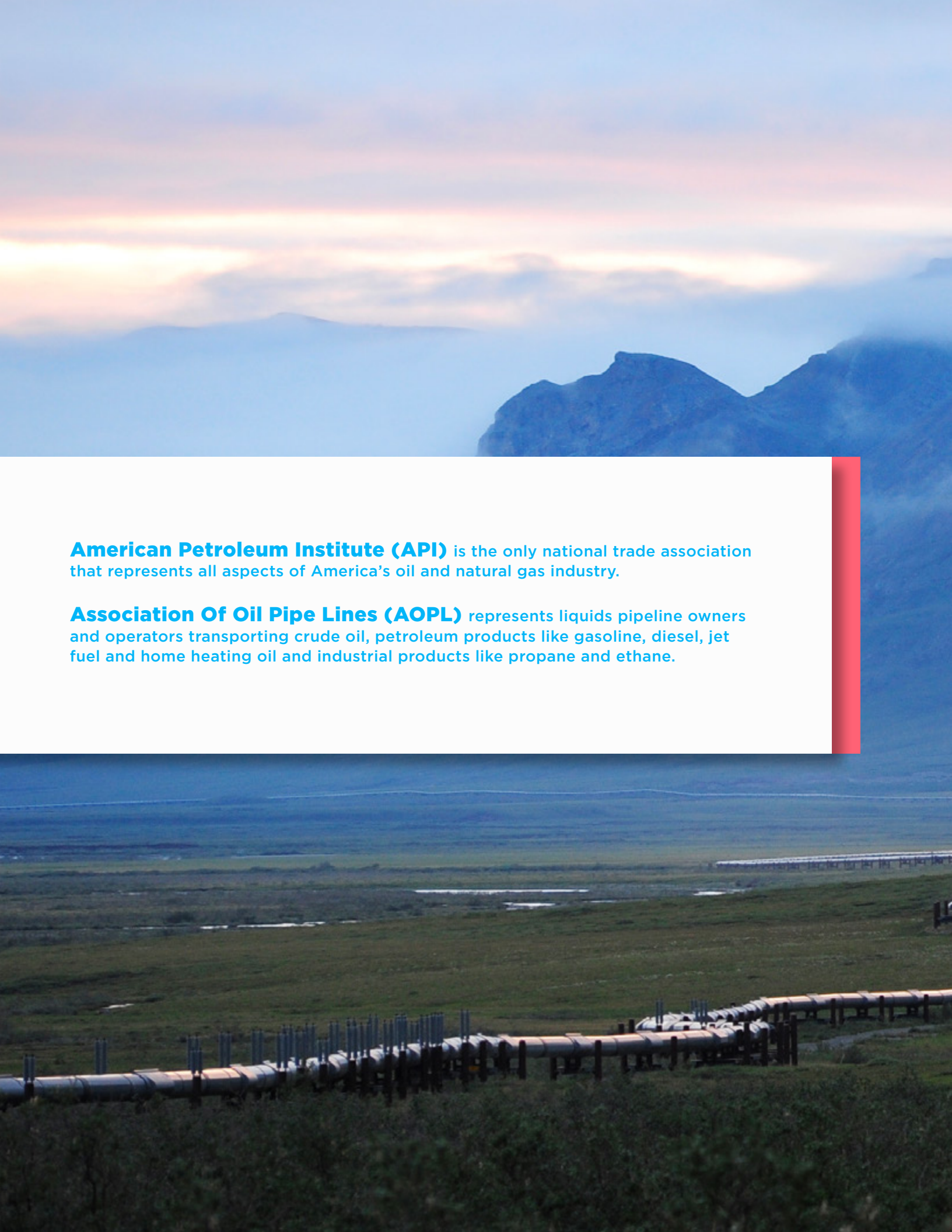
2020 PIPELINE SAFETY EXCELLENCE PERFORMANCE REPORT

& 2020-2022 STRATEGIC PLAN

API | AOPL Association of Oil Pipe Lines



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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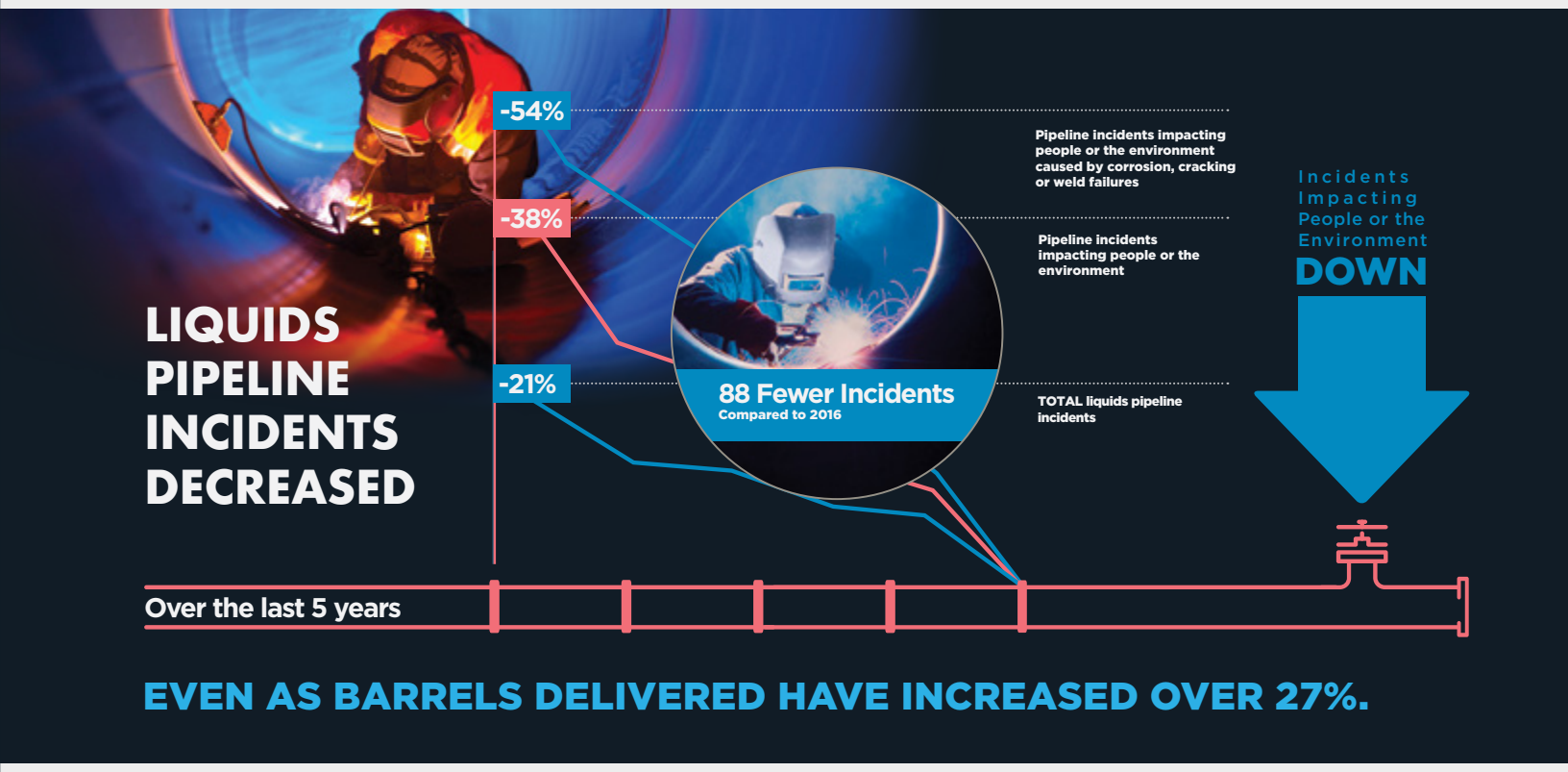
TODD DENTON
PRESIDENT, PHILLIPS 66 PIPELINE LLC

Chair, API-AOPL Pipeline Safety
Excellence Steering Committee

The year 2020 challenged us all. American families and workers confronted a worldwide pandemic and economic downturn. All of us struggled with uncertainty, parents struggled with virtual learning, workers struggled with continuing essential services, establishing virtual routines or for some just keeping their jobs. Pipeline operators were no different with our workers, their families and our operations needing to go on to deliver the energy all of us need and depend upon.



In my role as chair of our industry-wide safety efforts, I am especially proud of the safety our pipeline operators maintained throughout 2020. Across nearly every metric, pipeline safety performance improved. In 2020, total liquids pipeline incidents decreased 13% and they are down 21% over the last 5 years.

