UPDATES, FACTS AND FIGURES

PIPELINE SAFETY
September 2022

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From the Feds…

- Advisory Bulletins-Pipeline Safety: Potential for Damage to Pipeline Facilities Caused by Earth Movement and Other Geological Hazards | PHMSA ADB-2022-01
- Published 6/2/2022
- 3rd related notices and advisories since 2019:
  - Docket 2019-0087 ADB-2019-02
  - Docket 2019-0047 ADB-2019-01
- 2012 Docket-2012-0039 ADB 2012-05(Cast iron)
  - The 2012 ADB is a follow up to 2 Alert Notices from early 1990's
    - ALN-91-02
    - ALN-92-02

From the Feds…

Take a step back in time:

1991- ALN–91–02: **August 1990 explosion and fire in Allentown, PA:**

- **‘Require each gas operator to implement a program, based on factors such as age, pipe diameter, operating pressure, soil corrosiveness, existing graphitic damage, leak history, burial depth, and external loading, to identify and replace in a planned, timely manner cast iron piping systems that may threaten public safety.’’**
- **Pipeline safety regulations require that cast iron pipe on which general graphitization is found to a degree where a fracture might result must be replaced. In addition, the regulations require that cast iron pipe that is excavated must be protected against damage.**

From the Feds…

Take a step back in time:

1992- ALN–92–02: Supplementary Alert Notice to the 1991 Alert Notice

- The Supplementary Alert Notice reminded pipeline operators of the requirement at 49 CFR 192.613 that each operator have a procedure for continuing surveillance of its pipeline facilities to identify problems and take appropriate action concerning failures, leakage, history, corrosion, and other unusual operating and maintenance conditions. This procedure should also include surveillance of cast iron to identify problems and to take appropriate action concerning graphitization.

From PHMSA…

Take a step back in time:

2012- ADB-2012-05: **Cast Iron Pipe (Supplementary Advisory Bulletin).**

- Recent incidents, such as the deadly explosions in Philadelphia and Allentown, Pennsylvania involving cast iron pipe failures, have focused attention on our Nation's aging pipeline infrastructure and underline the importance of having valid methods for evaluating the integrity of pipelines to better ensure public safety.
- This advisory bulletin reiterates two prior Alert Notices which remain relevant, urges owners and operators to conduct a comprehensive review of their cast iron distribution pipelines and replacement programs and accelerate pipeline repair, rehabilitation and replacement of high-risk pipelines, requests state agencies to consider enhancements to cast iron replacement plans and programs, and alerts owners and operators of the pipeline safety requirements for the investigation of failures.

From PHMSA…

Take a step back in time:

2019- ADB-2019-01:

- PHMSA is issuing this advisory bulletin to remind all owners and operators of gas and hazardous liquid pipelines of the potential for damage to pipeline facilities caused by severe flooding and actions that operators should consider taking to ensure the integrity of pipelines in the event of flooding, river scour, and river channel migration.
- PHMSA listed 15 actions and suggestions including but not limited to:

From PHMSA…

Take a step back in time:

2019- ADB-2019-01:

- PHMSA is issuing this advisory bulletin to remind all owners and operators of gas and hazardous liquid pipelines of the potential for damage to pipeline facilities caused by severe flooding and actions that operators should consider taking to ensure the integrity of pipelines in the event of flooding, river scour, and river channel migration.
- PHMSA listed 15 action items for pipeline that can be affected by flooding, waterways and river crossings.

From PHMSA…

Take a step back in time:

2019- ADB-2019-02:

PHMSA is issuing this advisory bulletin to remind owners and operators of gas and hazardous liquid pipelines of the potential for damage to pipeline facilities caused by earth movement from both landslides and subsidence in variable, steep, and rugged terrain and for varied geological conditions. These conditions can pose a threat to the integrity of pipeline facilities if those threats are not identified and mitigated.

