2019 API DISTINGUISHED PIPELINE SAFETY AWARDS

Guidance Appendix

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Calculation of Hours

This section provides guidance on estimating contract worker hours. Recording contractor hours is mandatory for participation in the API Pipeline Awards program and if contractor hours are not directly tracked, this estimation tool provides a basis for consistency in reporting contractor hours. As stated in the cover letter, Appendix A in the OII Guidelines and Definitions (under the Data Entry tab online) also contains optional guidance for estimating contractor exposure hours. The API Pipeline Safety Managers Work Group developed the estimation method below, approved by the API Pipeline Environment, Health and Safety Group (EHSG), which is more focused for pipeline operators. For those applying for the awards, if you need to estimate contractor hours, please use only the method below. Contractor hours may be estimated using award period (annual) contractor expenditures and the following assumptions:

- Contract labor is 50% of total contractor dollars spent
- Contractor hours are equal to contractor labor expense divided by $40/hr. Or simply divide total contractor spend by 80; for example:
- Total contractor spend for the year = $6,000,000 → 6,000,000 / 80 = 75,000 hours

Eligibility

Eligibility will be based on metrics specific to both occupational and operational safety. For occupational safety it will be based on Total Recordable Incident Rate (TRIR) for employee and contractor safety performance that is required to be submitted to the API Survey on Petroleum Industry Occupational Injuries, Illnesses and Fatalities (OII Survey). You must participate in the survey to be eligible for this award. You must also provide information on type of case (i.e., injury or illness) and include number of hours for both employees and contractors. You must include work-related injuries and illnesses that result in any of the following: death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, loss of consciousness, or a significant injury or illness diagnosed by a physician or other licensed health professional[1]. This information is not optional for those applying for this Award. To participate, please go to http://oii.api.org and log in to enter your data. If you do not have a Company ID and Password, complete the form on the login page and click on the Send Email button. A Company ID and Password that allows you to access the OII Reporting System will be emailed to you. Occupational safety performance is established as defined by federal OSHA definitions and criteria. Contractor OSHA incident rates shall be based on recorded contractor hours and incidents related to company work and consistent with OSHA definitions and criteria for employee incidents - not necessarily whether the contractor records the incident. If contractor hours are not directly tracked by the Company, contractor hours must be estimated by using the method described in program document. The contractor hour estimation tools were implemented as a temporary process to allow companies who do not currently track contractor hours an opportunity to participate in the awards program. The preference is always to use actual hours rather than an estimate. The estimate is only to be used if contractor hours are not currently tracked. Please see “Frequently Asked Questions” on API’s website for further information on contractor hours or contact Alexa Carlson (API) for all questions on the OII Survey (CarlsonA@api.org or 202-682-8039). For Operational performance, an operator must be a participant and submit all information in the PSDTS. Participants in PSDTS provide detailed information on releases from liquid pipeline systems of 5 gallons and more (plus all spills to water), and infrastructure data related to the physical characteristics of the system, and certain integrity management activities completed during the year. Information on PSDTS can be found here. Please contact Adebukola (Bukky) Adeiya (API) for all PSDTS questions (AdeiyaA@api.org or 202-682-8548).

1. Starting January 1, 2015, OSHA regulation [29 CFR 1904] allows for a partial reporting exemption for pipeline operators among others, allowing operators to only report workplace incidents that result in an employee’s fatality, in-patient hospitalization, amputation or loss of an eye. Regardless of this exemption, in order to be considered for the API Distinguished Pipeline Safety Award, applicants must submit all work-related injuries and illness information, as specified above and in alignment with the OII Survey.

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Calculation of Pipeline System Release Event

The purpose of this Guidance Document is to identify leading and lagging indicators in the U. S. Pipeline industry for nationwide public reporting as well as indicators for use at individual facilities including methods for the development and use of performance indicators. A comprehensive leading and lagging indicators program provides useful information for driving improvement and when acted upon contributes to reducing risks of major hazards (e.g. by identifying the underlying causes and taking action to prevent recurrence).

