

API RP 1173

Evaluation Guidance and Tool

This document provides guidance for pipeline operators who wish to evaluate their progress in the development, implementation, and ultimate effectiveness of programs related to API RP 1173: Pipeline Safety Management Systems. It explains how to plan and conduct an evaluation, and how the API RP 1173 Evaluation Tool is structured and can be used to determine the maturity of an organization's Pipeline Safety Management System (PSMS) versus the requirements of API RP 1173 using the scale described in the industry Maturity Model.

The Evaluation Tool provides a simple method to document and summarize the evaluator's evaluation of an Operator's PSMS on its conformance to the RP (levels 1 – 3 on the maturity model), its effectiveness in implementation (level 4 on the maturity model), and its effectiveness in improving pipeline safety performance (level 5 on the maturity model). The Evaluation Tool can be used by internal or external evaluators for all segments of the pipeline industry: gas distribution, gas transmission, and liquids. While the evaluation tool is intended for use by operators who have reached level 3 (implemented) on the maturity model for most of the elements in the RP, it can be used at all levels of maturity. Users of the Evaluation Tool should be thoroughly familiar with API RP 1173 as well as the maturity model and the other reference materials available at www.pipelinesms.org.

This guidance and tool, like the RP itself, is voluntary. Each pipeline operator is free to pick and choose the parts which work best for them, considering their unique operating environment and stage of management system development. They are also free to modify this guidance and the associated tool as they see fit (although doing so will affect their ability to benchmark with other operators using this tool).

Evaluation Purpose

The development and improvement of safety management systems is a journey, not a destination, and there is no "right" or "wrong" way for an operator to develop and implement their management systems. On the other hand, all management systems can be improved through a process of continual evaluation and adjustment (the PDCA cycle explained in API RP 1173). The continual improvement of safety management systems over time will result in improved safety performance for each pipeline operator, and for the industry as a whole.

While the Evaluation Tool results in a maturity score on a scale of 1 to 5 (using the industry maturity model), the ultimate objective of the evaluation is not a score. Rather, the evaluation process, with the associated discussions between the operator and the evaluator regarding each question, should result in many suggestions and ideas for improvement for the operator's consideration. The evaluation score is simply a way to measure progress along what is by its nature a subjective scale.

Evaluation Process

Per section 10.2.5 of the RP, a mature Pipeline SMS should be comprehensively applied, systematically applied, and integrated. The RP is flexible and scalable, and the size, scope, and complexity of a Pipeline SMS to achieve “comprehensive”, “systematic”, and “integrated” will vary based on the size and complexity of the operator. A large operator with a complex operational structure and multiple organizational functions that affect hundreds of employees will require a much different Pipeline SMS to reach level 3 (implemented) than a small operator with a few dozen employees. The evaluation process will likewise be more extensive and complex regarding time, number of people involved, and extent of backup documentation required. The evaluator(s) and the operator will need to develop a documented process, specific to the size and complexity of that operator, to determine how to evaluate and weight the contribution of every part of the company’s organization when rating each question in the Implementation scores tab. This process should be used during each subsequent evaluation to measure improvement over time, which complies with the requirement in 10.2.5 that “pipeline operators shall maintain a method to evaluate the extent to which the development and deployment of the PSMS...”. Development of the evaluation process required for each operator in each circumstance is beyond the scope of this document.

Most implementation questions will apply to many functions, processes, and procedures within a company. The overall score for each question must consider how well the operator performs in all relevant aspects without being too concerned with a single aspect. As an example, Competence, Awareness, and Training (Element 9) will apply to all personnel involved in the execution of the PSMS. If the operator performs poorly in terms of providing training for Emergency Response personnel, this should lower the score, but the overall score should be balanced with the evaluation results of ALL the operator’s training programs including maintenance personnel and operations personnel.

The evaluation should be focused on the adequacy of **systems** related to pipeline safety management, and not be performed with an eye toward finding occasional non-conformance with individual policies and procedures (although they should be noted when found). The objective of the evaluation is not to find every instance of when a policy or procedure has not been followed perfectly, but to determine if a policy or procedure is working as intended to support pipeline safety, and to identify opportunities to improve its design and execution.

Key Performance Indicators (KPIs)

The Evaluation Tool has a variety of KPIs that can be used to compare an operator’s performance and its assets to its industry segment peers. Each segment of the energy pipeline industry (liquid transmission, gas transmission / gathering, and gas distribution) has slightly different KPIs as appropriate for that part of the industry. All of them (except for OSHA TRIR rates) are publicly available through PHMSA’s website and should be reported in a uniform manner according to the applicable rules and regulations. None of the KPIs are based on confidential or proprietary information.