PHMSA…

2022 ADB- highlights:

- Gas and hazardous liquid pipelines are required to be designed to withstand external loads including those that may be imposed by geological forces.
- ‘‘[t]he operator must take all practicable steps to protect each transmission line or main from washouts, floods, unstable soil, landslides, or other hazards that may cause the pipeline to move or to sustain abnormal loads.
- PHMSA lists 17 examples of pipeline events, incidents/accidents since 2016 with causes linked to these geologic related impacts.
- PHMSA encourages pipeline operators to enhance their preparations and procedures beyond the minimum Federal standards and to address the unique threats, vulnerabilities, and challenges of each individual pipeline facility. Pipeline operators, Federal and state regulators, and the public have a common goal of no damage and no releases from pipeline infrastructure. Working together will better achieve our goal of zero incidents and releases.

2022 ADB- Pipeline operators should consider taking the following actions to ensure pipeline safety:

1. Identify areas surrounding the pipeline that may be prone to large earth movement, including but not limited to slope instability, subsidence, frost heave, soil settlement, erosion, earthquakes, and other dynamic geologic conditions that may pose a safety risk.

2. Use geotechnical engineers during the design, construction, and ongoing operation of a pipeline system to ensure that sufficient information is available to avoid or minimize the impact of earth movement on the integrity of the pipeline system. At a minimum, operators should consider soil strength characteristics, ground and surface water conditions, propensity for erosion or scour of underlying soils, and the propensity of earthquakes or frost heave.

3. Develop design, construction, and monitoring plans and procedures for each identified location, based on the site-specific hazards identified. When constructing new pipelines, develop and implement procedures for pipe and girth weld designs to increase their effectiveness for taking loads, either stresses or strains, exerted from pipe movement in areas where geological subsurface conditions and movement are a hazard to pipeline integrity.

From PHMSA…

4. Monitoring plans may include provisions related to the following:

• Ensuring during construction of new pipelines that excavators do not steepen, load (including changing the groundwater levels) or undercut slopes which may cause excessive ground movement during construction or after operations commence.

• Conducting periodic visits and site inspections. Increased patrolling may be necessary due to potential hazards identified and existing/pending weather conditions. Right-of-way patrol staff must be trained on how to detect and report conditions that may lead to or exhibit ground movement to appropriate staff.

• Identifying geodetic monitoring points (i.e., survey benchmarks) to track potential ground movement. • Installing slope inclinometers to track ground movement at depth which may otherwise not be detectable during right-of-way patrols.

• Installing standpipe piezometers to track changes in groundwater conditions that may affect slope stability.

• Evaluating the accumulation of strain on the pipeline by installing strain gauges.

• Conducting stress/strain analysis utilizing in-line inspection tools equipped with inertia mapping unit technology and high resolution deformation in-line inspection for pipe bending and denting from movement.

• Utilizing aerial mapping light detection and ranging or other technology to track changes in ground conditions.

From PHMSA…

5. Develop mitigation measures to remediate the identified locations.

6. Monitor environmental conditions and changing weather patterns in proximity to their facilities and evaluate soil stability that may have been adversely impacted. • The National Oceanic and Atmospheric Administration's National Centers for Environmental Information has excellent information publicly available. For example, see the National Temperature and Precipitation Maps at the National Centers for Environmental Information (https:// www.ncdc.noaa.gov/temp-and-precip/ us-maps/).

7. Use available data and information resources to assess pipeline facility vulnerability relative to landslides and other types of earth movement. • The USGS has excellent information publicly available regarding land movement. For example, see the Landslide Hazards Maps at the USGS website

- www.usgs.gov/ programs/landslide-hazards/maps

From PHMSA…

8. Consider the findings and recommendations of pertinent research projects, studies, and reports on the impact of changing weather patterns on soil stability.3 PHMSA also notes that industry and academic materials could be informative regarding relevant considerations and strategies for ensuring pipeline integrity in areas of land movement or soil subsidence.