This Guidance Document may augment a Company's existing practices and procedures. This Guidance Document cannot and does not preempt any federal, state, or local laws. This Guidance Document is intentionally based upon the American Petroleum Institute's (API) Recommended Practice (RP) 754 and the Canadian Standards Associate (CSA) Z260 Pipeline System Safety Metrics Standard. In an effort to be consistent with our Pipeline regulators and the public reporting processes currently in place for the U.S. Pipeline industry, the definitions and thresholds for Pipeline System Release Events (PSRE) have been aligned with Pipeline and Hazardous Materials Safety Administration (PHMSA) metrics. This Guidance Document also defines the API Pipeline Award criteria that drives continual improvement while acknowledging top tier companies.

This Guidance Document is intended to be used by companies operating liquid hydrocarbon pipelines, industry organizations, researchers, and organizations that study or report on the safety performance of pipeline companies. The framework and definitions for PSRE used within this Guidance Document are also suitable for Government Agencies that regulate or report on pipeline safety. The leading and lagging metrics as well as award eligibility were not intended to apply to terminal facilities/companies.

Tier 1 Definition and Consequences:

A Tier 1 Pipeline System Release Event (T-1 PSRE) is a LOPC with the greatest consequence as defined by this Guidance Document. A T-1 PSRE is an unplanned or uncontrolled release of any material, including non-toxic and non-flammable liquids from a process that results in one or more of the consequences listed below.

The following materials[1] are applicable in this Guidance Document:

- Flammable liquids including those in Department of Transportation (DOT) 49 CFR 173.121 Packing Groups I, II, and III

Parking Group	Flash Point	Initial Boiling Point	Material
I		≤35 °C (95 °F)	
II	≤23 °C (73 ≤F)	>35 °C (95 °F)	Gasoline, Jet Fuel, >15 API Gravity Crude Oil
III	≥23 °C (73 °F) but ≤60.5 °C (141 °F)	>35 °C (95 °F)	Diesel, Kerosene, <15 API Gravity Crude Oil

- Combustible liquids – liquids with a flash point >60 °C (140 °F) and ≤93 °C (200 °F)
- Strong/moderate acids/bases

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Tier 1 Consequences:

- An employee, contractor, or subcontractor "days away from work" injury and/or fatality
- A hospital admission and/or fatality of a third-party
- A fire or explosion damage off company property, or fire or explosion damage to company property that results in damage greater than or equal to $100,000 of direct cost[1]
- An officially declared community evacuation or community shelter-in-place including precautionary community evacuation or community shelter-in-place
- A release[2] that results in:
  - A release into a water body with defined bed and bank and open water (e.g., channelized watercourse, open water wetland, lake) greater than or equal to 1 barrel; or[1]
- A release that results in the death of any listed species at the federal or state level[1]
- A release that results in the destruction of a cultural heritage resources[1]
- A release[2] that either occurs on the ROW or in a station and migrates outside the operator's property that results in:
  - A release within an HCA that is greater than or equal to 10 barrels;
  - A release outside an HCA that is greater than or equal to 100 barrels

Tier 2 Definition and Consequences:

A Tier 2 Pipeline System Release Event (T-2 PSRE) is a LOPC with lesser consequence. A T-2 PSRE is an unplanned or uncontrolled release of any material, including non-toxic and non-flammable liquids from a process that results in one or more of the consequences listed below and is not reported as a Tier 1 PSRE.

The following materials[1] are applicable in this Guidance Document:

- Flammable liquids including those in Department of Transportation (DOT) 49 CFR 173.121 Packing Groups I, II, and III

Parking Group	Flash Point	Initial Boiling Point	Material
I		≤35 °C (95 °F)	
II	≤23 °C (73 ≤F)	>35 °C (95 °F)	Gasoline, Jet Fuel, >15 API Gravity Crude Oil
III	≥23 °C (73 °F) but ≤60.5 °C (141 °F)	>35 °C (95 °F)	Diesel, Kerosene, <15 API Gravity Crude Oil

- Combustible liquids – liquids with a flash point >60 °C (140 °F) and ≤93 °C (200 °F)
- Strong/moderate acids/bases

1. (Source: Table 1, **CSA Z260:19 Pipeline System Safety Metrics**. © 2019 Canadian Standards Association)
2. Hydrotest water, HVLs and gases are excluded from the volumetric criteria above.

