

A photograph of an oil pumpjack in a grassy field under a blue sky with wispy clouds. A long pipeline runs across the foreground, supported by concrete pillars. The pumpjack is in the background, to the left, with a white storage tank partially visible. A tall light pole stands near the pumpjack.

2021 PIPELINE SAFETY EXCELLENCE PERFORMANCE REPORT

& 2020-2022 STRATEGIC PLAN





American Petroleum Institute (API) is the only national trade association that represents all aspects of America's oil and natural gas industry.



Association of Oil Pipe Lines (AOPL) represents liquids pipeline owners and operators transporting crude oil, petroleum products like gasoline, diesel, jet fuel and home heating oil and industrial products like propane and ethane.

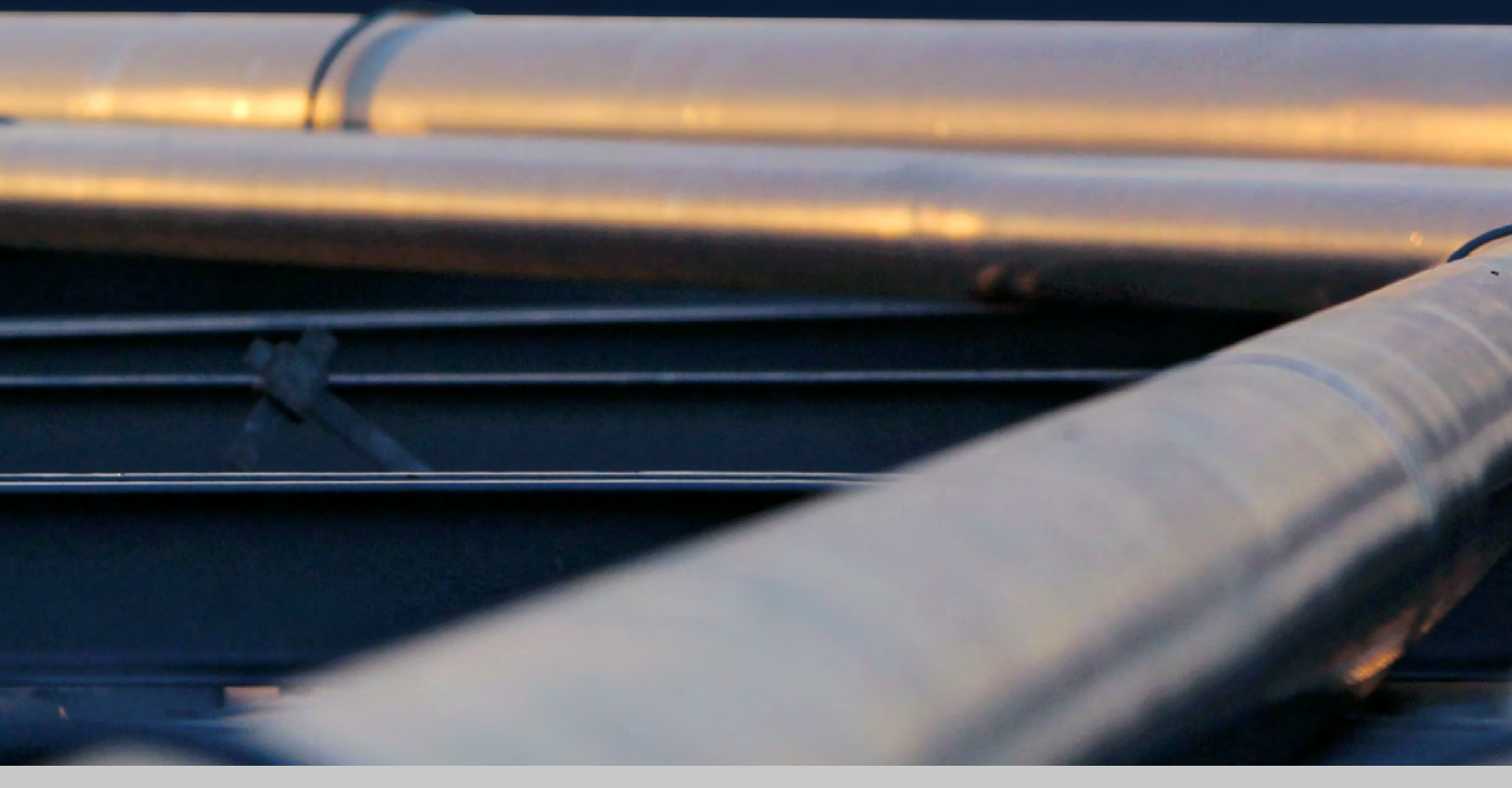


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Steering Committee Chair 4

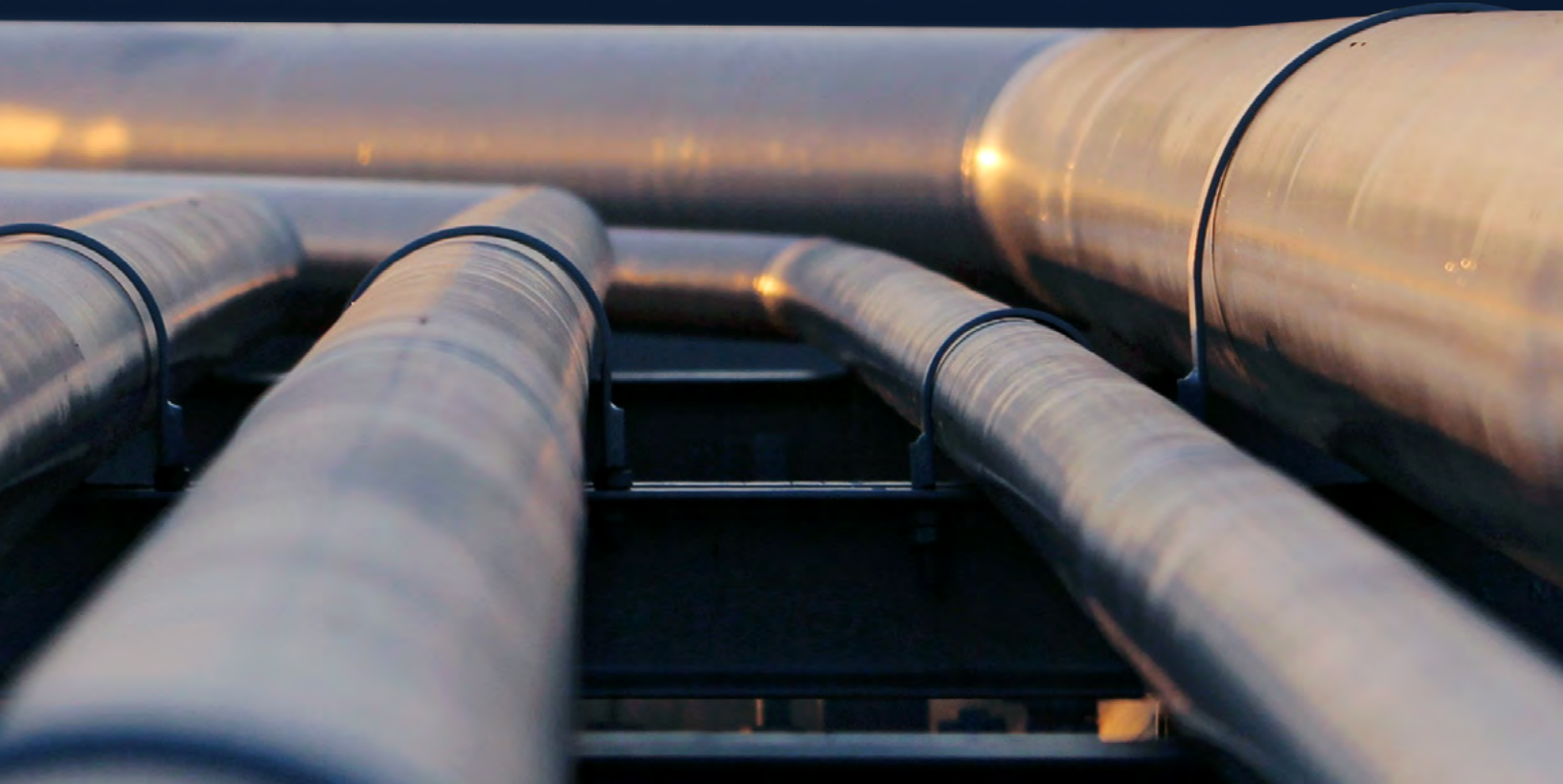
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Todd Denton

President, Phillips 66 Pipeline LLC

Chair, API-AOPL Pipeline Safety
Excellence Steering Committee

Last year when I shared this annual update on liquids pipeline safety performance, we were in the middle of the COVID-19 global pandemic. Now in 2022, with the worst of the pandemic potentially behind us, we face economic challenges at home and war in Europe. Higher prices and oil embargos are putting a focus on our energy system, where we produce our energy and how we get energy to American consumers.

Liquids pipelines perform the vital role of delivering U.S. produced energy to American consumers. The additional U.S. crude oil production we need to increase American energy security and supplies will flow by pipeline.

Pipelines are not only the best way to deliver large volumes of liquids energy; they are also the safest. Pipelines deliver liquid energy with fewer incidents and lower volumes released than other transportation alternatives.

This year's performance report on industry-wide pipeline safety metrics shows pipelines are safe and getting safer. According to government data from the U.S. Pipeline and Hazardous Materials Safety Administration, total liquids pipeline incidents are down 17 percent over the last 5 years. Pipeline incidents impacting people or the environment are down 31 percent since 2017.

Even while liquids pipeline safety performance improves, industry is still striving to make pipelines even safer. Our three-year strategic plan details the industry-wide improvement actions we are undertaking. Pipeline companies are implementing recommended practices for organizational excellence, harnessing technologies to improve safety, elevating the ways they engage with the communities around them, and ensuring they are prepared for any emergencies.

We are all facing challenging times. In the pipeline industry we are challenging ourselves. We have a role to play delivering energy safely and reliably. I hope you will read this report with interest to see how we are meeting the challenge.

A handwritten signature in black ink, appearing to read "Joe Out". The signature is fluid and stylized, with a large loop at the end.

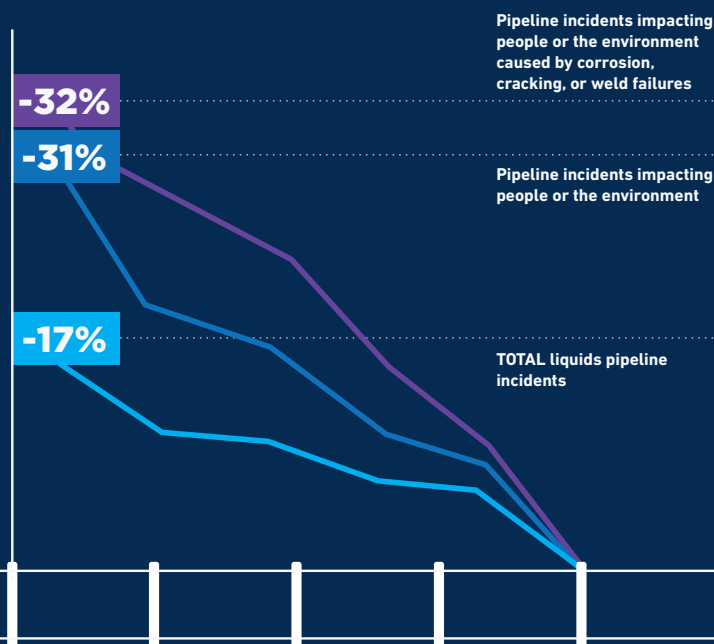
“ This year’s performance report on industry-wide pipeline safety metrics shows pipelines are safe and getting safer. ”

- Todd Denton
Chair, API-AOPL Pipeline Safety
Excellence Steering Committee

LIQUIDS
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ARE
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31%

Over the past 5 years



FEWER
INCIDENTS



EVEN AS PIPELINE MILEAGE AND BARRELS DELIVERED HAVE INCREASED NEARLY 10 PERCENT

Source: Data from the Pipeline and Hazardous Materials Safety Administration





POWERING LOCAL ECONOMIES



Local communities depend on good-paying jobs that support families, add to the tax base, and bring community services. New pipeline projects spur local economies not only along the construction route, but also in communities across America, manufacturing key components and sending trained workers to their job sites. When construction is complete, finished pipelines deliver reliable sources of energy to fuel transportation and heat homes. Industrial feedstocks delivered by pipeline support thousands more additional manufacturing jobs making goods and products.