9. Mitigation measures should be based on site-specific conditions and may include:

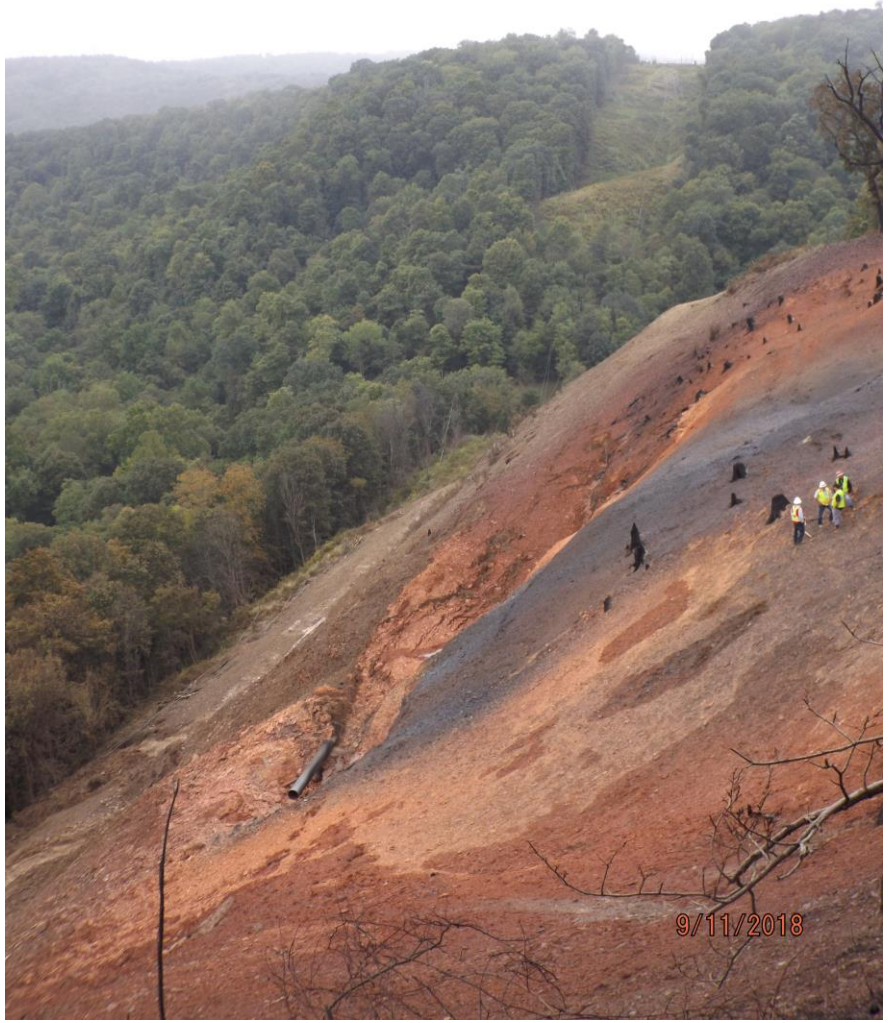
- Re-routing the pipeline right-of-way prior to construction to avoid areas prone to large ground movement such as unstable slope areas, earthquake fault zones, permafrost movement, or scour.
- Utilize properly designed horizontal directional drilling to go below areas of potential land movement.
- Installation of drainage measures in the trench to mitigate subsurface flows and enhance surface water draining at the site including streams, creeks, runs, gullies, or other sources of surface runoff that may be contributing surface water to the site or changing groundwater levels that may exacerbate earth movement.

From PHMSA…

- Reducing the steepness of potentially unstable slopes, including installing retaining walls, soldier piles, sheet piles, wire mesh systems, mechanically stabilized earth systems and other mechanical structures.
- Installing trench breakers and slope breakers to mitigate trench seepage and divert trench flows along the surface to safe discharge points off the site or right-of-way.
- Building retaining walls and/or installing steel piling or concrete caissons to stabilize steep slope areas as long as the corrosion control systems are not compromised.
- Reducing the loading on the site by removing and/or reducing the excess backfill materials to off-site locations. Soil placement should be carefully planned to avoid triggering earth movement in other locations.
- Compacting backfill materials at the site to increase strength, reduce water infiltration, and achieve optimal moisture content.

From PHMSA…

- Drying the soil using special additives such as lime-kiln dust or cement-kiln to allow the materials to be re-used and worked at the site. Oversaturated materials may require an extensive amount of time and space to dry.
- Regrading the pipeline right-of-way to minimize scour and erosion.
- Bringing the pipeline above ground and placing it on supports that can accommodate large ground movements (e.g., transitions across earthquake fault zones or unstable slopes, without putting excessive stress or strain on the pipeline).
- Reducing the operating pressure temporarily or shutting-in the affected pipeline segment completely.
- Re-routing the pipeline when other appropriate mitigation measures cannot be effectively implemented to maintain safety.