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Tier 2 Consequences:

- An employee, contractor, or subcontractor recordable injury
- A third-party receiving medical treatment without being admitted to a hospital
- A fire or explosion damage that does not cause any damages off company property and results in damage greater than or equal to $2,500 of direct cost[1]
- A release[2] that results in:
  - A release into a water body with defined bed and bank or open water (e.g., channelized watercourse, open water wetland, lake) that is greater than or equal to 4.2 gallons; or[1]
- A release that results in the death of livestock or any non-listed species at the federal or state level[1]
- A release[2] that either occurs on the ROW or in a station and migrates outside the operator's property that results in:
  - A release within an HCA that is greater than or equal to 1 barrel; or
  - A release outside an HCA that is greater than or equal to 10 barrels

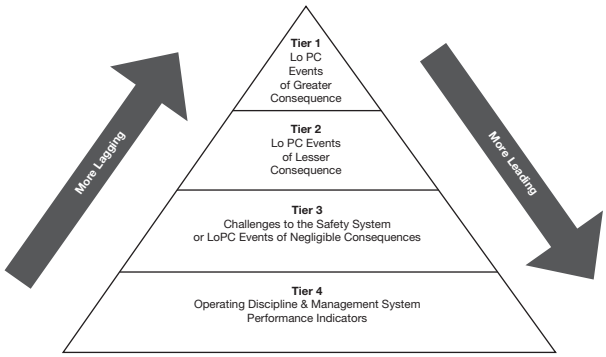
Caculation of Pipeline system Release Event (PSRE) Rate

The PSRE Rate shall be calculated below, where billion barrel miles are the miles calculated as of December 31 of the current year.

$$PSRE\ Rate = \frac{[(T - 1\ PSRE\ Count) \times 10] + (T - 2\ PSRE\ Count)}{billion\ barrel\ miles}$$

Leading and Lagging Performance Indicators

This Guidance Document identifies leading and lagging indicators useful for driving performance improvement. As a framework for measuring activity, status or performance, this Document classifies PSRE into four tiers of leading and lagging indicators. Tiers 1 and 2 are suitable for nationwide public reporting and defined in this Document. Tiers 3 and 4 are intended for internal use at individual companies. A company may also want to determine if a PHMSA 7000-1 event that is not reported as a T-1 PSRE or T-2 PSRE, is a Tier 3 indicator. Additionally, a company may also want to track a hydrotest failure (mainline blowout, weld failure, etc.) that is not reported as a T-1 PSRE or T-2 PSRE, as a Tier 3 indicator.



1. (Source: Table 1, **CSA Z260:19 Pipeline System Safety Metrics**. © 2019 Canadian Standards Association)
2. Hydrotest water, HVLs and gases are excluded from the volumetric criteria above.

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Definitions

- **Acids/Bases, Moderate** – Substances with pH ≥1 and <2, or pH >11.5 and ≤12.5, or more precisely, substances that cause full thickness destruction of intact skin tissue within an observation period up to 14 days starting after the exposure time of 60 minutes or less, but greater than three minutes, consistent with Globally Harmonized System (GHS) of Classification and Labeling of Chemicals (GHS) Skin Corrosion Category 1B. [source: API RP 754]
- **Acids/Bases, Strong** – Substances with a pH <1 or >12.5, or more precisely, substances that cause full thickness destruction of intact skin tissue with an observation period up to 60 minutes starting after the exposure time of three minutes or less, consistent with GHS Skin Corrosion Category 1A. [source: API RP 754]
- **Consequence** – outcome of an event affecting objectives
- **Contractor and Subcontractor** – any individual not on the Company payroll, whose exposure hours, injuries, and illnesses occur onsite. [source: API RP 754]
- **Cultural Heritage Resource** (Cultural Resource) – tangible aspects of human works or places that give evidence of human activity or have spiritual or cultural meaning, and historical value. Cultural heritage resources are distinguished from other resources by virtue of the historic value placed on them through their association with an aspect(s) of human history. [source: CSA Z260 Pipeline System Safety Metrics Standard]
- **Days Away from Work Injury** – work-related injuries that result in the person being unfit for work on any day after the day of the injury as determined by a physician or other licensed health professional. “Any day” includes rest days, weekend days, vacation days, public holidays, or days after ceasing employment. [source: API RP 754]
- **Destruction** – to cause sufficient damage to the structure, organic existence or condition of a receptor that its value is permanently lost
- **Direct Cost** – cost of repairs or replacement, cleanup, material disposal, and acute environmental cost associated with a fire or explosion. Note: Direct cost does not include indirect costs. Direct cost does not include the cost of repairing or replacing the failed component leading to the loss of primary containment if the component is not further damaged by the fire or explosion. Direct cost does include the cost of repairing or replacing the failed component leading to the loss of primary containment if the component failed due to internal or external explosion or overpressure. [source: API RP 754]
- **Employee** – any individual on the Company payroll whose exposure hours, injuries, and illnesses are routinely tracked by the Company. Individuals not on the Company payroll, but providing services under direct company supervisor are also included (e.g. government sponsored interns, secondees, etc.). [source: API RP 754]
- **Explosion** – a release of energy that causes a pressure discontinuity or blast wave (e.g. detonations, deflagrations, and rapid releases of high pressure caused by rupture of equipment or piping). [source: ARI RP 754]
- **Fire** – any combustion resulting from a loss of primary containment, regardless of the presence of flame. This includes smoldering, charring, smoking, singeing, scorching, carbonizing, or the evidence that any of these have occurred. [source: API RP 754]
- **Hospital Admission** – formal acceptance by a hospital or other inpatient health care facility of a patient who is to be provided with room, board, and medical service in an area of the hospital or facility where patients generally reside at least overnight. Treatment in the hospital emergency room or an overnight stay in the emergency room would not by itself qualify as a “hospital admission”. [source: API RP 754]