Pipelines are an essential part of the energy supply chain, which is foundational to American manufacturing. Across America, local economies making electronics components, cosmetics, pharmaceuticals, beverage containers, carpets, tires, and clothing depend upon raw material feedstocks delivered by pipeline. America's vast network of pipelines delivers raw materials to be processed into usable feedstocks, such as fibers, resins, and finished materials, and manufacturing final products and packaging.

The oil and natural gas industry overall supports 11.3 million jobs nationally with benefits of these employers extending to all corners of the country. For example, in New Mexico's 2nd Congressional District, the oil and natural gas industry supplies more than 17 percent of total state jobs, 21 percent of its labor income, and 32 percent of its value-added GDP. The oil and natural gas industry in four Pennsylvania Congressional districts – the 6th, 7th, 8th, and 17th – supports a total of more than 100,000 jobs. By transporting the energy produced in these areas to families and factories across the country, pipelines create jobs and benefit all Americans, ensuring the energy and products they need to live and prosper are affordable and available.

U.S. natural gas and oil companies have also sent more than \$1.1 trillion to federal, state, and local treasuries through taxes, royalty payments, and fees over the past decade, according to API estimates. State treasuries have received more than \$20 billion in the past two



“The oil and natural gas industry overall supports 11.3 million jobs nationally with benefits of these employers extending to all corners of the country.”

years from severance taxes, the vast majority paid by the industry to fund local and state public projects, including schools, public safety programs and facilities, roads, sanitation, and more.



SUPPORTING FAMILY BUDGETS



Family budgets can struggle when prices go up. Food, housing, and energy are necessities for life and everything a family wants to do. Energy, like everything else, is subject to supply and demand. When energy is most affordable, it is because plentiful supplies keep prices in check. In 2022, energy supplies are tight with war in Europe and federal government policy that discourages traditional energy production and transportation. We need only look back a few years to when energy prices were affordable and U.S. supplies were plentiful and reliable.

In the 2010s, abundant domestic energy helped reduce energy costs for American households. American families saved over \$200 billion annually in energy costs thanks to increased natural gas and oil production delivered by pipelines. U.S. energy workers harnessed technologies that unlocked oil and natural gas from shale rock. New pipelines delivered record-breaking amounts of energy that made the United States the number one producer of oil and natural gas in the world. That plentiful supply pushed prices down and saved the average American family approximately \$2,500 per year. U.S. household expenditures for energy decreased 25 percent between 2008 and 2020.

When energy prices go up, families suffer. A 10 percent increase in household energy costs can push approximately 840,000 people across the U.S. into poverty. African American households are forced to choose between reducing food purchases or forgoing medicine to pay higher energy costs at twice the national average. Protecting and growing economic prosperity for American families makes it even more important for our country to continue developing and maintaining its robust energy production and pipeline infrastructure.



“ American families saved over \$200 billion annually in energy costs thanks to increased natural gas and oil production delivered by pipelines. ”



REINFORCING ENERGY SECURITY



A secure America depends upon secure energy. Global events in 2022 have destabilized numerous regions, threatened the international supply chain, and increased demand on energy supplies. Giving foreign nations leverage by depending on their energy gives them an unacceptable amount of power over the daily lives and prosperity of Americans. That is why American energy security through domestic energy production, transportation, and refining is so important.

America has the energy supplies to achieve energy security and protect its citizens from higher energy costs. Americans saw the shale energy renaissance rewrite our nation's energy story. From energy scarcity to energy abundance, this nation benefited from declining crude oil imports, greater self-sufficiency, and strengthened security. For the first time in 67 years, the U.S. was a net energy exporter in 2019 and is now the world's leading producer of oil and natural gas and exporter of liquefied natural gas (LNG). This occurred just 46 years after the U.S. experienced a historic oil embargo by some foreign producers that left our nation vulnerable. That's progress – which can be extended anew by fully harnessing our American energy resources.

Recent API polling found 9 in 10 U.S. voters support the U.S. developing its own domestic sources of energy rather than relying on other regions of the world. Furthermore, 84 percent agree that producing natural gas and oil here in the U.S. helps make our country as well as our allies across the globe more secure. The American people have it right. They want a secure America. They want reliable and affordable energy, and that means energy security.



“ Furthermore, 84 percent of U.S. voters agree that producing natural gas and oil here in the U.S. helps make our country as well as our allies across the globe more secure. ”

A STRATEGIC PLAN TO IMPROVE PIPELINE SAFETY

● ZERO INCIDENTS

Only with a goal of zero safety incidents can accidents be minimized.

● ORGANIZATION-WIDE COMMITMENT

Safety is emphasized at every level of the organization, from employees who accept personal responsibility for safety to managers who are vital to reinforcing a safety culture.

● A CULTURE OF SAFETY

A workplace culture where safety is an enduring value that all employees share.

● CONTINUOUS IMPROVEMENT

Pipeline operators believe that no matter how safe they already are, they can always improve safety.

● LEARN FROM EXPERIENCE

Pipeline operators learn how they can improve safety from their own experiences and from other pipeline operators.

● SYSTEMS FOR SUCCESS

Safety management systems bring a consistent, holistic structure to safety management, helping to improve safety performance.

● EMPLOY TECHNOLOGY

From “smart pigs” to innovative ways to interpret integrity data, operators constantly develop new ways to advance pipeline safety.

● COMMUNICATE WITH STAKEHOLDERS

Operators know communicating and establishing a positive relationship with the public and stakeholders who value safety is vital to improving safety.



2020-2022

PIPELINE STRATEGIC GOALS

1. PROMOTE ORGANIZATIONAL EXCELLENCE

Develop and promote an industry-wide safety culture through continuous improvement mechanisms and voluntary industry implementation of Pipeline SMS. Transform industry-wide sharing into a robust, sustainable program, and emphasize the benefits and power of data integration.



2. IMPROVED SAFETY THROUGH TECHNOLOGY AND INNOVATION

Drive industry-wide engagement in advancing ILI capabilities to achieve the pipeline industry's goal of zero incidents. Accelerate the development and adoption of the most effective ILI tools. Create sustainable, workable frameworks for operator leak detection management.



3. INCREASE STAKEHOLDER AWARENESS & INVOLVEMENT

Improve industry's engagement with the public and government through the adoption and implementation of an industry-wide recommended practice. Promote robust and effective public awareness programs to reduce excavation damages from all parties and protect critical infrastructure systems.



4. ENHANCE EMERGENCY RESPONSE PREPAREDNESS

Increase effective and rapid emergency response efforts through the development and adoption of industry guidance on emergency planning and response processes. Promote peer to peer opportunities for drilling, exercising emergency response plans, and sharing of lessons learned from incidents.



1

PROMOTE ORGANIZATIONAL EXCELLENCE



OBJECTIVE 1.1

EXPAND SAFETY MANAGEMENT PRACTICES

STRATEGIC INITIATIVE: PIPELINE SMS

1

Increase Companies Assessing Their Current Safety Management Systems

5 percent increase in companies conducting Pipeline SMS gap assessment

2

Increase Companies Taking Action To Improve Their Safety Management Systems

5 percent increase in companies taking action on plans to address recommendations from Pipeline SMS gap assessment

3

Increase Companies Evaluating Their Safety Management Systems And Performance Improvement

Four companies complete API Third-Party Assessments per year

Despite the challenges of 2021, the pipeline industry maintained progress on the implementation of and commitment to API Recommended Practice (RP) 1173, *Pipeline Safety Management Systems*. The Pipeline SMS Industry Team, which includes distribution, transmission, and gathering operators, along with contractor representatives, serves to support operator journeys and implementation progress. The Team hosted a virtual workshop in October 2021 as well as an industry roundtable among national and regional trades involved in Pipeline SMS. Additionally, API's Pipeline SMS Third-Party Assessment Program succeeded in its second full year by completing four assessments in

2021, with an estimated 15 assessments in total being completed by the end of 2022. The assessment program is continually refining the program following operator feedback to ensure the assessments continue to provide valuable feedback to operators that help them improve their PSMS programs. Team members also utilized the 2020 Annual Report, along with a brief on Pipeline SMS's value during COVID-19, in frequent engagements with external stakeholders, including federal and state regulators, National Transportation Safety Board (NTSB) leadership, and pipeline public safety advocates. In the fall, the Team conducted its recurring Annual Survey to measure implementation progress, revealing significant progress in the number of companies expressing new management commitments, conducting gap assessments and management reviews, developing closure plans, surveying safety culture, and participating in sharing events. Lastly, the Team provided oversight on API RP 1173, which received a two-year extension in 2020, forming a policy group to identify sections of the first edition that may need revision before standards action is due in 2022.

In 2022, the Team will continue its work on revising the first edition of API RP 1173. The RP's first edition will likely be reaffirmed for five years in 2022 as the group determines the scope and breadth of its revisions and works to publish a revised second edition before 2027. The Team will also maintain its four strategic priorities of supporting operator and contractor journeys, increasing industry participation, providing stakeholder engagement, and ensuring governance and oversight. In 2022, these priorities will drive workshops and implementation tools, an approach to contractor management, and targeting smaller operators who have yet to begin implementation. API also plans to partner with other transmission trade associations for the industry's first combined safety culture survey in 2023,

highlighting the strong correlation between SMS and safety culture. Lastly, the API Third-Party Assessment Program has seven assessments confirmed for 2022, with the goal to publish a compilation of implementation benchmarks and notable practices.

OBJECTIVE 1.2

PROMOTE LEADING SAFETY PRACTICES

STRATEGIC INITIATIVE: SHARING & LEARNING

- 1 Increase Company Sharing Of Safety Lessons**
10 companies annually use systematic process, such as industry-developed Guide to Sharing, to review whether to share own safety lessons learned with other companies
- 2 Facilitate Industry - Wide Sharing Of Safety Lessons**
Liquids pipeline operators share safety lessons learned through four industry-wide safety tailgates and one safety exchange forum
- 3 Promote Company Learning From Safety Lessons**
Industry-developed Guide to Learning completed and 10 companies use this guide or other systematic process to review, incorporate and measure benefits of safety lessons learned from external sources

The pipeline industry has a long history of sharing safety information across the industry to prevent similar events from occurring. Sharing industry lessons learned to drive continuous improvement is one of the primary elements of the Pipeline Safety Management System program and API Recommended Practice (RP) 1173. Most companies have active post-incident or near-miss review, learning, and correction procedures to learn from and help prevent similar incidents from occurring in the future. The API-AOPL Sharing & Learning Subteam is tasked with carrying out Objective 1.2. The Sharing & Learning Subteam is focused on increasing the number of companies that share information and experiences, facilitating industry-wide sharing events, and promoting company learning processes. API and AOPL have issued a [Guide to Sharing](#) and [Guide to Learning](#) to facilitate greater sharing of lessons and incorporation of lessons in organizations' programs, processes, and procedures.