The “asset comparison” KPIs can be used to help the evaluator understand how an operator’s assets compare to the industry averages (younger / older; larger / smaller; more / less populated; etc. than

average). These asset comparison KPIs are neither good nor bad - they simply are what they are. An operator's programs and areas of emphasis should be appropriate to its unique mix of assets.

The "informative" KPIs have no pre-determined good or bad levels. Informative KPIs serve as a point of reference and discussion during the evaluation of an operator's performance under its Pipeline SMS. Informative KPI results may be useful when determining if an operators programs are appropriate (Level 3 maturity) and are being effectively implemented (Level 4 maturity).

A small number of KPIs are "Normative", with an associated scoring scale for performance better or worse than the industry averages. The operator's performance on normative KPIs is used to determine the additional scoring at level 5 maturity.

The evaluator should get and review all of the operators KPIs **prior** to the evaluation, so that they can be prepared to ask relevant questions during the evaluation. While all the KPIs should be available and be reviewed, only the normative KPI results are mandatory to conduct the evaluation.

Note that the KPIs listed in the Evaluation Tool are not to be confused with any operator-specific KPIs which they have established to monitor the performance of their systems and processes. The evaluator should consider the operator's own KPIs when evaluating each element of the Pipeline SMS.

The KPIs are explained in more detail in the KPI Appendix.

Guidance on selecting Implementation Levels

The Implementation Levels contained in the evaluation tool range from 0 to 4, on the same scale as the maturity model. Each level describes a different stage in the process of implementation, from initial awareness of the RP (Level 0) through implementation of the programs to comply with the RP (Level 3), and continuous improvement of the programs through one or more PDCA cycles (Level 4). There is an additional Level 5 in the maturity model, which recognizes the effectiveness of the PSMS in achieving its intended outcomes for safety performance and risk management. Level 5 is achieved by having Level 4 Conformance as well as performance (as measured by industry-wide KPIs) that is better than the applicable industry averages.

| Implementation Level Descriptions | | |
|-----------------------------------|-------|---|
| PDCA | Level | Description |
| Plan | 0 | Learning – The organization is aware of the RP, is learning about the RP and its requirements, is evaluating its costs and benefits, but has not yet made a commitment regarding implementation. |
| Plan | 1 | Planning – The organization has made a commitment to pursue implementation of the RP. A gap assessment has been performed and an action plan has been developed to close the gaps. |
| Do | 2 | Developing – The implementation of programs, processes, or procedures is in progress and is approximately halfway towards completion. |

| | | |
|------------------|----------|---|
| Do | 3 | Implemented – The programs, processes, or procedures have been fully developed and implemented, address all relevant aspects of the RP, and are being used consistently. Note that Level 3 does not require that the systems be perfect. They will undergo continuous improvement from this point forward. |
| Check Act | 4 | Established – The programs, processes, or procedures have been thoroughly evaluated to ensure they are working as designed, and they have been through one or more continuous improvement (PDCA) cycles. Improvements are being made on a priority basis. |

If a requirement's implementation status is between two levels, the evaluator can use increments less than 1. The spreadsheet can accommodate any degree of numerical precision the evaluator selects. Most operators are not expected to use increments smaller than 0.5.

Level 0

This level should be selected when the organization is learning about the RP but Top Management has not yet decided to implement it within their pipeline organization. This includes developing an understanding of the requirements within the RP, perhaps by reading the RP, attending workshops explaining the RP, and discussing the RP and its management system approach internally and with peers.

Level 1

This level should be selected when the organization has made a tangible commitment to implement the RP. The organization has evaluated its current management systems against the requirements of the RP, conducted and documented a gap analysis, and developed an action plan (with appropriate resources) to address the gaps.

Level 2

This level should be selected when the organization is approximately halfway towards full implementation of its action plan to address the results of the gap analysis.

Level 3

This level should be selected when the organization has developed programs that are in conformance with the requirements of RP 1173. The programs should be well documented and assign accountabilities and responsibilities for execution. Key Performance Indicators have been identified and are being tracked. Processes and procedures are established and updated, as necessary, to include changes in input and output requirements. Note that an organization might already have appropriate programs in place and start at Level 3 for some questions.

Level 4

This level should be selected when the PSMS programs have been assessed to verify that they are being effectively implemented as designed by the operator. The requirements of the RP are generally being met on a consistent basis (even if the assessments find some occasional deficiencies in implementation, or generate recommendations for further improvement). This does not require third-party assessments. Internal assessments which are documented and compliant with the RP are acceptable.