Our key pipeline performance indicator of incidents impacting people or the environment showed a 13% decrease over the previous year and 38% drop over the last 5 years.

The improved pipeline safety performance over the last 5 years reflects the efforts of our Pipeline Safety Excellence program. While pipeline operators may compete economically to deliver petroleum products to our customers, we join together to support safe pipeline operations. This report highlights our three-year strategic plan to improve pipeline safety. We are striving to promote organizational excellence, improve safety through technology and innovation, increase stakeholder awareness and involvement, and enhance emergency response preparedness.

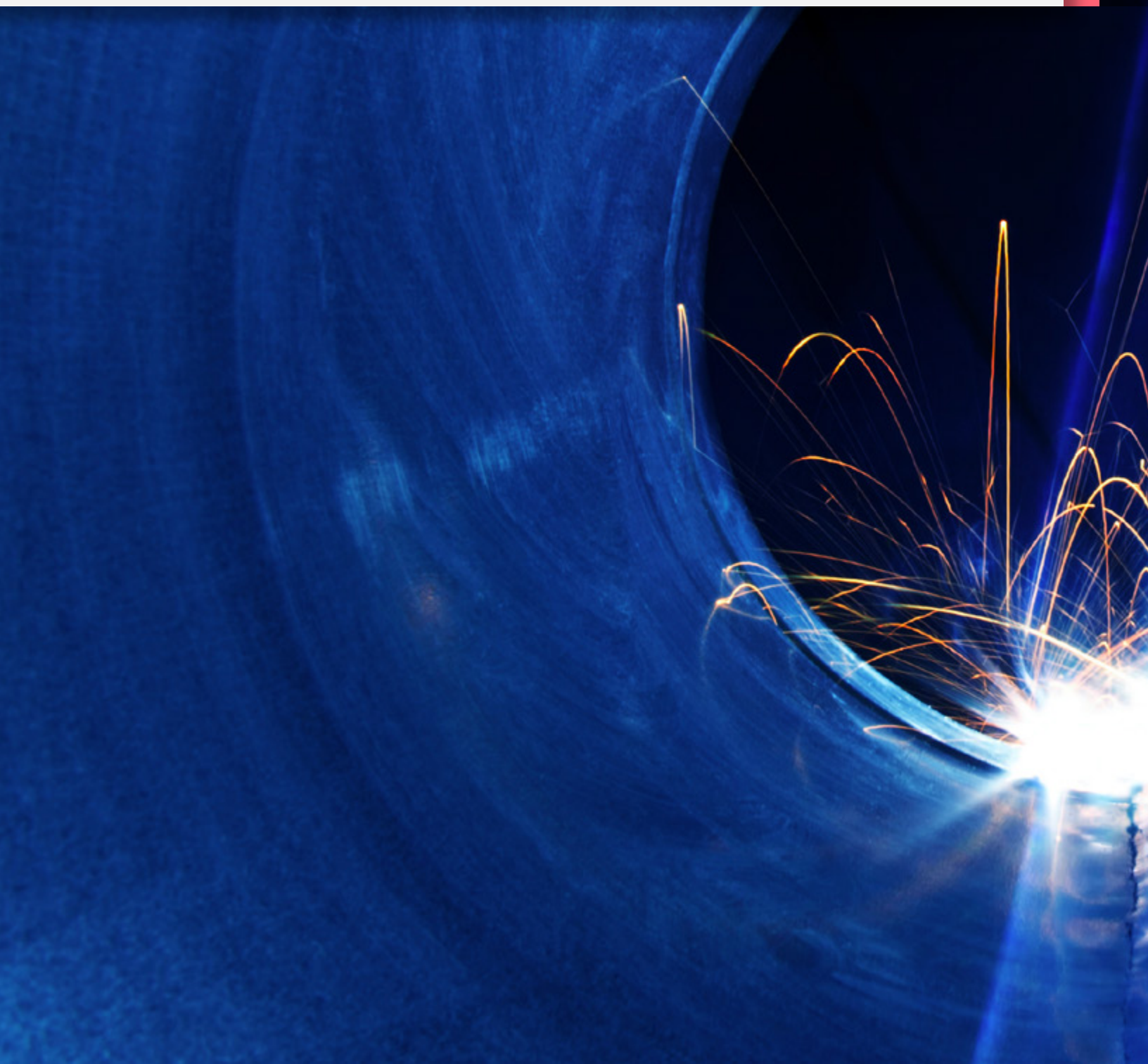
The following pages detail the objectives and programs we are pursuing as an industry to improve pipeline safety even further.