In 2021, the Subteam led several Virtual Safety Tailgate meetings where pipeline operators shared information related to safety incidents and lessons learned, near-miss incidents, and learnings from post-incident analysis. In November 2021, the Sharing & Learning Subteam sponsored the annual Pipeline Information eXchange (PIX), providing API and AOPL members with a day-long forum to openly communicate on a range of lessons learned and best practices developed based on those experiences. In early 2022, following the publication of API RP 1188, *Hazardous Liquid Pipeline Facilities Integrity Management*, the Sharing & Learning Subteam coordinated with other API Work Groups to sponsor a Facility Integrity Workshop to ensure broad communication on the application of API RP 1188 to improve integrity management at pipeline facilities and continue driving towards the goal of zero incidents related to pipeline operations. In 2022, the Subteam will continue to implement the Guides and play a more active role in planning sharing and learning events. The Subteam will also coordinate with API staff on evaluating updates to API's PIPES Learning Portal and improve the use of the platform for sharing and learning opportunities.

2

IMPROVE SAFETY THROUGH TECHNOLOGY & INNOVATION



OBJECTIVE 2.1

IMPROVE PIPELINE INTEGRITY INSPECTION TECHNOLOGY

STRATEGIC INITIATIVE: CONTINUOUS IMPROVEMENT OF ILI TECHNOLOGIES

- 1 Decrease The Number Of Incidents From Onshore Pipe Impacting The Public Or Environment**
- 2 Evaluate The Current Industry ILI Specifications**
- 3 Improve ILI Crack Tool Capabilities**
- 4 Create Further Transparency Between Operators And ILI Service Providers**

The ability to detect and identify conditions that represent a threat to pipeline integrity is central to ensuring the safe operation and reliability of pipelines. Pipeline operators inspect their pipelines on regular schedules looking for indications that the pipe needs maintenance. Through these regular inspections, pipeline operators identify and fix issues long before they become a problem for the pipe. In-line inspection (ILI) systems are the primary tools used for analyzing the health of pipelines and assessing integrity threats to pipeline systems.

Through its leadership, the API-AOPL Research & Development Work Group (RDWG) is advancing Objective 2.1 by actively driving Strategic Research Priorities (SRPs) established under the Pipeline Research Council International (PRCI) that are

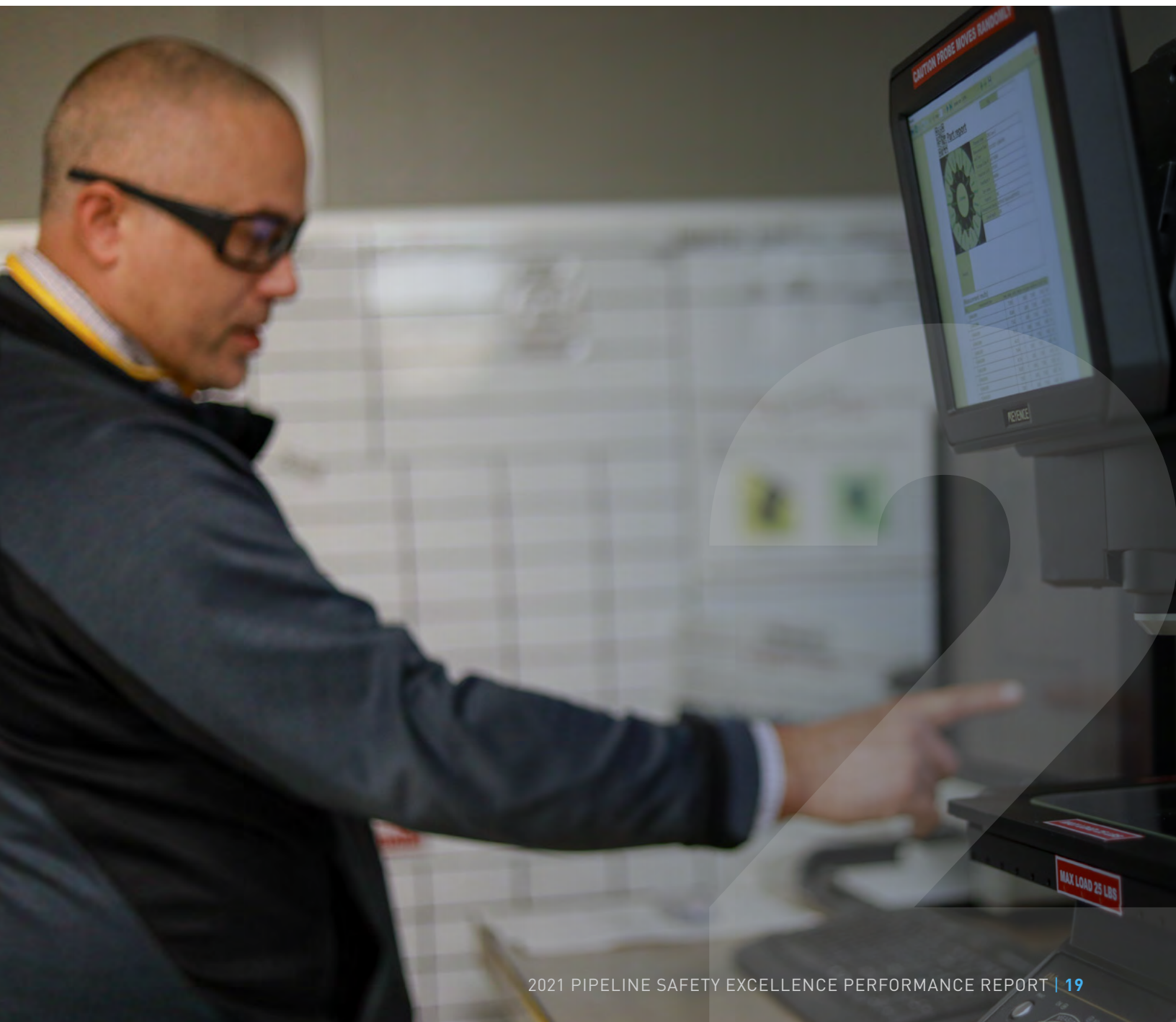
confirming and enhancing the capabilities of ILI technology. In 2021, testing was completed to evaluate the performance of ILI systems to detect and characterize the primary threats to pipeline integrity - corrosion, cracking, seam anomalies, and mechanical damage/dents. ILI systems tested included ultrasonic, magnetic, and caliper-based technologies, with 13 separate test trials of ILI systems completed in 2021 using ILI test strings built for each of the primary threats. Three test trials each were completed for corrosion and cracking/seam anomalies in 2021, and the data is currently under review. Additional ILI test trials for both corrosion and cracking features are planned for 2022.

Considerable progress was made in verifying ILI systems' performance for detection, identification, and characterization of dents (i.e., multi-peak dents) and dents with coincident features including corrosion, gouges, and crack features. Using data from test trials of seven separate ILI systems and technologies, new feature characterization techniques were applied to analysis of the data, including the separate consideration of the position of the coincident feature in the dent and its impact on detection and discrimination of the coincident features. The ability of the ILI tools to detect and identify features such as dents and report dent depth was nearly perfect, with some variation observed in reporting the dent shape. Another positive outcome of the test trials was confirmation of a high level of performance regarding detection and discrimination of metal loss within dents. While the performance of ILI systems in reporting corrosion feature depth is affected by the presence of a dent, there is only a limited reduction in performance, with

reductions as low as only one percent. Similar positive performance was confirmed for gouges coincident within dents, with ILI systems achieving a Percent of Detection (POD) as high as 90 percent and a Percent of Identification (POI) as high as 80 percent. Through the feedback loop and active engagement with the ILI Service Providers, consideration of enhancement of specifications for features coincident with mechanical damage reporting can now be established.

In 2022, the encouraging results from the mechanical damage ILI test trials will provide information and data to support regulatory changes that relate to mechanical

damage anomaly response criteria or to support special permit conditions related to dent Engineering Critical Assessment (ECA). Verifying the performance of ILI systems to detect, identify and size corrosion and gouge metal loss features should be used as a justification to permit the use of the API RP 1183 dent with coincident feature screening and integrity assessment tools. As additional test trials and data analysis continue in 2022, consideration will also be given to any appropriate modifications to API Std. 1163 regarding mechanical damage reporting specifications and criteria.



OBJECTIVE 2.2

ENHANCE INCIDENT IDENTIFICATION & RESPONSE

STRATEGIC INITIATIVE: IMPROVE LEAK DETECTION CAPABILITIES

- 1 Update Industry Standards For Managing Leak Detection Programs And Systems**
- 2 Support Improvement Of Technologies That Detect Product Released From Liquids Pipelines**
- 3 Support Improvement Of Analytic Capabilities That Indicate A Potential Pipeline Leak**
- 4 Conduct Yearly RP 1175 Survey (Cybernetics Group); Target To Increase Response Rate Year Over Year**

Improved leak detection capabilities will enhance the safety of pipeline systems by reducing the size and impact of any incident. Pipeline operators use multiple technologies and activities to detect pipeline leaks, including sensors monitoring pressure, flow, and volume, aerial overflights, ground-based inspections, and public education and awareness campaigns. Where applicable, analytical computer programs help operators discern between system readings reflecting normal operational variances and a potential release. In 2021, industry's ongoing leak detection improvement efforts centered on developing programmatic guidance to operators and promoting comprehensive leak detection efforts through API RP 1175, *Leak Detection Program (LDP) Management*. Initially published in late 2015, API is currently revising API RP 1175 and is scheduled to publish this 2nd edition revision by the end of the second quarter of 2022. The RP provides a framework for establishing and managing leak detection programs (LDPs). The document focuses on the development and management of LDPs, not their technical design. It encompasses all the various leak detection systems (which may include multiple techniques) employed by the operator and identifies all methods used to detect leaks and the policies, processes, and the human element. A major feature of the 2nd edition is to organize the essential elements of an LDP to mirror the elements of a pipeline safety management system, as found in API RP 1173. In conjunction with the publication of API

RP 1175, API is also updating and publishing API RP 1130, *Computational Pipeline Monitoring*, to align with the revision changes to API RP 1175 to ensure both RPs are complementary to enhance the industry's leak detection capabilities. Additionally, API is proposing a leak detection program implementation survey (checklist) to enhance the company's understanding and development of their own program as it relates to API RP 1175. Following publication, communication and guidance regarding the completion and new content of API RPs 1175 and 1130 will be communicated broadly throughout the industry, including industry workshops.

To supplement the programmatic work and finalization of API RP 1175 and RP 1130, the industry also increased its efforts to drive industry-wide leak detection activities. In 2021, the API-AOPL Performance Excellence Team (PET) approved the formation of a Leak Detection Subteam to focus on developing strategic direction for targeting industry efforts on small leak detection. The Subteam initiated activities in late 2021 and, working with the Data Mining Team, is conducting detailed analysis of industry incident data to identify key areas of improvement for leak detection programs to minimize the size and impact of any leak. The Subteam is addressing leak detection from a risk-based perspective, and linking operational, asset integrity, and technology solutions to drive improvements in industry performance in detecting small leaks from liquids systems.

The industry continued to fund R&D in 2021 through PRCI, including studies on advanced data analytics through Artificial Intelligence (AI) and Machine Learning (ML) to more rapidly identify indications where leaks may be present using computational pipeline monitoring (CPM) systems. In addition, research continued on the development of remote sensing systems that are being applied across a wide-range of platforms, including unmanned aircraft systems, to detect leaks that are not otherwise identified through CPM systems, including the detection of petroleum products on water and indications of subsurface leaks. Research conducted in 2021 included work on incorporating MEMS vibration sensors into in-situ cable-based leak detection systems. Additionally, member companies have applied location-specific hydrocarbon sensing systems to evaluate continuous monitoring at high-profile locations.