This level requires that Key Performance Indicators have been identified and are being tracked and reviewed by Top Management but does not require a demonstration of how well the PSMS program is working to improve Key Performance Indicators (which is evaluated by the Effectiveness Scores tab).

Interviews of personnel responsible for a specific procedure or process shall demonstrate that they understand the procedure/process, that the procedure is followed when applicable, and that they know where to find that procedure/process.

Note that some PSMS elements might be embedded within others and evaluating one element might help provide a better answer for another. For example, the *Documentation and Record Keeping* element is present in all other elements. The quality of documents and records being reviewed in other elements can be used in determining the maturity level of *Documentation and Record Keeping*. Management involvement with elements 2 to 10 of the PSMS will be helpful in evaluating element 1, *Leadership and Management Commitment*.

Evaluation Tool

The Evaluation Tool is an Excel spreadsheet with 7 tabs/worksheets:

1. Implementation Scores
2. Effectiveness Scores
3. Summary
4. 234 Shall Statements
5. Informative Liquid
6. Informative Gas T
7. Informative Gas D

Each tab/worksheet is explained below. To avoid inadvertent modification of the Evaluation Tool, many cells, including calculation cells, are locked. Contact info@pipelinesms.org if you need an unlocked version of this spreadsheet. The cells which require input by the user are highlighted in yellow.

Implementation Scores tab

The implementation scores worksheet contains 50 questions which address the requirements of API RP 1173. These questions are categorized by the 10 elements in the RP, with each element listed in the order in which it would likely be addressed during an evaluation (Operational Controls being first, and Management Commitment, being evidenced by the results of the evaluation, being last). The evaluator can evaluate the questions in whatever order they deem best.

Column A contains the "Short Question Name". This is a generic description of the topic addressed in that question. Column B contains the actual question, which is typically stated in one or more compound sentences with multiple embedded requirements. Column C is used by the evaluator to record the Operator's score on that question, on a scale of 0 to 4.0. Each question receives a score ranging from 0 to 3 depending on how well the PSMS meets the requirements set by the RP, and from 3 to 4 depending on how well it is functioning in a continuous improvement cycle. Column D is used by the evaluator to record their comments and observations about the Operator's compliance with that question and to note any opportunities for continuous improvement and further development. Column E gives the cross-reference to the applicable "shall statements" for that question (see below). There are 50 questions in the "Implementation Scores" worksheet and 234 Shall statements in the "234 Shall Statements" worksheet, so most implementation questions address multiple shall statements, with every shall statement addressed by at least one implementation scores question.

Effectiveness Scores tab

The Effectiveness Score is based on the operator's performance on the normative Key Performance Indicators (KPIs) versus the applicable industry segment averages, with deductions for PHMSA-reportable injuries and fatalities. Each of the segments of the pipeline industry has different reporting criteria and its own unique concerns regarding pipeline safety, so the normative KPIs are slightly different by segment – but they address the same issues. All segments of the industry have KPIs that address:

- Incident rate (PHMSA reportable)
- Incidents impacting the public / kmile (PHMSA reportable)
- Injury rate (OSHA – all personnel within the Pipeline SMS scope)

The 3 normative KPIs above are scored by comparing the operator's KPI results to its industry segment peers. The last 2 normative KPIs are automatic deductions, regardless of the size of the operator:

- Events with PHMSA-reportable Injuries (each injury incident without a fatality)
- Events with PHMSA-reportable Fatalities (each incident with fatalities or both fatalities and injuries)

Some operators may have pipelines in multiple segments of the industry (for example, gas transmission and gas distribution). The KPIs should be filled in for all segments that apply to the operator. Leave all inapplicable KPIs blank (nothing in the cell, not even a zero), and the spreadsheet will average only the applicable KPI results to determine the Average KPI score. Then the deductions are made for PHMSA-reportable injuries and fatalities to determine the Final KPI Score.

Summary tab

The Summary tab contains:

- Implementation Score for each of the 10 elements of the RP. All questions are equally weighted. The Implementation Score for each element is the average score of all the questions under that element.

$$\text{Implementation Score per Element} = \frac{\text{Total Score of Questions under that Element}}{\text{Number of Questions for that Element}}$$

- Overall Company Implementation Score (averaging all questions in the Implementation scores tab, not all Element scores). The Elements with more questions effectively get a higher weighting than Elements with fewer questions.
- Effectiveness Score (from the Effectiveness tab)
- Combined PSMS Score (Conformance score + Effectiveness score)

234 Shall Statements tab

This is a reference sheet which contains all 234 shall statements in RP 1173. Column B contains the Shall Statement Numbers, which are cross-referenced with the implementation questions as well as RP 1173. Column C contains each “shall” statement from the RP (as verbatim as possible). Columns D and E include guidance to differentiate between implementation levels 3 and 4 for each shall statement. Note that the guidance for each question are simply examples and are not intended to establish new or additional requirements not found in the RP. The evaluators can use these as guidelines when performing their evaluation. Generic criteria to determine implementation levels are explained below.