Over 5 years after the publication of API Recommended Practice 1173, the improvement in pipeline safety performance reflects the liquids industry's voluntary commitment to and implementation of Pipeline Safety Management Systems. Pipeline operators are continuously improving on the SMS journey by surveying safety culture, conducting gap analyses, and measuring maturity and effectiveness.

While pipeline safety was a rare bright spot in 2020, we know as all Americans know that better days are ahead. If you have any questions, please don't hesitate to reach out to us at www.api.org or www.aopl.org.

Sincerely,

“Our key pipeline performance indicator of incidents impacting people or the environment showed a 13% decrease over the previous year and 38% drop over the last 5 years.



While pipeline safety was a rare bright spot in 2020, we know as all Americans know that better days are ahead."

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

POWERING ECONOMIC RECOVERY AND SPURRING JOB GROWTH

Energy powers American progress. It takes energy to grow and adapt, to innovate and move forward – and to build a better future. Our industry has the size and resources to help lead a national economic recovery. Today, through energy delivered by pipelines, we're powering the lives of Americans from coast to coast – keeping the lights on, heating homes, getting people to work, helping family budgets with lower energy costs, reinvigorating U.S. manufacturing and providing the building blocks for the technologies of tomorrow.

American global energy leadership means increased self-sufficiency and the ability to help Americans find opportunities for better lives – through high-paying energy industry jobs that are valued by union and non-union tradespeople alike, as well as those the industry supports across the economy.

The oil and natural gas industry supports more than 10 million jobs and contributes billions to U.S. GDP. According to government and private data, we're driving nearly $290 billion of capital investments currently being maintained or under construction – from pipelines, refinery and petrochemical expansions to processing, storage and export facilities. Pipelines and other kinds of high value-added projects can transform communities and states, contributing an array of benefits throughout

LOWERING HOUSEHOLD ENERGY COSTS AND SUPPORTING COMMUNITIES

Abundant domestic energy delivered safely by pipelines has helped lower energy costs for American households, providing $203 billion in annual savings – about $2,500 a year for a family of four, according to a 2019 White House report. Further, gasoline prices in 2020 were about 39% lower than they were in 2011.

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In the last decade U.S. healthcare spending grew by over 70 percent and education spending increased over 50 percent, while household energy spending declined by 10 percent. As the U.S. continues to be the world's largest producer of oil and natural gas, pipelines safely and efficiently transport energy products thousands of miles from production areas eventually on to gas stations, airports, and manufacturing facilities.

CONTINUOUSLY IMPROVING SAFETY AND ENVIRONMENTAL PERFORMANCE

The pipeline industry has not waited for legislation or regulation to advance safety and environmental protection. With more than 700 standards covering all segments of the industry – developed through a rigorous process accredited by the country's foremost certifying organization - energy development, transportation and refinement have never been safer.

The pipeline industry's commitment to safety has remained strong, even as the nation faced dual challenges of an epidemic and economic downturn. Over the last five years, total liquids pipeline incidents are down 21%, with those incidents impacting people or the environment (IPE) down 38%. IPE incidents involving corrosion, cracking, or weld failure are down 54% in the last five years as well.

Overall, the oil and natural gas industry has helped the U.S. cut CO_2 emissions more than any other country since 2000, including a 61% reduction in carbon dioxide emissions from the power sector since 2005. As an industry of problem solvers, pipeline companies will also play a key role in innovative solutions including carbon capture, utilization, and storage, providing the infrastructure to safely transport processed CO_2 to safe storage sites or used in manufacturing facilities.

STRENGTHENING COMMUNITY RELATIONSHIPS

Our companies recognize that being a good neighbor is integral to the impact they make with the communities where they operate – where their workers live and raise their families. Beyond fostering growth and opportunity through active operations, pipeline operators are lending a helping hand and making life in their cities and towns better. During the COVID-19 pandemic, the energy industry has donated over $100 million and more than two million pieces of PPE to keep our communities safe.

As the industry expands and maintains liquids pipeline infrastructure, pipeline operators found new ways to establish local relationships, address performance issues, and engage community members while following CDC guidelines. Critically important is communicating the value of pipelines and associated infrastructure to businesses, families, and individual consumers by providing abundant and reliable energy, as well as building community relationships.