OBJECTIVE 2.3

IMPROVE CORROSION DETECTION AND IDENTIFY MITIGATIONS

STRATEGIC INITIATIVE: IMPROVE CORROSION RISK

- 1 Decrease The Number Of Corrosion-Related Incidents Impacting The Public Or Environment**
- 2 Cultivate Awareness Of The Increasing Number Of Corrosion Related Releases Through Sharing Corrosion-Related Topics At Industry-Wide Events**
- 3 Increase The Number Of Operators Who Have Completed A Gap Analysis Against PHMSA Data**
- 4 Collaborate With Outside Organizations To Formalize An Industry-Wide Corrosion Management Document**

Industry data showed continued improvement and a declining trend in corrosion-related pipeline incidents in 2021. Based on analysis of corrosion data and failure statistics using PHMSA and operator provided data, the Pipeline Integrity Group, through a coordinated effort with the API Data Mining Team (DMT) and the Corrosion Subteam, led the development of API RP 1188, *Hazardous Liquid Pipeline Facilities Integrity Management*, which was published in January 2022. The RP is a more focused approach to addressing corrosion threats at pipeline facilities, which are a significant source of reported incidents to PHMSA by liquids operators. In support of API RP 1188, a Facilities Integrity Workshop was held on January 19 with more than 250 registrants and 210 participants.

A key finding from development of API RP 1188 and data analysis conducted with the DMT is the impact of internal corrosion at facilities as one of the leading causes of facility incidents. Based on these findings, API approved the development of a separate Technical Report (TR) that is targeted on addressing internal corrosion in liquids pipeline facilities/stations. This Technical Report, API TR 1189, will include methods to prevent, investigate, mitigate, and remediate internal corrosion threats in liquids pipeline facility operations. The TR will also highlight functional use cases, such as cases where internal corrosion was successfully managed and cases where internal corrosion resulted in a leak. The TR will consist of three parts:

an overview of internal corrosion in stations; a discussion on the technical merits of cause, control, and remediation; and practical cases from operators on their internal corrosion experiences. The document is intended to be used in conjunction with API RP 1188, *Pipeline Facility Integrity Management*, to help operators build and maintain effective internal corrosion management programs as part of their integrity management programs. API TR 1189 is expected to be published by the fall of 2022.

Through PRCI, research was conducted to improve the detection and the sizing accuracy capabilities of ILI systems for corrosion anomalies. The work included the construction of a metal loss pipeline pull test string that includes former in-service pipeline samples with naturally shaped pinholes inside areas of general corrosion, wide area wall loss, and other metal loss morphologies that have been shown to be challenging for existing ILI systems to detect. Based on the performance evaluation results, the ILI Service Providers are provided with data to identify gaps and error sources in detection, identification, and sizing of their ILI systems, either hardware (sensor, carrier, sensor arrangement), software (signal processing, identification and sizing algorithms) or analysis (qualification and training of the analysis SME team, analysis process), for redesign and improvement. The ILI systems evaluation is expected to be completed and a report published on the results in 2022.

3

INCREASE STAKEHOLDER AWARENESS & INVOLVEMENT



OBJECTIVE 3.1

IMPROVE COMMUNICATIONS TO AND FROM STAKEHOLDERS ON PIPELINE SAFETY

STRATEGIC INITIATIVE: IMPROVE STAKEHOLDER ENGAGEMENT

- 1 Increase Traffic To The Updated www.Pipeline101.org Website By 10 Percent As Compared To 2019 And Maintain With Evergreen Content To Engage Targeted Audiences**
- 2 Increase Papers Participation to 26 Companies In 2021**
- 3 Develop Recommend Practice For Pipeline Public Engagement**

The pipeline industry continues to focus on public engagement and awareness during the planning, construction, and operation of pipelines. In 2021, operators worked on two critical industry documents, including the revision of the third edition of API RP 1162, *Public Awareness Programs for Pipeline Operators*. The RP, which provides guidance on ensuring stakeholders near pipelines are aware of an existing pipeline's operations, was balloted and approved in the spring with a significant number of comments. The Task Group diligently worked throughout 2021 to resolve comments, improve clarity within the document, and strengthen operators' public awareness programs. Pipeline operators also conducted a cycle of the Public Awareness Program

Effectiveness Research Survey (PAPERS) last year to improve their programs' efficacy of outreach and messaging.

Last year, the industry also kicked off efforts to develop API RP 1185, *Pipeline Public Engagement*, with government and public partners to improve engagement and communication throughout a pipeline's life cycle. The RP 1185 Task Group met regularly throughout 2021 to draft guidance around six key program elements and follow the continuous improvement cycle of Pipeline SMS. Similar to API RP 1173, RP 1185 also provides the scalability for operators of all sizes to engage appropriately and the flexibility to incorporate existing company programs and procedures. Along with API RP 1185, pipeline operators exchanged best practices and lessons learned in quarterly engagement forums detailing specific challenges and opportunities following the 2020 publication of the [Community Engagement Guidelines](#).

In 2022, the pipeline industry looks to complete the revision and publish the third edition of API RP 1162. Additionally, the Task Group is developing an implementation guidance website to offer supplemental guidance and examples for operators managing public awareness programs. Once published, the industry will also encourage PHMSA to incorporate the third edition by reference and replace the outdated first edition. Operators will also continue to support the development of API RP 1185 through the creation of an implementation team, offering additional guidance, and conducting information exchanges such as webinars to support and augment operator programs. The industry will also look to

hold a day-long knowledge exchange on engagement best practices and lessons learned in 2022 to further strengthen the pipeline industry's social license to operate. Lastly, operators will maintain outreach to PHMSA, FERC, and state regulatory officials, continue offering free training for first responders, and host the www.Pipeline101.org website for basic pipeline awareness next year.

OBJECTIVE 3.2

PROMOTE INNOVATIVE APPROACHES TO ENHANCING DAMAGE PREVENTION

STRATEGIC INITIATIVE: REDUCE EXCAVATION DAMAGE

- 1 Decrease The Number Of First And Second Party Damages By Sharing Information For Safe Digging Along The Pipeline Right-of-Way**
- 2 Decrease The Number Of Third Party Damages During Pipeline Operator Excavation**

Excavation damage to underground pipelines remains a critical source of significant incidents and a threat to critical infrastructure integrity. In 2021, the API/AOPL Damage Prevention Work Group (DPWG) focused on reducing first- and second-party damages. Despite being fewer than third-party incidents, operators have a greater ability to impact and potentially reduce first- and second-party incidents. Throughout 2021, DPWG members participated in the revision of API RP 1162, *Public Awareness Programs for Pipeline Operators*, to ensure the dissemination of damage prevention awareness and procedures. DPWG members tirelessly participated in biweekly calls to resolve comments and strengthen the guidance within API RP 1162. Additionally, numerous DPWG members conducted a cycle of the Public Awareness Program Effectiveness Research Survey (PAPERS) last year to improve damage prevention outreach and awareness. Lastly, operators in the DPWG tracked unauthorized activity and encroachment near pipelines to identify problematic areas geographically and reduce threats to critical underground infrastructure.

In 2022, the DPWG will continue tracking unauthorized activity and encroachment by excavation type to reduce first- and second-party incidents and better protect



underground infrastructure. Additionally, DPWG members will support the revision and publication of API RP 1162, third edition, in 2022, along with the implementation guidance site and encouragement for incorporation by reference. The group will also look to share learnings and data from the 2021 PAPERS cycle with similar organizations to track repeat offenders and improve damage prevention. DPWG members will also look to revise, as necessary, documents on the Excavation Damage Prevention Toolbox, which provides a collection of operator best practices for avoiding damage to underground infrastructure. Lastly, members of the DPWG will support implementation of NTSB's recommendations among PHMSA, dredging companies, and training organizations for damage prevention, appropriate procedures, and accurate locating data in marine environments.

4

ENHANCE EMERGENCY RESPONSE PREPAREDNESS



OBJECTIVE 4.1

BOOST OPERATOR & FIRST RESPONDER PLANNING, PREPAREDNESS & RESPONSE CAPABILITIES

STRATEGIC INITIATIVE: PIPELINE EMERGENCY PLANNING, PREPAREDNESS & RESPONSE

- 1 Conduct Yearly RP 1174 Survey**
Increase response rate year over year
- 2 First Responder Training Portal**
Increase course completions by 10 percent year over year
- 3 Cross – Company Learnings**
Yearly Summary published and 25 percent cross-company participation for all opportunities provided

The Oil Spill & Emergency Preparedness and Response, Emergency Response Group (ERG) is currently developing two tactical response guidance documents. Working with an oil spill response organization, a tactical response guide for responding to inland spills during winter weather (icy) conditions is currently in draft form and is expected to be published this year. Secondly, the ERG is currently developing a scope of work and soliciting consultants to draft an all-hazards tactical response guide for midstream tank farms. The document would focus on readiness, pre-planning & exercises, exposure control,

and key tactics with midstream-related risks. Since the previous report, the ERG has completed and published the *Swift Water Tactical Response Guide* and the *Natural Gas Liquids and Liquefied Petroleum Gas Emergency Response Guide* on www.OilSpillPrevention.org.

In 2022, a renewed emphasis has been placed on cross-company participation in exercises and trainings with metric goal of 25 percent. Member companies typically participate in one another's events to share ideas and lessons learned and evaluate the exercise. Over the past few years, many exercises were canceled, delayed, or conducted virtually in response to the COVID pandemic. Finally, API RP 1174, *Onshore Hazardous Liquid Pipeline Emergency Preparedness and Response*, has been extended to 2022. It is anticipated it will be re-affirmed for another five years.





2021 PERFORMANCE REPORT



KEY PERFORMANCE INDICATORS

Measuring the performance of pipelines is a critical way to determine how safe they are and whether their safety is improving. Pipeline operators and PHMSA collect hundreds of different data points measuring how safely pipelines are operating and the reasons behind pipeline incidents when they occur.

Particularly useful measures of pipeline safety examine incident size, location, commodity, and cause. The liquids pipeline industry uses each one of the following measures to better understand pipeline incident trends and develop strategies for improving pipeline safety. As a sign of overall pipeline safety performance, the liquids pipeline industry tracks a core set of Key Performance Indicators (KPIs). These KPIs are based primarily on incidents impacting people or the environment. They were created through a recommendation of the U.S. National Transportation Safety Board in a collaborative effort between PHMSA, pipeline operators and public pipeline safety advocates represented by the Pipeline Safety Trust. They reflect the highest priority we place on protecting people and the environment. Despite ongoing challenges in 2021, the liquids pipeline industry kept its focus on safety with pipeline incidents declining across the board. Incidents impacting people or the environment are down 31 percent over the last five years. The pipeline industry tracks its performance with four industry-wide KPIs, which are:

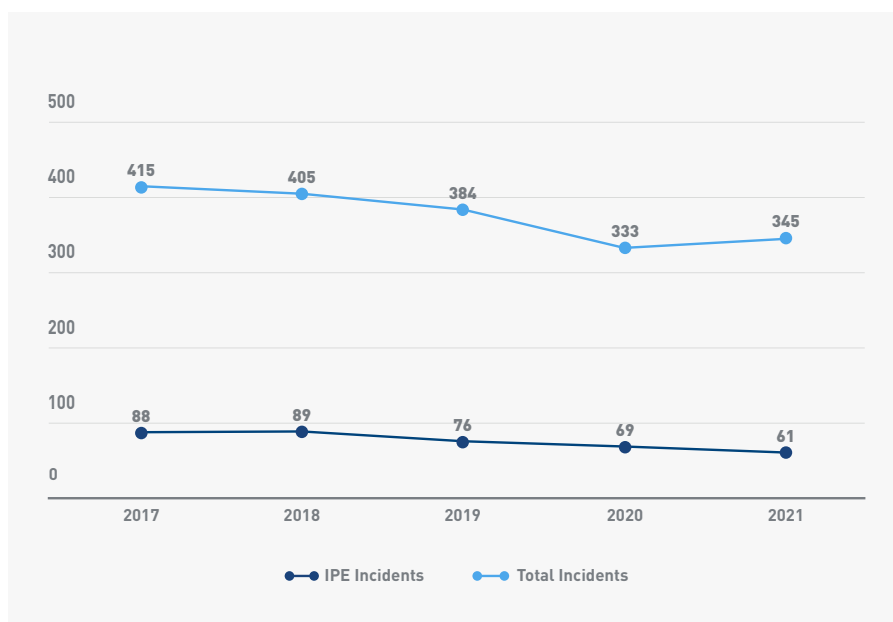
- 1** Total Incidents Impacting People or the Environment
- 2** Integrity Management Incidents Impacting People or the Environment
- 3** Operations & Maintenance (O&M) Incidents Impacting People or the Environment
- 4** Participation in Pipeline Safety Management System (PSMS) Programs

Integrity management incidents are those of the pipeline itself, such as corrosion, cracking, or weld failure. Operations and maintenance causes include equipment failure or incorrect operations.