Informative KPI Tabs

The Evaluation Tool has 3 Informative KPI tabs – one for each segment of the energy pipeline industry.

- Informative Liquid (for liquid transmission pipeline operators)
- Informative Gas T (for gas transmission pipeline operators)
- Informative Gas D (for gas distribution pipeline operators).

The appropriate informative KPI tab(s) should be completed prior to the evaluation, so that the evaluator(s) and operator can be aware in advance of any outliers in these metrics that might merit discussion during the evaluation. All of the KPIs are based on publicly reported information, and all should be calculated – but the absence of complete informative KPI information is not a reason to defer an evaluation. The sources and calculation methods for all KPIs are explained in comments inserted in the appropriate cells of the Evaluation Tool worksheets as well as below in the KPI Appendix to this document.

KPI Appendix

This appendix provides additional detail and commentary concerning the KPIs in the Evaluation Tool. It explains how certain KPIs are calculated and how the normative KPIs are scored. The Evaluation Tool spreadsheet also contains numerous comments embedded in applicable cells in the various KPI tabs. The spreadsheet comments point the user to specific parts and subparts of the applicable incident and annual reports for the data used in those calculations. The user will need to refer to both the information below and the comments in various KPI tabs / cells in the Evaluation Tool spreadsheet to ensure that all KPIs are calculated correctly for the operator.

Normative KPIs, and scoring

Each segment of the industry has 3 normative KPIs. The tables below summarize the normative KPIs for each segment of the industry and how they are scored.

| Normative KPIs (versus industry peers) ¹ | | |
|---|---|---|
| Liquid | Gas Transmission | Gas Distribution |
| <ul style="list-style-type: none"> ROW incidents² / kmile | <ul style="list-style-type: none"> ROW incidents / kmile | <ul style="list-style-type: none"> Incidents / kmile (main and services) |
| <ul style="list-style-type: none"> PHMSA IPE / kmile | <ul style="list-style-type: none"> Incidents with public impacts / kmile | <ul style="list-style-type: none"> Incidents with public impacts / kmile (main and services) |
| <ul style="list-style-type: none"> OSHA Injury Rate | <ul style="list-style-type: none"> OSHA Injury Rate | <ul style="list-style-type: none"> OSHA Injury Rate |

For each of these normative KPIs, the operator's KPI results are compared to its industry segment average and a score is assigned using the scale below. Operators get a positive score when they perform better than the industry average. Approaching a goal of zero incidents is an asymptotic process, with increasing amounts of effort required to achieve ever-smaller levels of improvement. For that reason, the scale is weighted toward the zero side of the chart.

| Normative KPI scoring | |
|---|-------------|
| Operator rate versus industry segment average | KPI Scoring |
| <= 25% | +1.00 |
| >25% to <= 50% | +0.75 |
| >50% but <= 75% | +0.50 |
| <75% to <=90% | +0.25 |
| <90% to <= 150% | 0.00 |
| >150% but <= 200% | -0.25 |
| >200% | -0.5 |

¹ See the Definitions section for the definitions of "ROW Incidents", IPE, and "incidents with public impacts".

² Using PHMSA terminology, liquids pipelines have "accidents" and gas pipelines have "incidents", but these terms are interchangeable for our purposes. For simplicity, this document refers to both as "incidents".

Even large operators will have relatively few PHMSA-reportable incidents per year, and there will be significant random variation up and down from year to year. For the Normative KPIs using PHMSA data, an operator should use a 3-year average when comparing their metrics to the industry averages. For the OSHA TRIR normative KPI, use the prior 12 months or year, whichever is available. The OSHA TRIR should be for all the personnel working within the scope of the PSMS.

