to clean up after maintenance work.

D. Management of Change (MOC):

- A change was made without an MOC.
- A change was placed into service before the MOC was in the ready to start-up status.

E. Lock Out Tag Out (LOTO):

- An energy source was not properly isolated, but no LOPC occurred.
- Isolation removal before work complete. Includes removal of isolation blinds without approval.

F. Hot Work:

- Hot work was completed without a valid hot work permit.
- Hot work completed without fire watch.

G. Work Permitting:

- Working without a valid permit.
- Cutting or working on the wrong line or equipment.
- Entering a confined space without a permit.

H. Equipment Preparation: Small spills, releases or H_2S exposure ≥50 ppm from equipment that was fully isolated, but not adequately cleaned.

I. Fires: Fires not associated with a current or past LOPC (i.e., trash fire, clean scaffold board) that occur in the process area (PSE4). Fires related to an LOPC should be categorized as PSE 3, Group 5. Fires that occur in non-process areas such as offices, shops, warehouse buildings (excluding active warehouse) and lab are non-process safety fires and should not be recorded as a PSE 3 nor a PSE 4 (Other Incident Type per RSP-1704-000).

J. Spurious or Inadvertent Activation of a Safety System: Where there is no demand on the system from a valid signal. Such as testing that caused inadvertent activation due to a management system failure (error in execution of testing procedure), inadvertent/unintentional trip during normal operation (inadvertent use of field switch), malfunctioning instrument reading that caused the system to activate (Refer also to PSE3, Group 4)

K. Mechanical Integrity: Failure on equipment covered by RSP-1308 due to undetected damage mechanism that does not result in a PSE 3 but is an example of a failure of the MI management system such as:

- Unexpected corrosion or damage on piping that has not yet leaked but requires corrective action beyond normal work processes.
- Equipment components found in the field (in-service or installed) not meeting required specs (wrong metallurgy/PMI process failure, wrong pressure rating etc.).
- Failures identified during SIS functional testing that would have resulted in SIS system failing to activate on demand.
- Any PRV that does not pre-pop or pre-popped above the lowest hydrotest pressure of the assets protected by the PRV.

Notes:

1. This includes but is not limited to the following:
   - Routine inspection finds small section of piping has corrosion rate above the expected for the line and requires immediate corrective action, such as shutdown until clamp or repair can be made.
   - Carbon steel component found where the spec calls for Monel on new install that is now in service.
   - Carbon steel found where all current installations were supposed to be retroactively upgraded to Monel and was missed in the upgrade.
2. This does not include the following:
   - Routine inspection finds small section of piping has corrosion rate above expected for the line and will require a clamp in order to run until the next turnaround but is considered acceptable to operate per code until the clamp is installed.
   - Routine inspection finds corrosion rate has increased but line is still safe to use just requires replacement at next turnaround.
   - Carbon steel but now the new spec would install Monel but existing installations were considered grandfathered.
   - Carbon steel components found while checking equipment prior to release from warehouse.

L. Control System (DCS): Lost of DSC view but no loss of local instrument control or associated unit upsets.

M. Other: Other failures that if left unchecked could lead to a PSE or increased severity of a PSE. Items falling in this category may vary from site to site but could include things such as radio/communication device malfunctions/failures, malfunction of UPS/battery backup systems, etc.

26.0 ATTACHMENT 7 – PERSONAL AND FIXED MONITOR ALARMS GUIDANCE

26.1 Guidance for Tagging Personal Monitor Alarms

The following table gives guidance for tagging personal monitor alarms.

Situation	Concentration	PSE 3	Chemical Exposure(2)	Group 7	Group 8	PSE 4	Notes
Personal H_2S Monitor alarms in or near a process area and despite looking, the source cannot be located, there is no evidence that the monitor might be faulty.	≥ 50 ppm	YES	√	√			Likely an actual exposure, assume small LOPC
	< 50 ppm(1)	NO	√				
Personal H_2S Monitor alarms in or near a process area and despite looking, the source cannot be located, there is evidence that there may have been interference from another gas such as H_2, SO_2, steam, etc.	≥ 50 ppm	YES - If Grp 8	√		√ - may be either grp 8 or PSE 4 depending on activities, but only choose one	√ - may be either grp 8 or PSE 4 depending on activities, but only choose one	Either a leak or mgmt. sys failure. Mark as PSE4 if associated with a planned activity, otherwise Group 8. Chemical Exposure if anything but steam.
	< 50 ppm(1)	NO	√				
Personal H_2S Monitor alarms in or near a process area and while looking, find the source to be a small leak.	≥ 50 ppm	YES	√	√			LOPC
	< 50 ppm(1)	NO	√				
Personal H_2S Monitor alarms and is found to be faulty or malfunctioning. For example, alarms while at desk in main office building, or subsequent testing of the monitor shows it to be faulty	≥ 50 ppm	NO	√				Malfunction, no LOPC, but may capture in management system as near miss to allow correlation with logs
	< 50 ppm(1)	NO	√				
Personal H_2S monitor alarms during maintenance work and it is found that the equipment was not cleaned adequately.	≥ 50 ppm	NO	√			√	Not a LOPC
	< 50 ppm(1)	NO	√				