KEY PERFORMANCE INDICATORS

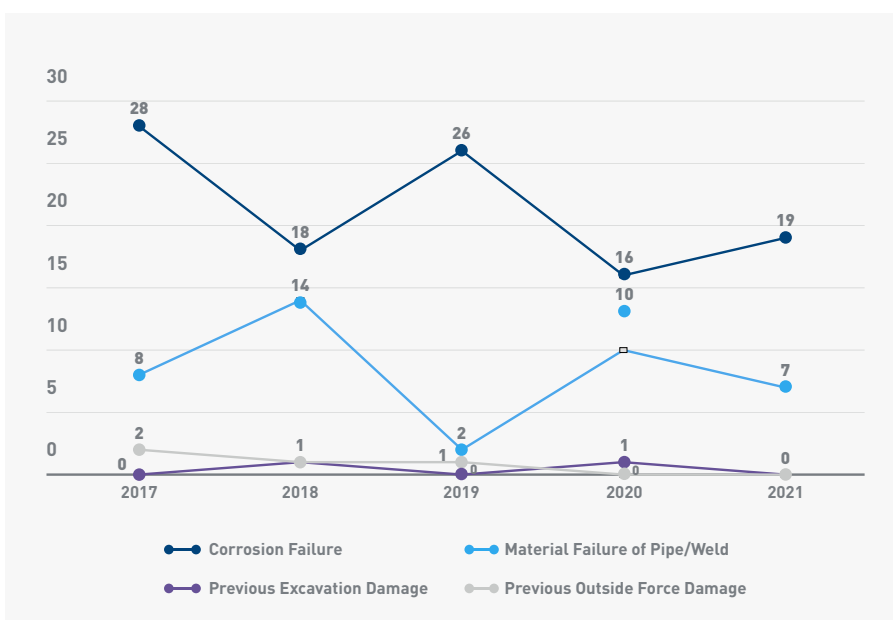
#1: TOTAL INCIDENTS VS INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2017 – 2021)

Pipeline incidents impacting people or the environment decreased 31 percent over the last 5 years. Total pipeline incidents were down as well, dropping 17 percent over 5 years with 70 fewer incidents in 2021 compared to 2017. A full description of the specific types of incidents impacting people or the environment can be found on page 46.



#2: INTEGRITY MANAGEMENT INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2017 – 2021)

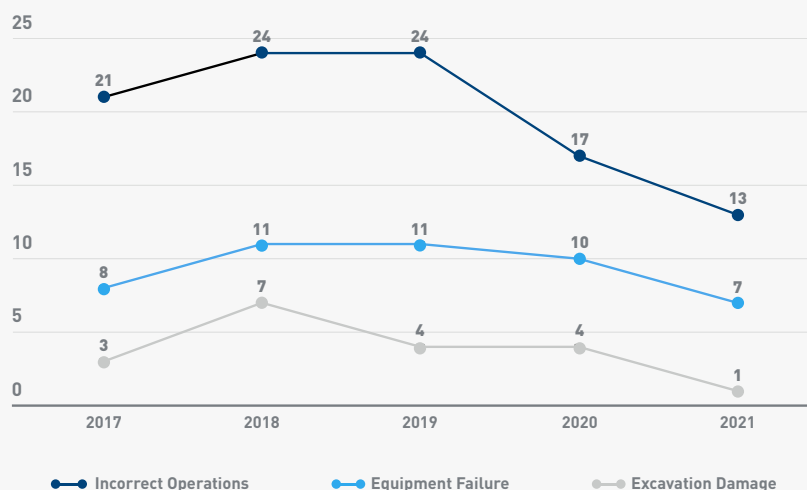
Incidents related to the pipeline itself, such as corrosion, cracking, or weld failure, were down 32 percent over the last 5 years in areas impacting people or the environment. In these areas, corrosion failures are also down 32 percent from 2017 to 2021.



KEY PERFORMANCE INDICATORS

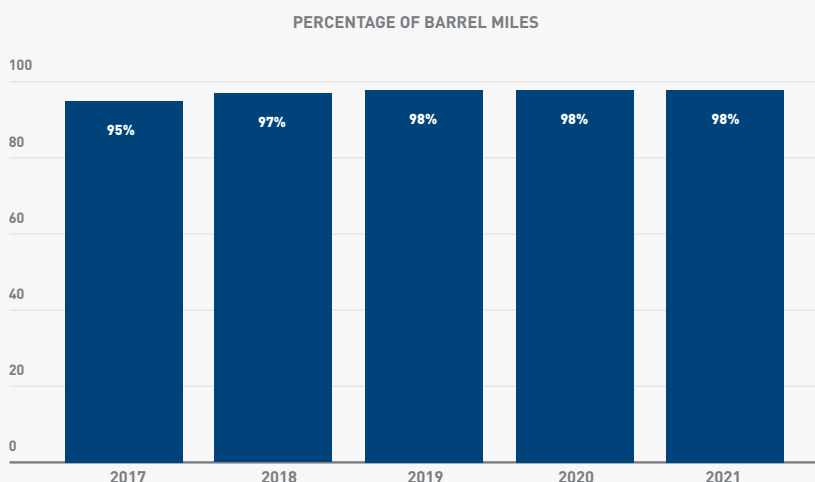
#3: OPERATIONS & MAINTENANCE INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2017 – 2021)

Incidents related to maintaining pipeline equipment or operating the pipeline and its valves or pumps were down 34 percent over the last 5 years in areas impacting people or the environment. In these areas, incidents caused by incorrect operations decreased by 38 percent while equipment failure decreased 13 percent from 2017 to 2021.



#4: PIPELINE SAFETY MANAGEMENT SYSTEM OPERATOR COMMITMENT (2017 – 2021)

In 2021, the pipeline industry maintained liquids pipeline operator commitment to Pipeline Safety Management Systems at 98 percent of industry barrel miles.

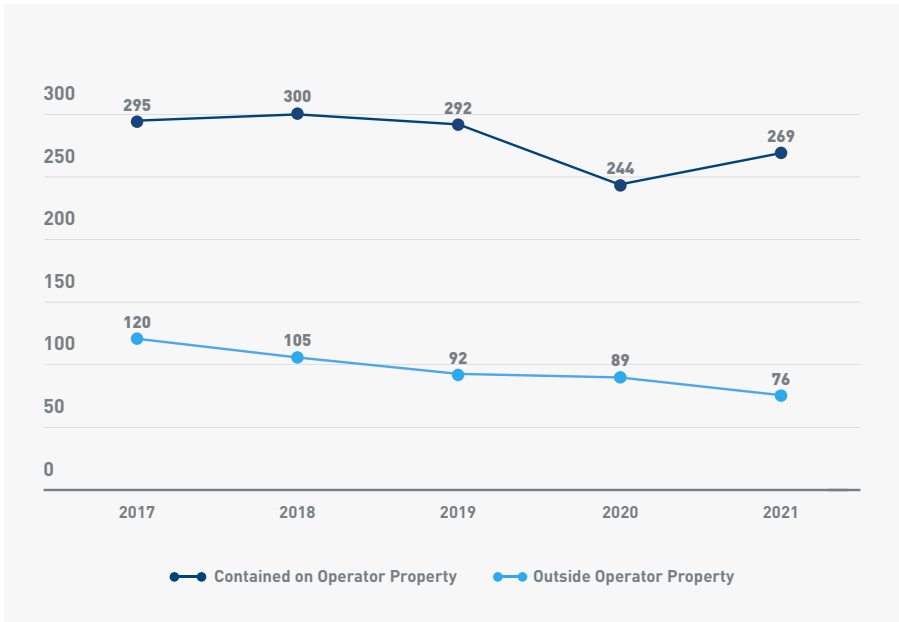


INCIDENTS BY LOCATION

The location of a pipeline incident matters both when gauging the impact of an incident and developing strategies to prevent incidents in the future. Pipeline operators place the greatest emphasis on preventing and minimizing impacts to people or the environment. Tracking these incidents helps operators focus on this priority. Additional measures of incident impacts are whether they are contained on operator property or outside the operator’s facilities, specifically in high consequence areas (HCAs), a regulatory term used by PHMSA.

#5: PIPELINE INCIDENTS INSIDE AND OUTSIDE OPERATOR PROPERTY (2017 – 2021)

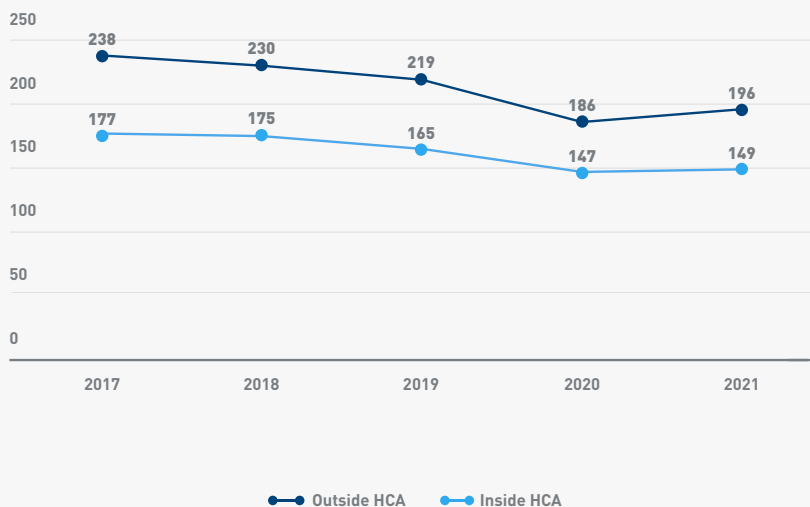
In 2021, 78 percent of incidents from liquids pipelines were contained within an operator’s property. Examples of pipeline operator properties include pump stations, tank farms, and terminals. Incidents in public spaces outside of operator facilities decreased 37 percent from 2017 to 2021.



INCIDENTS BY LOCATION

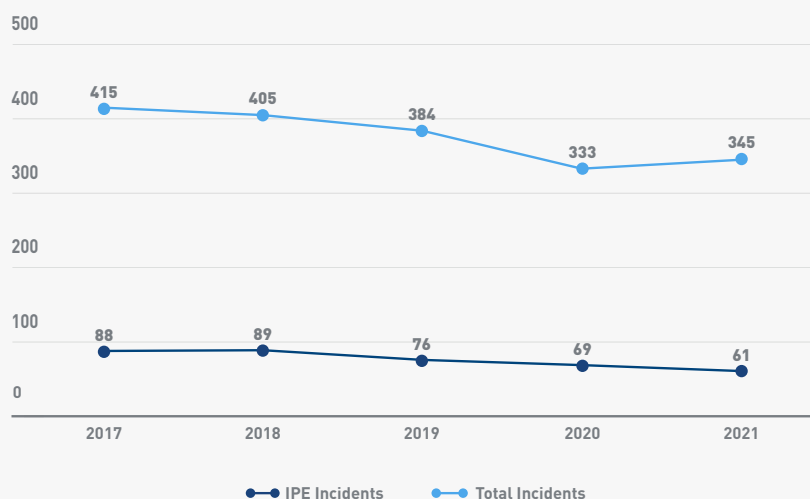
#6: PIPELINE INCIDENTS INSIDE & OUTSIDE HCAs (2017-2021)

Liquids pipeline incidents occurring in high consequence areas (HCAs) declined 16 percent over the last 5 years. Through federal regulation, PHMSA defines HCAs as areas of population concentration, commercially navigable waterways, or sensitive environmental locations. Fewer than half (43 percent) of pipeline incidents occurred in HCAs in 2021. HCA data differs from incidents impacting people or the environment, because under PHMSA regulation an incident can have no impact on people or the environment, remain wholly within an operator's facility, and still count as an HCA if that facility is surrounded by an HCA.