9/11/2018

API RP 1173- SMS

[Docket No: PHMSA–2022–0060]

- PHMSA invites public comments on its intent to request Office of Management and Budget (OMB) approval of a new, one-time information collection titled:
- ‘‘Voluntary Adoption of API RP 1173 for Gas Distribution Systems.’’ The proposed information collection would provide data necessary to prepare the report required by Section 205 of the Protecting Our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2020 for gas distribution systems.
- **DATES:** Interested persons are invited to submit comments on or before November 7, 2022.

Gathering Rule

- Nov. 15, 2021 PHMSA published Gas Gathering Rule creating Type C and Type R gathering
- Pennsylvania expected to gain 1000s of miles of Type C gathering and several operators
- July 8, 2022 PHMSA issued a letter providing limited enforcement discretion on 8-12 inch mains for 49 CFR 192.9.
  - Does not affect reporting per 49 CFR 191.
  - Classification per 192.8
  - Or anything over 12.75 inches
- Gas Gathering Regulatory Overview | PHMSA (dot.gov)

Gathering Rule

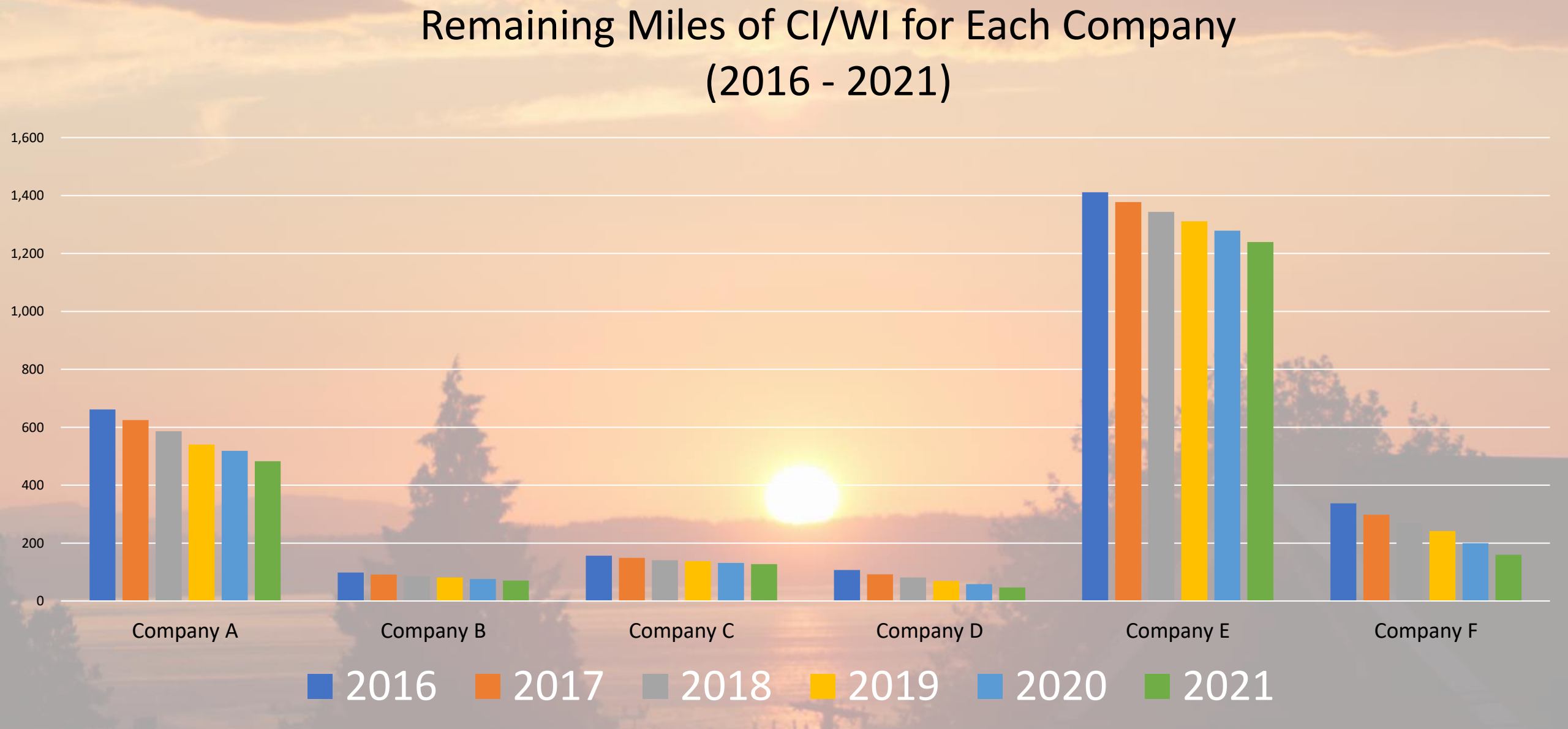
- Subjects all gas gathering lines, including all unregulated lines (Type R), to annual and incident reporting requirements in 49 CFR part 191.
- Limits the use of the “incidental gathering line” exception on new pipelines to lines 10 miles or less (§ 192.8(a)(5)).
- Defines a new category of Type C regulated gas gathering lines in Class 1 locations that are:
  - Outside diameter of 8.625 inches and greater, and
  - Hoop stress>20% of the Specified Minimum Yield Strength (SMYS), or operating at greater than 125psig of pressure if the pipeline is non-metallic or the stress level is unknown
- Defines risk-based requirements for Type C regulated gas gathering lines (§ 192.9(e) and (f))
  - All new and replaced Type C lines are subject to design, construction, initial inspection and testing requirements.
  - All Type C lines are subject to damage prevention, and emergency planning requirements.
  - All Type C lines are subject to public awareness, line marker, corrosion control and leak survey requirements, with an exception for pipelines with no nearby structures (see § 192.9(f).
  - Type C lines with an outside diameter greater than 12.75 inches are subject to MAOP and plastic pipe requirements, with an exception for pipelines with no nearby structures (see § 192.9(f).