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Definitions (Cont.)

- **High Consequence Area (HCA)** – means any of the following areas:
  - A potential impact zone which contains 20 or more structures intended for human occupancy or an identified site
  - An identified sites is:
    - A building occupied by 50 or more persons 5 days a week 10 weeks a year (the days and weeks need not be consecutive), or
    - A small, well defined outside area occupied by 20 or more persons 5 days a week 10 weeks a year (the days and weeks need not be consecutive), and
      - Is visibly marked;
      - Is licensed or registered by a Federal, State, or local agency;
      - Is known by public safety officials; or
      - Is on a list or map maintained by or available from a Federal, State, or local agency
- **Highly Volatile Liquid (or HVL)** – a hazardous liquid which will form a vapor cloud when released to the atmosphere and which has a vapor pressure exceeding 276 kPa (40 psia) at 37.8 °C (100 °F). [source: Federal Register]
- **Incident** – a situation that might be, or could lead to, a disruption, loss, emergency, or crisis. Includes, but may not necessarily involve a loss of primary containment. Note: The term Incident is defined by multiple regulatory jurisdictions and may be used interchangeably with the above definition within the context of this Guidance Document. The common term "event" is used in this Guidance Document to describe relevant occurrences including, but no limited to, a regulatory or this Guidance Document's definition of incident. For example, activation of system shutdown is an event but does not necessarily constitute an incident
- **Loss of Primary Containment (LOPC)** – an unplanned or uncontrolled release of any material or hazardous energy from primary containment, including non-toxic and non-flammable materials. [source: API RP 754]
- **Material** – substance with the potential to cause harm due to its chemical (e.g. flammable, toxic, corrosive, reactive, asphyxiate) or physical (e.g. thermal, pressure) properties. [source: API RP 754]
- **Officially Declared** – a declaration by a recognized community official (e.g. fire, police, civil defense, emergency management) or delegate (e.g. Company official) authorized to order the community action (e.g. shelter-in-place, evacuation). [source: API RP 754]
- **Primary Containment** – a tank vessel, pipe, truck, rail car, or other equipment designed to keep material within it, typically for the purposes of storage, separation, processing, or transfer of material. [source API RP 754]
- **Process** – storage, transportation, or distribution of petroleum products, petrochemicals, oilfield water or waste products and associated forms of hazardous energy. This includes the operation of process equipment (e.g. piping, pumps, compressors, etc.), storage tanks, active warehouses, ancillary support areas, on-site remediation facilities, and distribution piping under control of the Company for the aforementioned purposes.
- **Recordable Injury** – a work-related injury that results in any of the following: death; days away from work; restricted work or transfer to another job; medical treatment beyond first aid; loss of consciousness; or a significant injury diagnosed by a physician or other licensed health professional
- **Terminal** – an industrial facility for the storage of oil and/or petrochemical products and from which these products are usually transported to end users (e.g., truck loadrack) or further storage facilities
- **Total Work Hours** – total employee, contractor, and subcontractor hours worked minus the hours associated with major construction projects. This is the same number typically used to calculate Occupational Injury and Illness (OI&I) rates. [source: API RP 754]