#7: TOTAL INCIDENTS VS INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2017 - 2021)

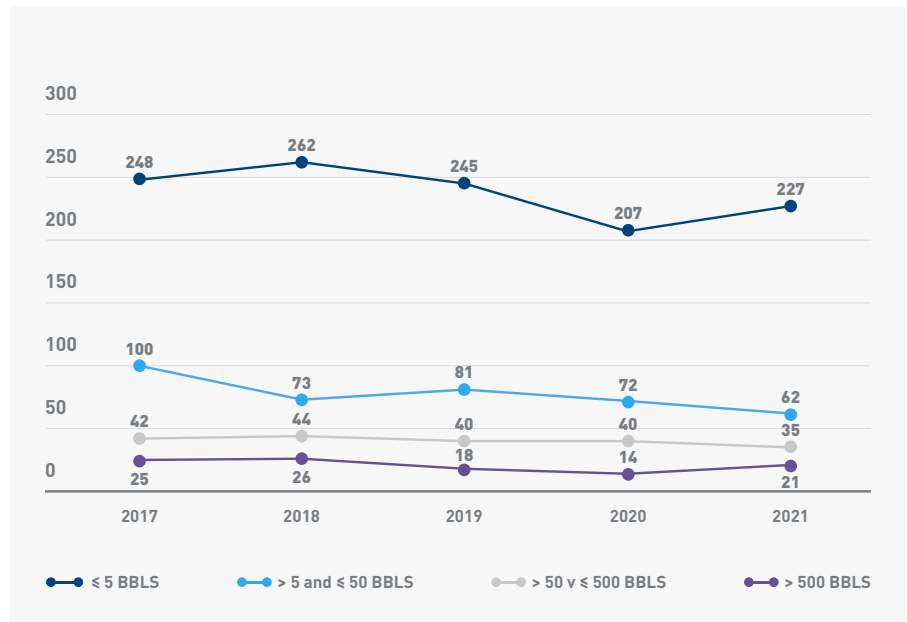
Pipeline incidents impacting people or the environment decreased 31 percent over the last 5 years. Total pipeline incidents were down as well, dropping 17 percent over 5 years with 70 fewer incidents in 2021 compared to 2017. A full description of the specific types of incidents impacting people or the environment can be found on page 46.



INCIDENTS BY SIZE

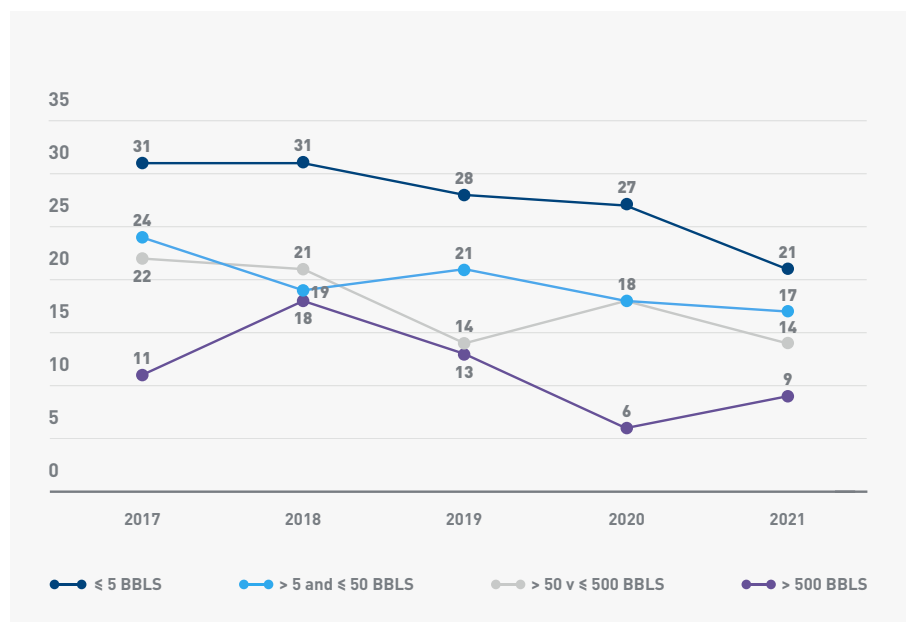
#8: LIQUIDS PIPELINE INCIDENTS BY SIZE (2017 – 2021)

Most pipeline incidents are small in size. In 2021, 66 percent of incidents were less than 5 barrels and 84 percent were less than 50 barrels. Large pipeline incidents are also the rarest. In 2021, only 6 percent of incidents were 500 barrels or larger and these large incidents are down 16 percent over the last 5 years.



#9: IPE INCIDENTS BY SIZE (2017 – 2021)

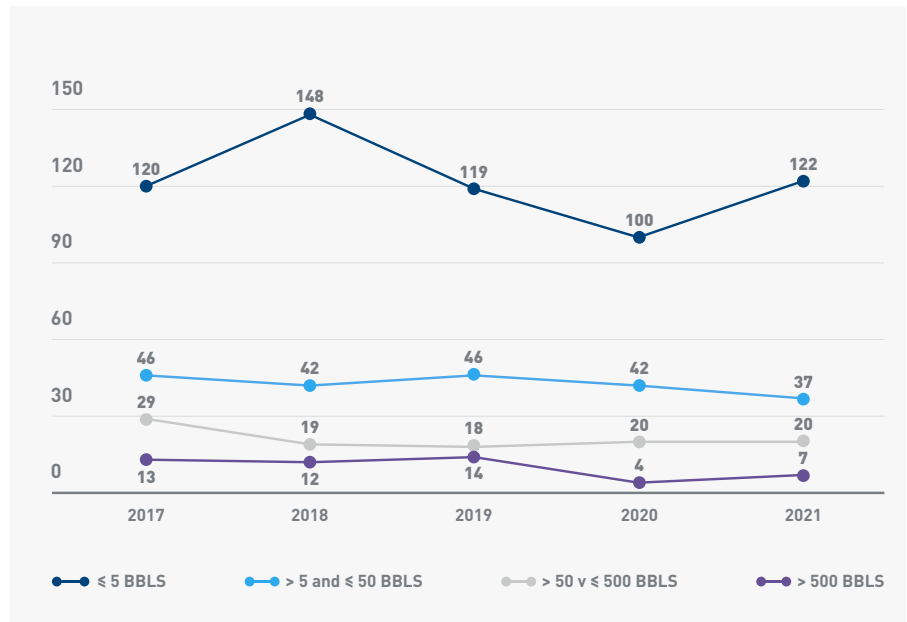
Most incidents impacting people or the environment are small in size. In 2021, approximately 62 percent of such incidents were less than 50 barrels, with only 15 percent of incidents impacting people or the environment 500 barrels or larger. Large incidents impacting people or the environment are down 18 percent over the last 5 years.



INCIDENTS BY SIZE

#10: CRUDE OIL INCIDENTS BY SIZE (2017 – 2021)

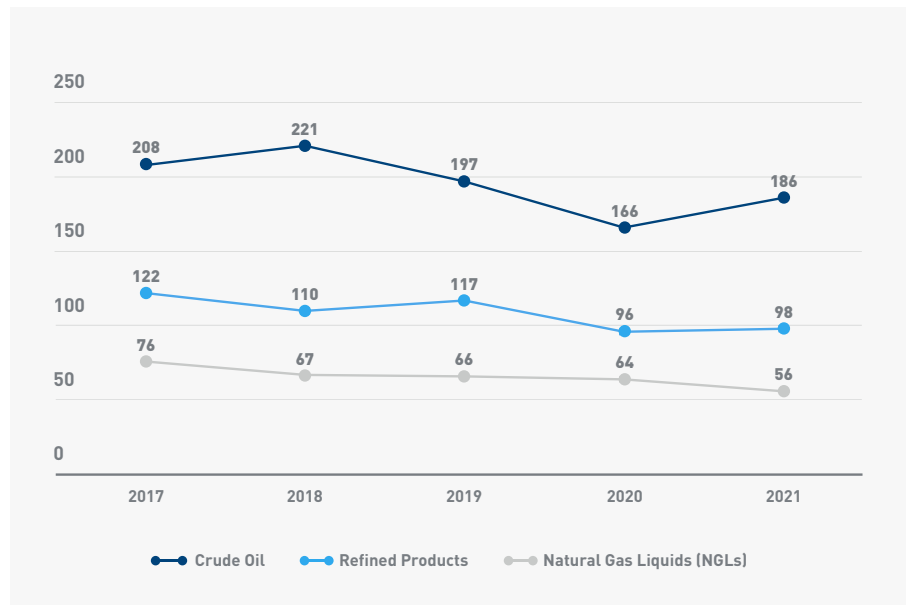
Similar to total incident trends, the majority of crude oil pipeline incidents are small in size. In 2021, 66 percent of crude oil incidents were 5 barrels or smaller and 85 percent of crude oil incidents were smaller than 50 barrels. Over the last 5 years, only 4 percent of crude oil incidents were over 500 barrels. Large crude oil releases are down 46 percent since 2017.



INCIDENTS BY COMMODITY

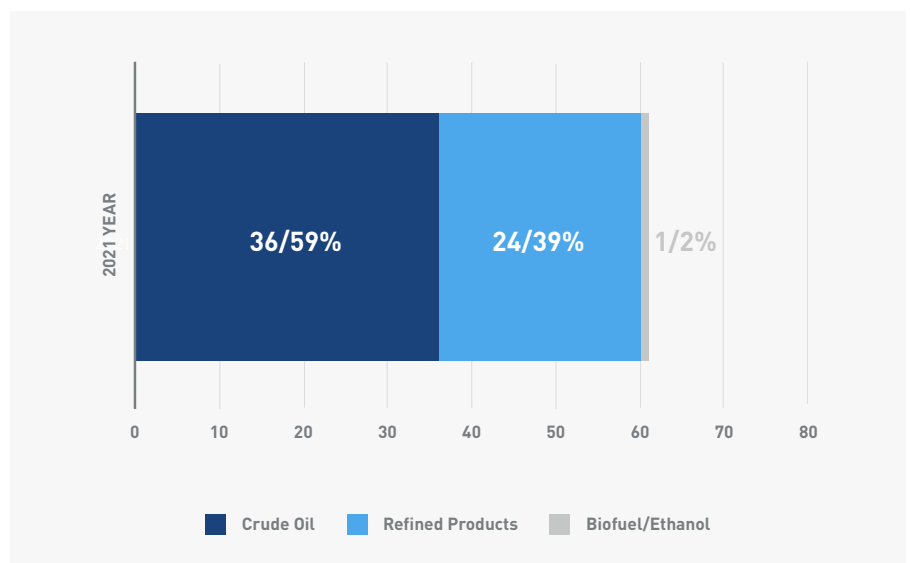
#11: ALL INCIDENTS BY COMMODITY (2017 – 2021)

In 2021, crude oil incidents represented 54 percent of total incidents, with refined products at 28 percent and natural gas liquids at 16 percent of total incidents. The number of annual crude oil incidents are down 11 percent from 2017. Carbon dioxide pipeline incidents are down 56 percent over the last 5 years with 4 nationwide in 2021.