Main Replacement-

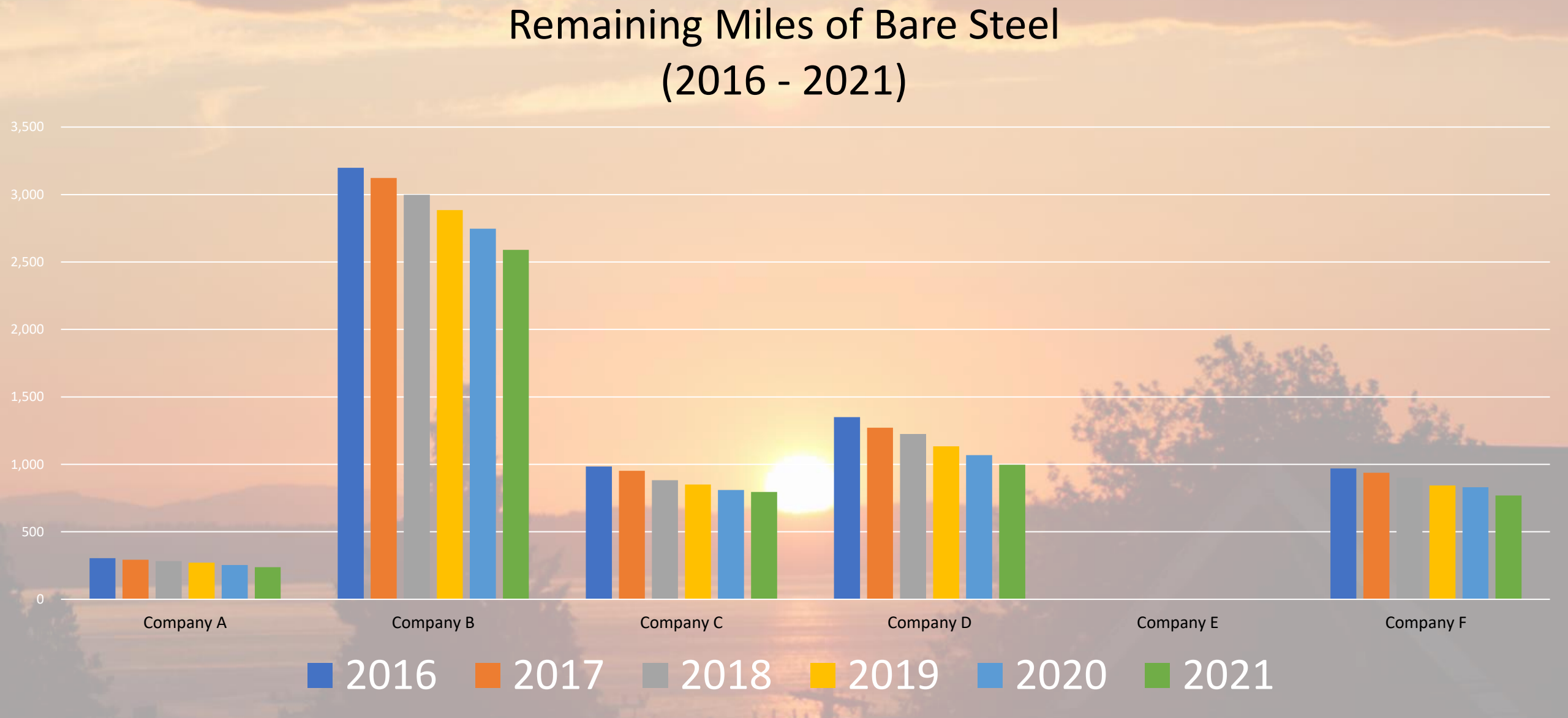
- Pennsylvania PUC and the Safety Program is reminded annually to urge operators to replace bare steel/cast iron/wrought iron pipelines.