Situation	Concentration	PSE 3	Chemical Exposure(2)	Group 7	Group 8	PSE 4	Notes
Personal H_2S monitor alarms during maintenance work and it is found that the equipment was not fully isolated.	≥ 50 ppm	YES	√	√			This is both LOPC and mgmt. sys error (tag only as Group 7)
	< 50 ppm(1)	NO	√				
Personal H_2S monitor alarms during maintenance work and it is found that the isolation has leaked through.	≥ 50 ppm	YES	√	√			LOPC
	< 50 ppm(1)	NO	√				
Situation	Concentration	PSE 3	Chemical Exposure(2)	Group 7	Group 8	PSE 4	**Notes**
Personal H_2S monitor alarms during planned activity such as (un)loading a truck, draining a line, or catching a sample, where no unintentional LOPC has occurred.	≥ 50 ppm	NO	√			√	Not a LOPC
	< 50 ppm(1)	NO	√				
Personal H_2S monitor alarms while steaming equipment to the atmosphere	≥ 50 ppm	NO	√			√	Not a LOPC
	< 50 ppm(1)	NO	√				
Personal H_2S monitor alarms while wearing respiratory protection because exposure to H_2S was anticipated	≥ 50 ppm	NO	√				Planned event. No LOPC
	< 50 ppm(1)	NO	√				
Maintenance job or similar is being conducted in breathing air. Back-up person or interested bystander thought to be out of "hot-zone" not in breathing air has H_2S monitor alarm	≥ 50 ppm	NO	√			√	Not a LOPC
	< 50 ppm	NO	√				

Notes:

1. < 50 ppmH_2S or for any other gas personal monitor such as CO, SO2, etc.
2. Chemical Exposure indicates data is required to be entered within the Chemical Exposure section of the electronic data management system. It does not necessarily indicate there has been a chemical exposure.

26.2 Guidance for Tagging Fixed Monitor Alarms

The following table gives guidance for tagging fixed monitor alarms.

Situation	PSE 3	Chemical Exposure(1)	Near Miss	Group 7	Group 8	PSE 4	Notes
$H_2S \geq 50$ ppm, no LOPC		√				√	If there was no leak, then this was most likely a management system issue.
$H_2S \geq 50$ ppm, with LOPC	√	√		√			Since there was a leak, this is also a PSE 3, Group 7 for the H_2S alarm above 50 ppm.
H_2S <50 ppm		√	√				With less than 50 ppm, then it is neither a PSE 3 or a PSE 4.
Gases other than H_2S, such as HF, SO_2, CO, LEL etc.		√			possible		See group 8 definition
Malfunction		√	√				Capture for tracking only.

Note: (1)Chemical Exposure indicates data is required to be entered within the Chemical Exposure section of the electronic data management system. It does not necessarily indicate there has been a chemical exposure.

26.3 Examples

The following table provides an example of grouping based on a particular scenario.

Situation	Controlled	Planned	Group
Sulfur loading occurring in fresh air and a personal H_2S monitor alarms.	Yes	Yes	n/a
Sulfur loading occurring without fresh air and a personal H_2S monitor alarms ≥ 50 ppm.	While there is no LOPC, management systems were not in place, or were not adequate to prevent chemical exposures or other hazards		PSE 4
Sulfur loading occurring in fresh air and a fixed H_2S monitor alarms ≥ 50 ppm.	While there is no LOPC, management systems were not in place, or were not adequate to prevent chemical exposures or other hazards		PSE 4
A pump is drained to an oily water sewer location per procedure.	Yes	Yes	n/a
A pump is drained to an oily water sewer location per procedure, and a personal H_2S monitor alarms ≥ 50 ppm.	While there is no LOPC, management systems were not in place, or were not adequate to prevent chemical exposures or other hazards		PSE 4
A pump is drained to an oily water sewer location per procedure, and the vapors coming out of the lift station caused a fixed LEL meter to alarm.	While there was no LOPC, if a person would have been at the location they would have been exposed. This not controlled.		PSE 4
Blind being installed on the HF Alky in Proper PPE due to potential for residual contamination.	Yes	Yes	n/a
Blind being installed on the HF Alky in proper PPE due to residual contamination. Enough HF is emitted to cause fixed gas detectors to alarm outside the restricted area of work.	While there was no LOPC, if a person would have been at the location they would have been exposed. This is not controlled.		PSE 4
An exchanger dollar plate is removed and oil remaining in the exchanger drains into a collection drum for removal.	Yes	Yes	n/a
An exchanger dollar plate is removed, and a flare connection was found not to be isolated, allowing flare gas to exit to the atmosphere.	The event went from controlled to uncontrolled when the flare gas exited to atmosphere and an LOPC occurred. The event went from planned to unplanned when the isolation was missed.		7 (if fixed or personal H_2S monitor alarms ≥ 50 ppm) or 8 (if no monitors alarm)
An exchanger dollar plate is removed, and oil which was not anticipated to be remaining in the exchanger, drained to the ground and non-oily water sewer.	While there is no LOPC, the management systems were not in place, or were not adequate to prevent oil from going to ground and reaching the non-oily sewer.		PSE 4
An exchanger dollar plate is removed, and oil remaining in the exchanger drains into a collection drum for removal. Personal or fixed gas detector alarms.	While there is no LOPC, management systems were not in place, or were not adequate to prevent chemical exposures or other hazards		Possible PSE 4
A day pot is filled to the appropriate level.	Yes	Yes	n/a
A day pot is overfilled, and the secondary containment collects the material for removal.	No, the flow to the secondary containment was not controlled.	No, the vessel was overfilled.	8