#12: TOTAL IPE INCIDENTS BY COMMODITY (2021)

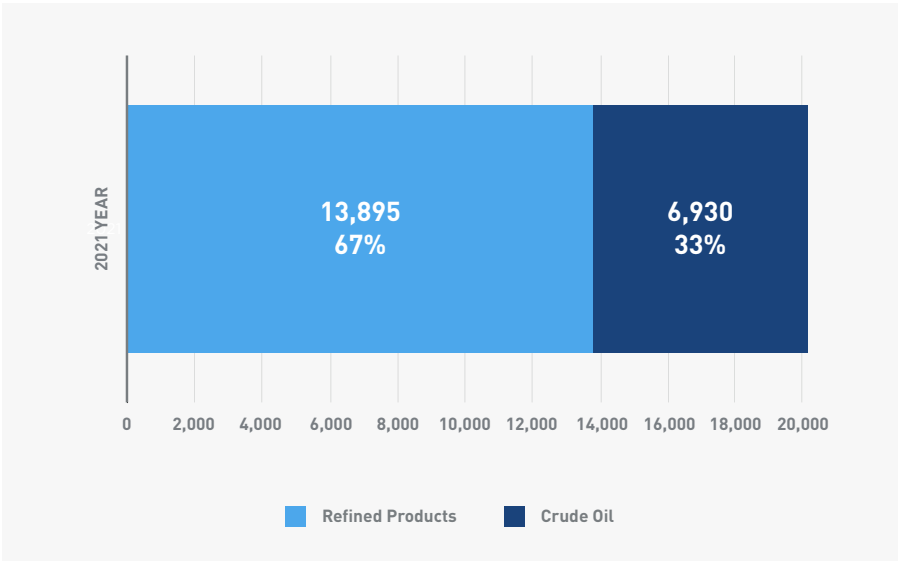
In 2021, there were 36 crude oil and 24 refined products incidents impacting people or the environment. Crude oil incidents impacting people or the environment are down 33 percent over the last 5 years.



INCIDENTS BY COMMODITY

#13: PERCENT OF IPE BARRELS RELEASED BY COMMODITY (2021)

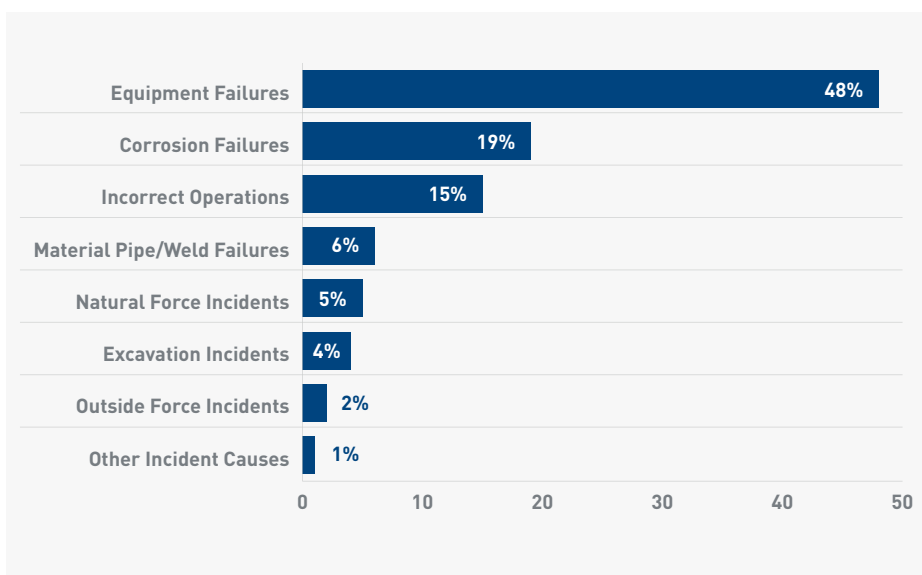
Crude oil incidents impacting people or the environment in 2021 represented 33 percent of the total, with refined products reflecting 67 percent of released barrels from liquids pipelines.



INCIDENTS BY CAUSE

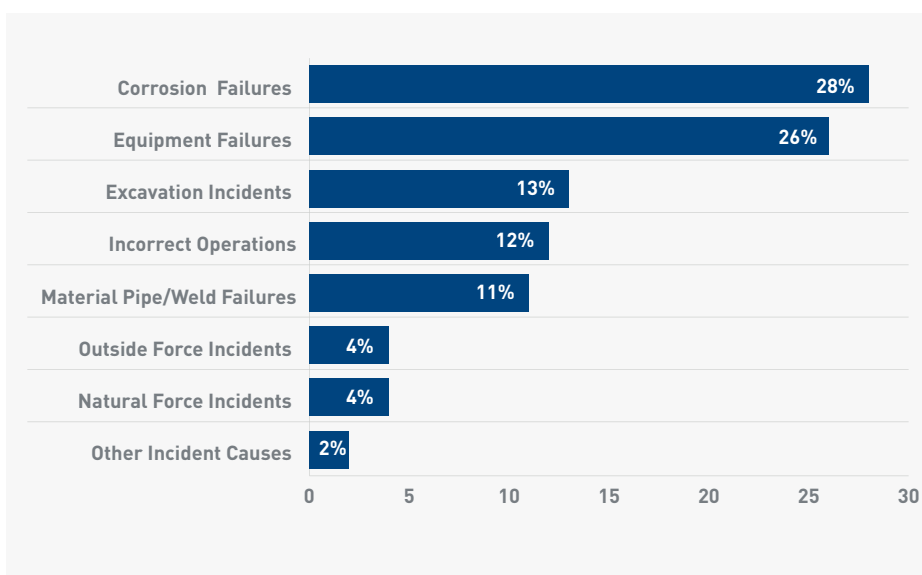
#14: LIQUIDS PIPELINE INCIDENTS BY CAUSE (2017 – 2021)

Over the last 5 years, equipment failure represented 48 percent of incidents, corrosion failure 19 percent and incorrect operation 15 percent of incidents. While equipment failure is the most frequent cause of total incidents, the majority of these incidents are smaller volume and contained within operator facilities with no impact to people or the environment. Material pipe/weld failures, which include cracking, a primary source of large volume releases, represented only 6 percent of incidents since 2017.



#15: TOTAL IPE INCIDENTS BY CAUSE (2017 – 2021)

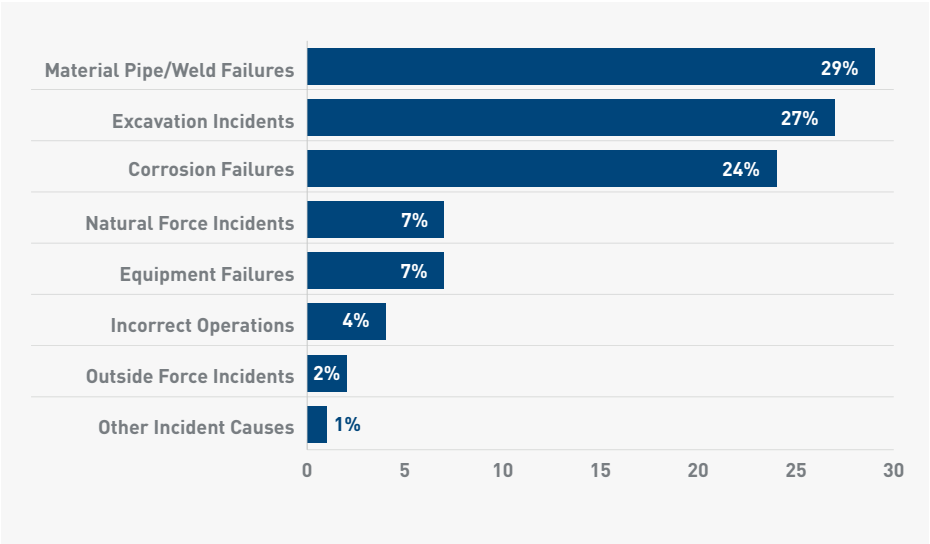
Over the last 5 years, corrosion failures (28 percent) were the most frequent cause of incidents impacting people or the environment, followed by equipment failure (26 percent), excavation incidents (13 percent) and incorrect operations (12 percent).



INCIDENTS BY CAUSE

#16: PERCENT OF IPE BARRELS BY CAUSE (2017 – 2021)

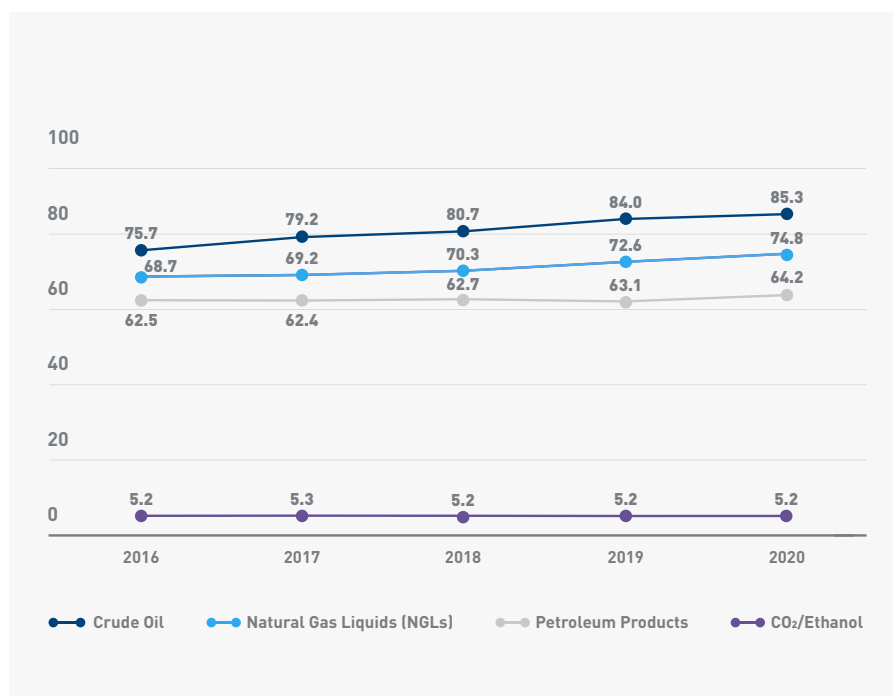
Material pipe/weld failures (29 percent) were responsible for the most barrels released in incidents impacting people or the environment, followed by excavation incidents (27 percent) and corrosion failures (24 percent).



PIPELINE MILES & BARRELS DELIVERED

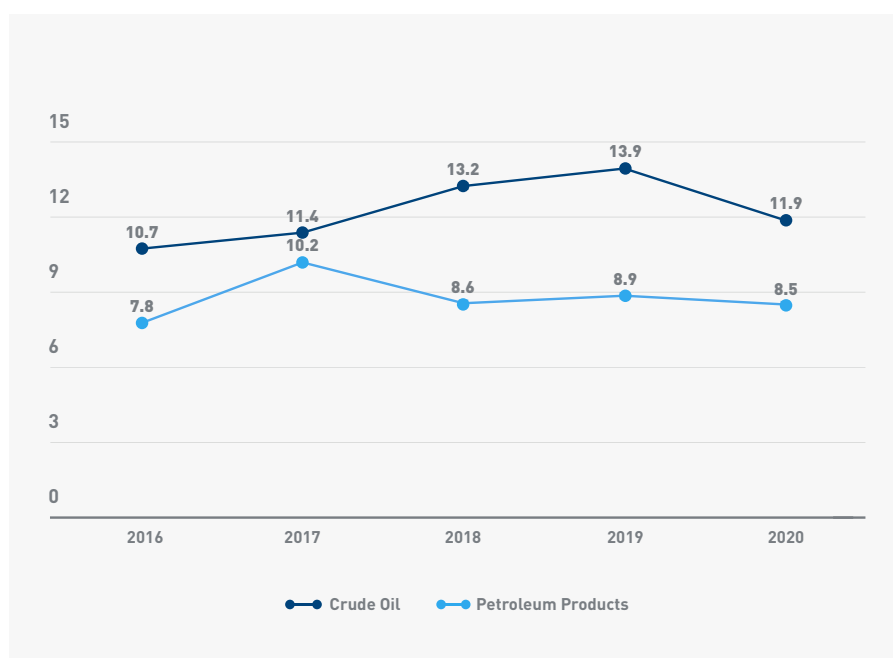
#17: MILES OF U.S. PIPELINE BY PRODUCTS (2016 – 2020) (Thousands)

At the end of 2020 (the most recent year this data is available), there were 229,454 total miles of liquids pipelines, with crude oil pipelines representing 37 percent of the total at 85,307 miles, refined products at 28 percent or 64,187 miles, and natural gas liquids reflecting 33 percent or 74,794 miles. Total liquids pipeline mileage is up 8 percent over the last 5 years with crude oil pipeline mileage rising 9,597 miles or 13 percent and natural gas liquid mileage increasing by 6,065 miles or 9 percent between 2016 and 2020.