So how are we doing…

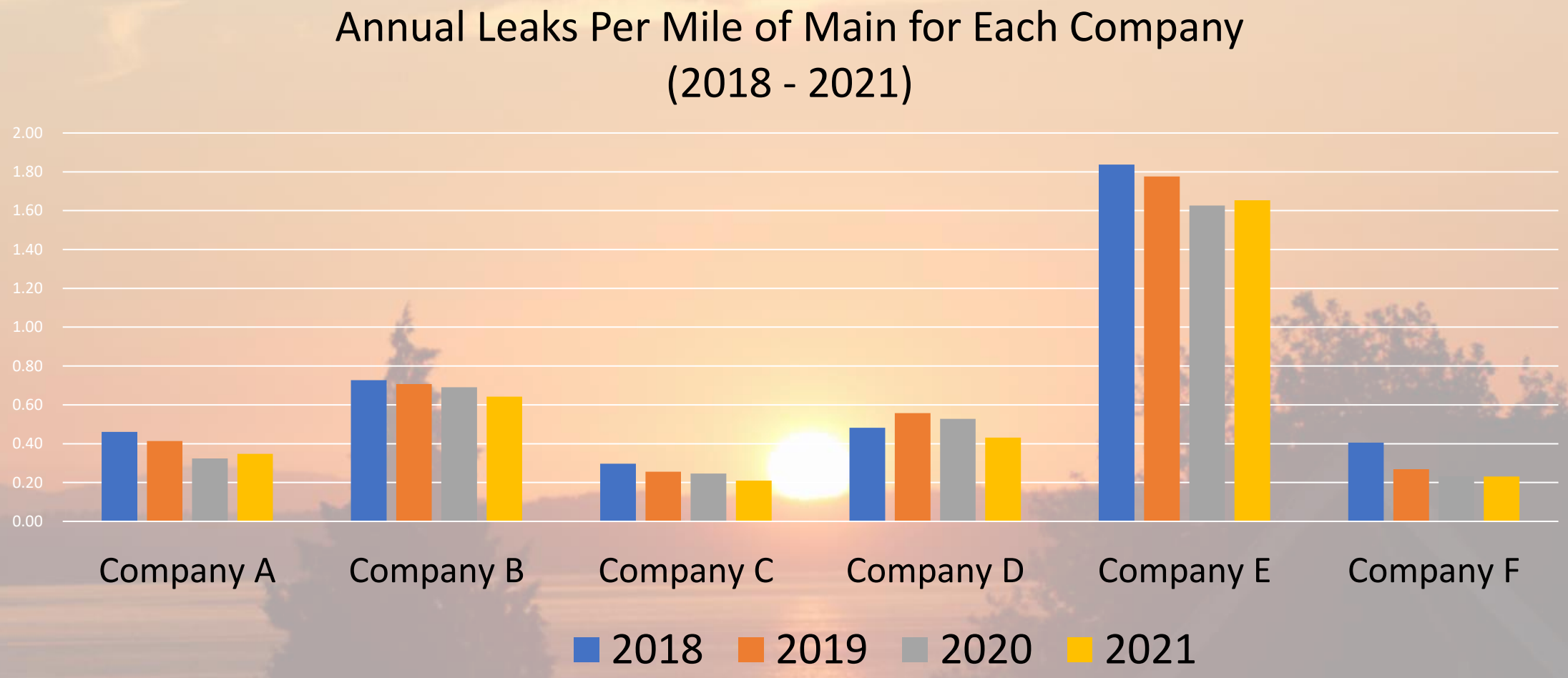
Main Replacement-CI/WI



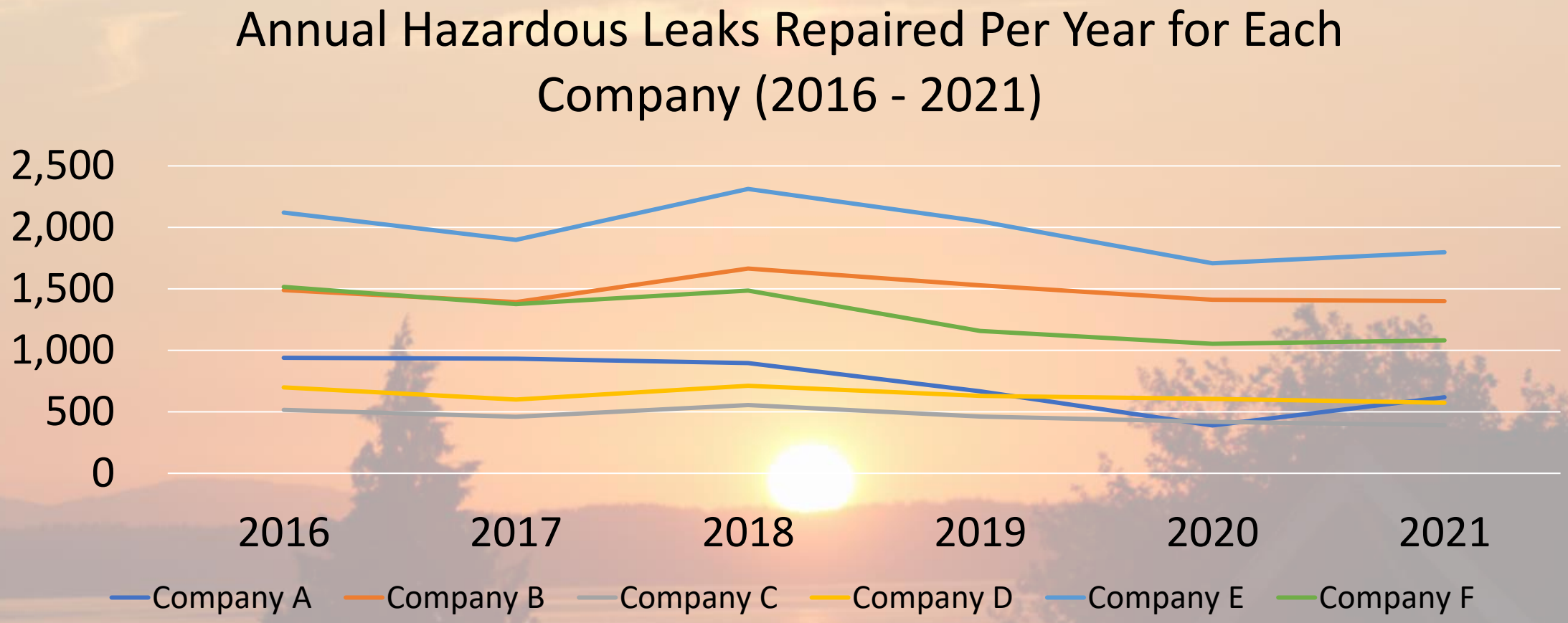
Main Replacement-Bare Steel



Leak trends large distribution operators



Hazardous Leak trends Large distribution operators




Thank You!