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Calculation of Hours

The following abbreviations apply in this Guidance Document:

- AOPL – Association of Oil Pipe Lines
- API – American Petroleum Institute
- CSA – Canadian Standards Association
- DOT – Department of Transportation
- EPA – Environmental Protection Agency
- GHS – Globally Harmonized System
- HCA – High Consequence Area
- HDD – Horizontal Directional Drilling
- HVL – Highly Volatile Liquid
- OI&I – Occupational Injury and Illness
- LOPC – Loss of Primary Containment
- PHMSA – Pipeline and Hazardous Materials Safety Administration
- PSDTS – Pipeline Strategic Data Tracking System
- PSRE – Pipeline System Release Event
- ROW – Right of Way
- RP – Recommended Practice

PSRE Examples & Questions

Table 1 – PSRE Examples and Questions: Injury

- An operator walks along the ROW and slips and fails to the ground and suffers a days away from work injury. The slip/fall is due to weather conditions, “chronic” rain and slippery shoes. This is not a PSRE. Personal safety “slip/trip/fall” incidents that are not directly associated with evacuating from or responding to a LOPC are specifically excluded from PSRE reporting.
- Same as above, except the operator slipped and fell while responding to a small spill of liquid resulting in a days away from work injury. This would be a Tier 1 PSRE since the operator was responding to a LOPC.
- Same as above, except that the operator slipped and fell several hours after the incident had concluded. This would not be a reportable PSRE. Personal safety events (e.g. slips, trips, and falls) that are not directly associated with on-site response to a LOPC are excluded. Slips/trips/falls after the LOPC has concluded (such as “after-the-fact” clean-up and remediation) is not directly associated with on-site response.
- A scaffold builder experiences a days away from work injury after falling from a scaffold ladder while evacuating from a LOPC on nearby equipment. This is a Tier 1 PSRE.
- A maintenance technician is turning a bolt on a process flange with a wrench. Due to the improper body positioning, the wrench slips and hits the employee in the mouth, requiring dental surgery and two days off work. This is not a PSRE because there was no unplanned or uncontrolled LOPC involved with the injury.
- As part of a new construction project, equipment was being hydrotested using potable water when a 2-inch ball valve suddenly became disconnected. The hose whipped and struck a worker in the head and caused his death. A hydrotest using portable water for new construction is not considered a “process”; therefore, this tragic event is not a PSRE. It is an occupational safety related fatality and would be recorded on the Company’s injury and illness log.

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PSRE Examples & Questions (Cont.)

- During the draining of a gas line, a fire begins. The worker performing the draining operation was not hurt; however, another worker near the draining operation began running and fell down a flight of stairs injuring his ankle. The injury resulted in 8 days away from work. The facility Evacuation Protocol wasn't activated because the fire was incipient (minor deflagration) and the fire damage was less than $2,500. If there was any reason to believe that the person began running because of fear of the potential consequence of a fire occurring in their work area, then the injury would be related to the LOPC. Since the LOPC resulted in a day away from work injury, this would be a Tier 1 PSRE.

PSRE Examples and Questions: Fire and Explosion

- An internal deflagration in a pipeline causes equipment damage of $100,000, but there was no loss of containment. While this is a series process event and should be investigated as such, it does not meet the definition of a Tier 1 PSRE because there was no LOPC involved.
- An electrical fire, loss of electricity, or any other loss of utility may occur that causes a facility shutdown and possibly incidental equipment damage, however if it does not create a LOPC release it is not a PSRE. It is likely that during a shutdown, one or more safety devices are activated; therefore, a company may choose to record a Tier 3 Demand on Safety System.
- A pump lube oil system fire from a leak causes damage greater than $100,000, but does not create a LOPC greater than the volumetric quantity or cause a fatality or serious injury. This is a Tier 1 PSRE since the damage was greater than $100,000.
- Hydrocarbon fumes migrate into the QA/QC laboratory located within the facility and results in a fire with $5,000 damage. The source of the hydrocarbon fumes is the oily water sewer system. This incident is a Tier 2 PSRE since the LOPC was from the process and resulted in a Tier 2 consequence (a fire that results in a direct cost greater than $2,500).
- The rundown temperature on a #6 fuel oil was much higher than normal going into tankage. One tank reached its fill volume, and the rundown was swapped to a second tank. The heel in this second tank was extremely low and there was free water on top of the product in the tank, presumably caused by condensation. The high temperature of the product entering the second tank caused the water to vaporize, over-pressuring the tank, causing the roof to buckle, the top seam to rip in a couple of places, and vapors to escape. Damage to the tank exceeded $100k. Is this a Tier 1 event? The rapid vaporization of the water resulted in a pressure discontinuity that satisfies the API 754 definition of explosion, and since the direct cost exceeded the Tier 1 threshold of $100,000, this event would be a Tier 1 PSRE.
- In the case of a release that results in a fire/explosion, do you calculate the amount of material released and the fire damage? If the material released ignites immediately, the fire/explosion direct cost damage represents the LOPC's full potential for harm; therefore, only the direct cost from the fire/explosion is used to determine the Tier classification of the event. If the ignition of the material is not immediate, both the quantity released and the fire/explosion direct cost damage would be evaluated to determine the appropriate PSRE classification.