PHMSA reportable fatalities and injuries each have an automatic deduction if Yes within the prior 12 months. Note that only PHMSA-reportable injuries and fatalities are used for this metric, and that this is more limited than the broader category of “occupational” injuries or fatalities. For example, an employee who suffers an injury while lifting a piece of equipment on the job might have an OSHA-recordable injury, but not a PHMSA-reportable injury. PHMSA-reportable injuries and fatalities are only those associated directly with a pipeline incident, and even large operators would not normally have a single event in a 12-month period. Events with PHMSA-reportable fatalities have an automatic deduction of 0.5, and events with PHMSA-reportable injuries have an automatic deduction of 0.25. Note that a single event resulting in both PHMSA-reportable fatalities and injuries would have a deduction of 0.5, not 0.75.

| Automatic Deduction KPIs | |
|--|-------------|
| Any event | KPI Scoring |
| Events with PHMSA Injuries (each injury incident without a fatality) | -0.25 |
| Events with PHMSA Fatalities (each incident with fatalities or both fatalities and injuries) | -0.50 |

Scoring method:

The Evaluation Tool spreadsheet will automatically score each Normative KPI and average the results to get the initial Normative KPI score. Then, make deductions to that score for any PHMSA-reportable injuries or fatalities, to arrive at the operator’s final KPI score. This KPI score is added to the operator’s Pipeline SMS program evaluation score to get a final summary score on the maturity model scale in the Evaluation Tool.

Example:

| | |
|--|--------------|
| In the past 12 months, a large liquid pipeline operator has: | Score |
| • OSHA Injury Rate that is 80% of industry avg | +0.25 |
| • ROW incidents / kmile that is 75% of industry avg | +0.50 |
| • PHMSA IPE / kmile that is 0% of industry avg (none) | +1.00 |
| COMPARATIVE KPI SCORE (average above) | +0.58 |
| Fatalities deduction | ?? |
| Injuries deduction | ?? |
| Total KPI score | ??? |

The KPI score would be +0.58 if there were no incidents with PHMSA-reportable injuries or fatalities. If this operator had one or more incidents with a PHMSA-recordable fatality, they would have an automatic deduction of -0.5 and get a total KPI score of +0.08. If they had no PHMSA-recordable incidents with fatalities, but had one incident with a PHMSA-recordable injury they would get an automatic deduction of -0.25 for a total KPI score of +0.33. If they had 2 separate incidents with PHMSA-recordable injuries they would have a total KPI score of +0.08. If they had a single incident with both injuries and fatalities, the deduction would be -0.5 (not -0.75) for a total score of +0.08.

Informative KPIs (not scored)

Informative KPIs serve as a point of reference and discussion during the evaluation of an operator's performance under its Pipeline SMS. While the results for an informative KPI might be relevant, and even important, there are no right and wrong answers for informative KPIs. For example, it is relevant to know that an operator has twice as many immediate repairs per thousand miles of pipe versus its industry peers – and that fact may help to inform the discussion between the evaluator and the operator as to the effectiveness of its risk management program. Perhaps the operator's immediate repair rate is high because they are using a conservative criterion for immediate repairs. Perhaps it has recently spiked because the operator has begun using a more sensitive inspection tool that identifies more immediate repair conditions than the previous inspection tools. On the other hand, perhaps the operator has been using a less-conservative dig and repair criteria than its peers and as a result finds more conditions on subsequent inspections that have deteriorated into immediate repair conditions than average. The point being that informative KPIs are just that – “informative”. The operator and the evaluator should be aware of how the operator compares to its industry peers on these KPIs, with appropriate follow up discussion during the evaluation.

| Informative KPIs | | |
|--|--|--|
| Liquid | Gas Transmission | Gas Distribution |
| <ul style="list-style-type: none"> IPE Releases by Cause Category: # / kmile | <ul style="list-style-type: none"> IPE Releases by Cause Category: # / kmile | <ul style="list-style-type: none"> IPE Releases by Cause Category: # / kmile |
| <ul style="list-style-type: none"> IPE Releases: # / Mbbl-Miles note: IPE releases / kmile is a normative metric. | <ul style="list-style-type: none"> IPE Releases: # / MMscf | <ul style="list-style-type: none"> NA |
| <ul style="list-style-type: none"> Immediate repairs / kmile | <ul style="list-style-type: none"> Immediate repairs / kmile | <ul style="list-style-type: none"> Leaks / kmile (main and services) |
| <ul style="list-style-type: none"> Scheduled repairs / kmile | <ul style="list-style-type: none"> Scheduled conditions / kmile | <ul style="list-style-type: none"> Excavation damages / kmile (main and services) |
| <ul style="list-style-type: none"> Onshore PL ROW releases (total): # and bbls by kmile and Mbbl-miles (4 metrics). | <ul style="list-style-type: none"> Gathering Line Releases: # / 1 K Gathering Miles | <ul style="list-style-type: none"> MMCF Unintentionally Released / 1 K Services |