#18: BARRELS DELIVERED BY U.S. PIPELINE (2016 – 2020) (Billions)

In 2020, there were a total of 20,383,545,445 crude oil and petroleum products barrels delivered by pipeline, with crude oil representing approximately 58 percent or 11,874,328,801 of the barrels delivered and other petroleum products 42 percent or 8,509,216,644 barrels. Total barrels delivered reflect a 10 percent increase from 2016, although an 11 percent decrease from 2019 to 2020 reflecting the COVID pandemic.





GRAPH #1: TOTAL INCIDENTS VS INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2017 - 2021)			
Year	IPE Incidents	Non-IPE Incidents	Total Incidents
2017	88	327	415
2018	89	316	405
2019	76	308	384
2020	69	264	333
2021	61	284	345
% Change from 2017	-31%	-13%	-17%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #2: INTEGRITY MANAGEMENT INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2017 - 2021)					
Year	Corrosion Failure	Material Failure Of Pipe/Weld	Previous Excavation Damage	Previous Outside Force Damage	Total Incidents
2017	28	8	2	0	38
2018	18	14	1	1	34
2019	26	2	1	0	29
2020	16	10	0	1	27
2021	19	7	0	0	26
% Change from 2017	-32%	-13%	-100%	0%	-32%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #3: OPERATIONS & MAINTENANCE INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2017 - 2021)				
Year	Equipment Failure	Incorrect Operation	Excavation Damage	Total O&M IPE Incidents
2017	21	8	3	32
2018	24	11	7	42
2019	24	11	4	39
2020	17	10	4	31
2021	13	7	1	21
% Change from 2017	-38%	-13%	-67%	-34%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #4:	PIPELINE SAFETY MANAGEMENT SYSTEM OPERATOR COMMITMENT (2017 - 2021)
Year	% Commitment
2017	97
2018	98
2019	98
2020	98
2021	98

Source: API and AOPL Membership Survey.

GRAPH #5:	PIPELINE INCIDENTS INSIDE AND OUTSIDE OPERATOR PROPERTY (2017 - 2021)			
Year	Outside Operator Property	Contained on Operator Property	Offshore	Total Incidents
2017	120	295	3	415
2018	105	300	3	405
2019	92	292	5	384
2020	89	244	1	333
2021	76	269	5	345
% Change from 2017	-36%	-9%	67%	-17%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #6:	PIPELINE INCIDENTS INSIDE AND OUTSIDE HCAS (2017 - 2021)		
Year	Outside HCA	Inside HCA	Total Incidents
2017	238	177	415
2018	230	175	405
2019	219	165	384
2020	186	147	333
2021	196	149	345
% Change from 2017	-18%	-16%	-17%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #7:	TOTAL INCIDENTS VS IPE INCIDENTS (2016 - 2020)		
Year	IPE Incidents	Non-IPE Incidents	Total Incidents
2017	88	327	415
2018	89	316	405
2019	76	308	384
2020	69	264	333
2021	61	284	345
% Change from 2017	-31%	-13%	-17%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #8: LIQUID PIPELINE INCIDENTS BY SIZE (2017 - 2021)					
Year	≤ 5 Bbls	> 5 and ≤ 50 Bbls	> 50 and ≤ 500 Bbls	> 500 Bbls	Total Incidents
2017	248	100	42	25	415
2018	262	73	44	26	405
2019	245	81	40	18	384
2020	207	72	40	14	333
2021	227	62	35	21	345
% Change from 2017	-8%	-38%	-17%	-16%	-17%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #9: INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT BY SIZE (2017 - 2021)					
Year	≤ 5 Bbls	> 5 and ≤ 50 Bbls	> 50 and ≤ 500 Bbls	> 500 Bbls	Total Incidents
2017	31	24	22	11	88
2018	31	19	21	18	89
2019	28	21	14	13	76
2020	27	18	18	6	69
2021	21	17	14	9	61
% Change from 2017	-32%	-29%	-36%	-18%	-31%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #10: CRUDE OIL INCIDENTS BY SIZE (2017 - 2021)					
Year	≤ 5 Bbls	> 5 and ≤ 50 Bbls	> 50 and ≤ 500 Bbls	> 500 Bbls	Total Incidents
2017	120	46	29	13	208
2018	148	42	19	12	221
2019	119	46	18	14	197
2020	100	42	20	4	166
2021	122	37	20	7	186
% Change from 2017	2%	-20%	-31%	-46%	-11%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #11:	ALL INCIDENTS BY COMMODITY (2017 - 2021)					
Year	Crude Oil	Refined Products	Highly Volatile Liquids (HVLs)	CO₂	Biofuel/Ethanol	Total Incidents
2017	208	122	76	9	0	415
2018	221	110	67	5	2	405
2019	197	117	66	4	0	384
2020	166	96	64	6	1	333
2021	186	98	56	4	1	345
% Change from 2017	-11%	-20%	-26%	-56%	-	-17%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #12:	TOTAL INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT BY COMMODITY (2017 - 2021)	
Year	Crude Oil	Refined Products
2017	54	34
2018	55	34
2019	51	25
2020	37	31
2021	36	24
% Change from 2017	-33%	-29%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #13:	PERCENT OF INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT BARRELS RELEASED BY COMMODITY (2017 - 2021)	
Year	Crude Oil	Refined Products
2017	56%	44%
2018	53%	47%
2019	71%	29%
2020	15%	85%
2021	33%	67%
% Change from 2017	-23%	23%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #14: LIQUID PIPELINE INCIDENTS BY CAUSE (2017 - 2021)

Cause	Total Incidents	Percentage
Equipment Failures	903	48%
Corrosion Failures	359	19%
Incorrect Operations	285	15%
Material Pipe/Weld Failures	110	6%
Natural Force Incidents	97	5%
Excavation Incidents	66	4%
Outside Force Incidents	34	2%
Other Incident Causes	28	1%
Total	1,882	100%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #15: TOTAL INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT BY CAUSE (2017 - 2021)

Cause	Total Incidents	Percentage
Corrosion Failures	107	28%
Equipment Failures	99	26%
Excavation Incidents	48	13%
Incorrect Operations	47	12%
Material Pipe/Weld Failures	41	11%
Natural Force Incidents	17	4%
Outside Force Incidents	15	4%
Other Incident Causes	9	2%
Total	383	100%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #16: BARRELS RELEASED IMPACTING PEOPLE OR THE ENVIRONMENT BY CAUSE (2017 - 2021)

Cause	Barrels Released	Percentage
Material Pipe/Weld Failures	54,563	29%
Excavation Incidents	50,189	27%
Corrosion Failures	44,588	24%
Natural Force Incidents	13,737	7%
Equipment Failures	12,721	7%
Incorrect Operations	7,927	4%
Outside Force Incidents	2,933	2%
Other Incident Causes	1,176	1%
Total	187,834	100%

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #17: MILES OF U.S. PIPELINE BY PRODUCT (2016 - 2020)

	2016	2017	2018	2019	2020
Crude Oil	75,710	79,211	80,741	84,015	85,307
Petroleum Products	62,461	62,369	62,720	63,117	64,187
Natural Gas Liquids (NGLs)	68,729	69,163	70,269	72,632	74,794
CO ₂ /Ethanol	5,210	5,252	5,221	5,164	5,167
Total Miles	212,109	215,995	218,951	224,928	229,454

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2022.

GRAPH #18: BARRELS DELIVERED BY U.S. PIPELINE (2016 - 2020)

	2016	2017	2018	2019	2020
Crude Oil	10,741,427,874	11,382,453,374	13,235,435,698	13,935,745,435	11,874,328,801
Petroleum Products	7,774,085,019	10,189,745,566	8,558,867,781	8,856,466,147	8,509,216,644
Total Barrels	18,515,512,893	21,572,198,940	21,794,303,479	22,792,211,582	20,383,545,445

Source: U.S. Federal Energy Regulatory Commission.

DEFINITIONS & NOTES

BARRELS

One barrel of crude oil or petroleum products is equivalent to 42 gallons.

BARRELS RELEASED

The Department of Transportation's Pipelines and Hazardous Materials Safety Administration (PHMSA) also requires operators to report intentional releases of natural gas liquids in gas form into the atmosphere during maintenance activities. Unintentionally released barrels of crude oil and petroleum products form the basis of barrels released data and analysis in this report. This process displaces residual hydrocarbons in gas state from the section of pipeline set to undergo maintenance. Barrels released data in this report does not include intentional blowdown releases.

IN-LINE INSPECTION DEVICE OR "SMART PIG"

An in-line inspection (ILI) device, commonly referred to as a "smart pig," is a diagnostic tool that travels inside the pipeline scanning the pipe walls for imperfections and recording the data for later analysis.

NATURAL GAS LIQUIDS

Petroleum products that are liquid when traveling through a pipeline under high pressure and a gas at atmospheric pressure are referred to generally as natural gas liquids (NGLs). Examples of NGLs transported by pipeline include: propane, ethane and butane. They occur naturally in petroleum deposits and are produced along with crude oil or natural gas

(methane). NGLs are separated from the crude oil and natural gas after production and sent to manufacturers (ethane, butane) as an industrial raw material to produce consumer goods such as polymers, fertilizers and home goods, or to other commercial, agricultural or residential uses (propane).

INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (IPE) CRITERIA

If either criterion 1 or 2 below is met for a crude oil or refined products pipeline the incident counts as IPE:

TIER 1. Regardless of location of incident: Fatality, Injury requiring in-patient hospitalization, Ignition, Explosion, Evacuation, Wildlife impact, Water contamination = ocean/seawater, groundwater, or drinking water or public/non-operator private property damage.

TIER 2. For location of incident "Not totally contained on operator-controlled property." Unintentional release volume greater than or equal to 5 gallons and in an HCA; or Unintentional release volume greater than or equal to 5 barrels and outside of an HCA; or Water contamination; or Soil contamination.

PHMSA INCIDENT REPORTING

Pipeline operators regulated by PHMSA are required to report data related to pipeline incidents including location, cause and consequences. PHMSA compiles this information in a publicly available online database. The pipeline safety data used in this report was obtained from PHMSA in March 2022.

API RECOMMENDED PRACTICE

Documents that communicate proven industry practices; RPs may include both mandatory and non-mandatory provisions.

REFINED PRODUCTS

Products derived from the process of refining crude oil. Examples of refined products include: gasoline, kerosene, and lubricating oil.

CRUDE OIL

Includes condensate, light, medium, and heavy unrefined hydrocarbons extracted from underground petroleum formations.





For more information, contact John Stody at jstody@aopl.org or Sam Minifie at minifies@api.org.

Learn more at: www.api.org
Learn more at: www.aopl.org