PSRE Examples and Questions: Loss of Primary Containment

- A spill of 20 barrels of gasoline occurred within a facility with 2 barrels reaching nearby river. This is a Tier 1 PSRE because there was a LOPC greater than 1 barrel into a water body with a defined bed and bank.

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PSRE Examples & Questions (Cont.)

- A faulty tank gauge results in the overfilling of a product tank containing liquid with a normal boiling point >35 °C (95 °F) and a flash point <23 °C (73 °F). Approximately 50 barrels of liquid overflows into the tank's diked area. This is not an Tier 1 or 2 PSRE event as the material did not migrate outside of the operator's property.
- Same as above except this time 20 barrels migrates outside of the operator's property into a non-HCA area. This incident is a Tier 2 PSRE since it is a release of 10 barrels or more outside an HCA.
- A portion of piping is being prepared for maintenance. The line is drained and isolation is verified. At some point prior to the first flange break, the line accumulated liquid due to a leaking valve. If the volume of material that leaked back into the isolated line is greater than a Tier 1 or Tier 2 PSRE volumetric quantity, would this be considered a LOPC and subsequently a Tier 1 or Tier 2 PSRE? Since there was no LOPC, this is not a Tier 1 or Tier 2 PSRE. The material remained within the piping designed to contain it. If the flanges were opened and the LOPC resulted in injury, fire/explosion, or a volumetric quantity release, then it would be classified as a PSRE.
- An operator opens a quality control sample point to collect a routine sample of product and material splashes on him. The operator runs to a safety shower leaving the sample point open and a Tier 2 volumetric quantity is released off company property. This is a Tier 2 PSRE since the release of a volumetric quantity migrated offsite and was unplanned or uncontrolled.
- Same as above, however, the operator catches the sample, blocks in the sample point and later drops and breaks the sample container resulting in exposure and injury from the sample contents. This is not a PSRE because the LOPC is from a piece of ancillary equipment not connected to a process.
- If an internal or external floating roof partially sinks and material gets above it, but remains within the tank, is this a LOPC? Material on top of the floating roof is an LOPC. Material stored within a floating roof tank is expected to be inside the tank walls and beneath the floating roof. Depending upon the volume of material released offsite, if any, this may be a Tier 1 or 2 PSRE.
- 12 barrels of mud are generated while completing Horizontal Direction Drilling (HDD) within an HCA area. Since the HDD is completed next to the active pipeline filled with petroleum product, and is not directly connected to a "live" process, this is not a T-1 or T-2 PSRE.

PSRE Examples and Questions: Pipeline

- There is a 200 barrel spill of liquid with a flash point <23 °C (73 °F) that ignites and results in damages to other equipment, along with three days away from work injuries and one fatality. This is a Tier 1 PSRE. The company would record a single event with multiple consequences (e.g. one fatality, three days away from work injuries, and potential volumetric quantity exceedance if material migrated offsite).

PSRE Examples and Questions: Ancillary Equipment

- Does the definition of "process" include consumables for the equipment (e.g. hydraulic fluids for hydraulic actuator, lubricating oil for engine/motor). Should LOPC of such consumables be included in the reporting scope? The definition for the scope of "process" has been made as broad as possible while still recognizing that there are pieces of equipment that operate and activities that occur that are not involved with the "process". Hydraulic fluids for hydraulic actuators and lubricating oil for motors, are part of the "process" when the actuator and motor are used by the process equipment, but not when the hydraulic actuator or engine are on a piece of mobile equipment.

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