| | | |
|--|---|---|
| Note: # / kmile is a normative metric. | <ul style="list-style-type: none"> MCF Unintentionally Released / kmile and MMSCF (2 metrics) | |
| <ul style="list-style-type: none"> Onshore PL ROW releases by IM and O&M causes: # and bbls by kmile and Mbbl-miles (8 metrics). | <ul style="list-style-type: none"> Incidents by IM and O&M Cause Category: # / kmile and MCF / kmile | <ul style="list-style-type: none"> Incidents by Cause Category: # / kmile and # / kservices |
| <ul style="list-style-type: none"> Onshore PL ROW Releases by Commodity: # and bbls by kmile and Mbbl-miles (4 metrics). | <ul style="list-style-type: none"> # Releases by Class Location | <ul style="list-style-type: none"> # Releases by class location |
| <ul style="list-style-type: none"> Onshore PL ROW Releases in HCA: # / 1k HCA miles | <ul style="list-style-type: none"> HCA Releases: # / 1 K HCA Miles | <ul style="list-style-type: none"> NA |
| <ul style="list-style-type: none"> Primary Method of Release Identification -pie chart with 4 slices: Controlled by Operator <ul style="list-style-type: none"> CPM/SCADA-based information (SCADA only for NG Trans & Distribution) Static/Pressure/Leak Test Controller Air/Ground Patrol Local Operating personnel 3rd Party <ul style="list-style-type: none"> Public notification Notification from 3rd party that caused the release Emergency Responder notification. Other | <ul style="list-style-type: none"> Ditto HL | <ul style="list-style-type: none"> Ditto HL |
| <ul style="list-style-type: none"> Facility & Tank Releases (total): # and bbls per 1 K Tanks and 1Mbbl estimated (or actual) storage (4 metrics) | <ul style="list-style-type: none"> Leaks repaired / year (last 3 years) and Leaks outstanding at YE (last 3 years) | <ul style="list-style-type: none"> Leaks repaired / year (last 3 years) and Leaks outstanding at YE (last 3 years) |
| <ul style="list-style-type: none"> Facility & Tank Releases by Cause: # / 1 K Tanks | <ul style="list-style-type: none"> NA | <ul style="list-style-type: none"> # MFF / Year % MFF by Fitting Type % MFF by Material |
| <ul style="list-style-type: none"> Facility & Tank Releases by Commodity: # / 1 K Tanks | <ul style="list-style-type: none"> NA | <ul style="list-style-type: none"> # incidents by Installation or |

| | | |
|--|--|-----------------------------------|
| | | Manufacture Decade / 1 K Miles |
|--|--|-----------------------------------|

Asset Comparison KPIs (not scored)

Asset comparison KPIs can be used to help the evaluator understand how an operator's assets compare to the industry averages (younger / older; larger / smaller; more / less populated; etc. than average). These asset comparison KPIs are neither good nor bad - they simply are what they are. An operator's programs and areas of emphasis should be appropriate to its unique mix of assets. Asset comparison KPIs have been identified for each segment of the industry, as follows. Use the most recent year of data available, unless specified otherwise.

| Asset Comparison KPIs | | |
|---|---|---|
| Liquid | Gas Transmission | Gas Distribution |
| <ul style="list-style-type: none"> % Miles of Pipe by Decade Installed (including Unknown) | <ul style="list-style-type: none"> Ditto HL | <ul style="list-style-type: none"> Ditto HL |
| <ul style="list-style-type: none"> % Miles of Bare Pipe with CP / without CP | <ul style="list-style-type: none"> Ditto HL | <ul style="list-style-type: none"> Ditto HL |
| <ul style="list-style-type: none"> % Miles of pre-1970 LF ERW Pipe | <ul style="list-style-type: none"> NA | <ul style="list-style-type: none"> # miles of cast iron pipe |
| <ul style="list-style-type: none"> % ILI Miles / PL miles by Tool Type / 5 Years | <ul style="list-style-type: none"> % ILI Miles / PL miles by Tool Type / 7 Years | <ul style="list-style-type: none"> NA |
| <ul style="list-style-type: none"> % ECDA Inspection Miles / PL miles / 5 Years | <ul style="list-style-type: none"> % ECDA Inspection Miles / PL miles / 7 Years | <ul style="list-style-type: none"> NA |
| <ul style="list-style-type: none"> # Anomalies Repaired / kmile / 5 Years | <ul style="list-style-type: none"> # Anomalies Repaired / 1 K Miles / 7 Years | <ul style="list-style-type: none"> NA |
| <ul style="list-style-type: none"> # Immediate Repairs / HCA kMiles / 5 Years | <ul style="list-style-type: none"> # Immediate Repairs / HCA kMiles / 7 Years | <ul style="list-style-type: none"> NA |
| <ul style="list-style-type: none"> # Pressure Test Leaks / Ruptures per Tested kMiles/ 5 years | <ul style="list-style-type: none"> # Pressure Test Leaks / Ruptures per Tested kMiles / 5 years | <ul style="list-style-type: none"> NA |
| <ul style="list-style-type: none"> # and % of Regulated Gathering Miles | <ul style="list-style-type: none"> # and % of Regulated Gathering Miles | <ul style="list-style-type: none"> NA |
| <ul style="list-style-type: none"> % of tanks by size range | <ul style="list-style-type: none"> NA | <ul style="list-style-type: none"> NA |
| <ul style="list-style-type: none"> # and % of Miles of Pipe Operating at Unknown Stress Levels | <ul style="list-style-type: none"> Ditto HL | <ul style="list-style-type: none"> NA |
| <ul style="list-style-type: none"> % of HCA Miles by type of HCA | <ul style="list-style-type: none"> NA | <ul style="list-style-type: none"> NA |
| <ul style="list-style-type: none"> NA | <ul style="list-style-type: none"> # NG Transmission Miles with Incomplete MAOP Records / kmiles (All determination methods) | <ul style="list-style-type: none"> NA |

| | | |
|------|--|------|
| • NA | • # NG Transmission Miles Unable to Internally Inspect (not piggable) / kmiles | • NA |
|------|--|------|

Definitions / Sources

General:

The KPI tabs in the Evaluation Tool spreadsheet have comments in many of the cells, explaining where to find the appropriate data on the incident report or annual report, and how to perform the calculation. Refer to the information below as well as to the individual KPI cell comments to ensure all KPIs are calculated correctly.

Liquids “on the ROW” criteria:

For hazardous liquids a ROW accident is an accident reported to PHMSA on the 7000-1 report form where the following questions are answered in the combinations found in the table. For instance, all onshore pipeline, including valve site systems are included as long as Part B.11 is not answered as “Tank, including attached appurtenances”. Similarly, Onshore Pump/Meter Station equipment and piping is ONLY included as a ROW accident if it is located on the Pipeline Right-of-Way in Part B.10.

- The “per thousand miles” comes from Part H of the PHMSA HL Annual Report, and is simply the sum of all the onshore miles reported each calendar year.

ONSHORE PIPELINE

| PARTB.1 - ON_OFF_SH ORE | PARTB.10 - LOCATION_TYPE | PARTC.2 - SYSTEM_PART_INV OLVED | PARTB.11 - INCIDENT_AREA_TYPE |
|-------------------------------|--|---|--|
| ONSHORE | ORIGINATED ON OPERATOR-CONTROLLED PROPERTY, BUT THEN FLOWED OR MIGRATED OFF THE PROPERTY | ONSHORE PIPELINE, INCLUDING VALVE SITES | NOT “Tank, including attached appurtenances” |
| | PIPELINE RIGHT-OF-WAY | ONSHORE PIPELINE, INCLUDING VALVE SITES | |
| | | ONSHORE PUMP/METER STATION EQUIPMENT AND PIPING | |
| | TOTALLY CONTAINED ON OPERATOR-CONTROLLED PROPERTY | ONSHORE PIPELINE, INCLUDING VALVE SITES | |

Liquids “Facilities” criteria:

Hazardous liquid accidents are considered a Facility accident if the following criteria for the PHMSA 7000-1 report are marked: In this instance, as long as these items were NOT located on the Pipeline Right-of-Way, and included either belowground storage, pump/meter stations, or terminal/tank equipment but did NOT answer Part B.11 as “Tank”, then it is considered a Facility accident.

- “Per thousand tanks” is the sum of all tanks reported in the PHMSA Annual Report each year in Part M.

FACILITY

| PARTB.1 - ON_OFF_SH ORE | PARTB.10 - LOCATION_TYPE | PARTC.2 - SYSTEM_PART_INV OLVED | PARTB.11 - INCIDENT_AREA_TYPE |
|-------------------------------|--|--|--|
| ONSHORE | ORIGINATED ON OPERATOR-CONTROLLED PROPERTY, BUT THEN FLOWED OR MIGRATED OFF THE PROPERTY | ONSHORE EQUIPMENT AND PIPING ASSOCIATED WITH BELOWGROUND STORAGE | NOT “Tank, including attached appurtenances” |
| | | ONSHORE PUMP/METER STATION EQUIPMENT AND PIPING | |
| | | ONSHORE TERMINAL/TANK FARM EQUIPMENT AND PIPING | |
| | TOTALLY CONTAINED ON OPERATOR-CONTROLLED PROPERTY | ONSHORE EQUIPMENT AND PIPING ASSOCIATED WITH BELOWGROUND STORAGE | |
| | | ONSHORE PUMP/METER STATION EQUIPMENT AND PIPING | |
| | | ONSHORE TERMINAL/TANK FARM EQUIPMENT AND PIPING | |

Liquids “Estimated Storage Volume” criteria:

For each size range of tank on the annual report, the midpoint of the range is assumed and multiplied by the # of tanks reported for that range. For tanks greater than 150 thousand barrels, the standard assumption is a tank size of 250 thousand barrels.

- (# Tanks <= 50 K bbls * 25 K bbls) +
- (# Tanks > 50 K and <= 100 K * 75 K bbls) +
- (# Tanks > 100 K and <= 150 K bbls * 125 K bbls) +
- (# Tanks > 150K bbls * 250 K bbls)

= Total estimated storage volume bbls

The estimate is reported in billions of barrels of estimated HL storage.

Gas Transmission “on the ROW” criteria:

For **ROW incidents on Natural Gas Transmission/Gathering lines**, as long as Part B.10 is marked as “Pipeline right-of-way” on the NG PHMSA Incident Form 7100.2, then it is considered a ROW incident.

- The mileage is taken from Part H of the PHMSA Annual Report form for Natural Gas Transmission and Gathering lines.

Gas Transmission Impacting the Public definition:

(this is our own definition, not agreed with PHMSA or the public)

- death,
- injury,
- public evacuation,
- fire,
- explosion,
- public/private property damage, or
- in an HCA if the total cost of the release is > \$50 K in 1984 dollars (to avoid counting relief valve releases).

Gas Distribution Impacting the Public definition:

(this is our own definition, not agreed with PHMSA or the public)

- death,
- injury,
- public evacuation,
- fire,
- explosion,

note: most gas distribution incidents will be inside a population HCA, and many will involve public / private property damage.

Liquids Impacting People or the Environment (IPE):

(this definition has been agreed with PHMSA and the public, and is tracked on PHMSA’s website)

If either criterion 1 or 2 below is met for a crude, biofuels, or refined products pipeline (excludes HVLs and CO2), the accident counts as IPE: (letters / numbers refer to PHMSA accident report form)

1. Regardless of Location of Accident (B10):

- Fatality (A12) greater than zero; or
- Injury requiring in-patient hospitalization (A13) greater than zero; or
- Ignition (A15) = Yes; or

- Explosion (A16) = Yes; or
 - Evacuation (A17) greater than zero; or
 - Wildlife impact (D1) = Yes; or
 - Water contamination (D5a) = Ocean/Seawater, Groundwater, or Drinking water; or
 - Public/Non-Operator Private Property Damage (D8a) greater than zero
2. For Location of Accident (B10) *not* “TOTALLY CONTAINED ON OPERATOR CONTROLLED PROPERTY”:
- Unintentional Release Volume (A9) greater than or equal to 5 gallons AND is inside an HCA (D7 = Yes); or
 - Unintentional Release Volume (A9) greater than or equal to 5 barrels AND is outside an HCA (D7 = No); or
 - Water contamination (D5a) = Surface; or
 - Soil contamination (D2) = Yes

PHMSA Source Data & Data Visualizations for HL IPE Accidents:

https://hip.phmsa.dot.gov/analyticsSOAP/saw.dll?Portalpages&NQUser=PDM_WEB_USER&NQPassword=Public_Web_User1&PortalPath=%2Fshared%2FPDM%20Public%20Website%2F_portal%2FHL%20Performance%20Measures&Page=IPE%20Accidents

Integrity Management (IM) Causes:

- Corrosion
- Material / Weld Failure
- Previous Excavation Damage
- Previous Outside Force

Operations and Maintenance (O&M) Causes:

- Excavation Damage where the Operator / its contractor was at least partially responsible
- Incorrect Operation
- Equipment Failure

Immediate Repairs

From the HL PHMSA Annual Report data from Part F.4.c1, the “Total number of conditions repaired in calendar year within a segment that could affect an HCA meeting the definition of immediate repair condition [195.452(h)(4)(i)]”.

- The number of miles here are just the HCA miles found in the PHMSA Annual Report in Part L.

OSHA Injury Rate

Reported online at the following link from the Bureau of Labor Statistics, you can find these stats by Industry. The Pipeline Industry is listed under the NAICS code 486. The website has tables for Injuries, Illnesses, and Fatalities in the Pipeline Industry sector. <https://www.bls.gov/iag/tgs/iag486.htm>