Energy infrastructure creates opportunities for local economic growth and other benefits for communities. The industry's commitment to being a good neighbor throughout a pipeline project requires ongoing dialogue with local communities, tribal nations, emergency responders, elected officials, concerned residents, and many others. API's Community Engagement Guidelines for Pipeline Projects provides actionable strategies for identifying interests, issues and concerns. The pipeline industry, in partnership with public safety advocates and government officials, have also embarked on the development of Recommended Practice 1185, *Pipeline Public Engagement*, to provide a robust framework for public engagement throughout the lifecycle of a pipeline.

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 PLAN GOALS

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.

1

IMPROVE 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.

2

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.

3

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.

4

GOAL 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% increase in companies conducting Pipeline SMS gap assessment
2. **INCREASE COMPANIES TAKING ACTION TO IMPROVE THEIR SAFETY MANAGEMENT SYSTEMS -** 5% 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 third-party assessments per year

Despite all the challenges of 2020, the pipeline industry continued to make significant progress implementing API Recommended Practice (RP) 1173, *Pipeline Safety Management Systems*. Already representing all segments of the pipeline industry, the Team further expanded to include contractor associations to maintain a united approach to SMS implementation and continued to focus on its four key subteams. To better support operator journeys, the Team hosted a virtual workshop series in October, mapped requirements between RP 1173, 49 CFR 192 and 195, and CEPA's Integrity First program, and conducted the first safety culture survey among liquid pipeline operators. API's Pipeline SMS Third-Party Assessment Program also quickly adapted to social distancing requirements to conduct two partial assessments remotely, with the in-person portions to be completed in 2021. The Team effectively engaged with external stakeholders throughout 2020, briefing regulators and pipeline public safety advocates on the 2019 Annual Report, the value of SMS during COVID-19, and highlighting operator journeys during the Virtual API Pipeline Conference. In the fall, the Team conducted the 2020 Annual Survey to measure implementation progress, showing significant improvements in the percent of companies making a leadership commitment, conducting gap assessments, maintaining methods to evaluate maturity, and other important metrics. Lastly, with the RP due for standards action in July, the Team requested and received a two-year extension for RP 1173.

In 2021, the Team will continue to facilitate SMS implementation across the pipeline industry through industry trainings, engagement opportunities, and implementation tools. Additionally, the Team will establish an ad hoc group to identify necessary sections of RP 1173 for revision or clarification. API will also continue to improve the Pipeline SMS Third-Party Assessment Program, its assessors, and processes as pipeline operators are encouraged to measure their maturity and benchmark against peers.

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 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 industry-wide to prevent similar events from occurring. Most companies also 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, facilitating industry-wide sharing, and promoting company learning processes.

In 2020, the Subteam published the API-AOPL Guide to Learning, which is a companion document to the Guide to Sharing published in 2019. The Guide to Learning is a tool that helps companies improve their total safety performance by incorporating lessons learned from various industry sharing events. Last year, the Subteam also provided support for several API events such as the quarterly Virtual Tailgates and the annual Pipeline Information eXchange (PIX). In 2021, the Subteam will continue to implement the Guides and play a more active role in planning sharing and learning events. The Subteam will also evaluate API's PIPES Learning Portal and develop a plan for increasing traffic to the site.

GOAL 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

Pipeline operators inspect their pipelines on regular schedules looking for signs the pipe needs maintenance. By inspecting proactively, pipeline operators catch and fix issues long before they become a problem for the pipe. In-line inspection (ILI) tools are a key tool for analyzing the health of pipelines and assessing threats to pipeline systems. The API-AOPL Research & Development Work Group (RDWG) is advancing Objective 2.1 to Improve Pipeline Integrity Inspection Technology through crack tool capability work under the Pipeline Research Council International (PRCI). The RDWG, which is leading the PRCI project team, developed protocols and equipment to validate and test the performance specifications published for ultrasonic crack detection (UTCD), electromagnetic acoustic transducer (EMAT), and spiral and circumferential magnetic flux leakage (MFL) ILI tools. In 2020, the project team completed Phase I to develop plans and procedures. In 2021, the project is now in Phase II to compare previous ILI test results in donated pipe samples to non-destructive examination of those samples the project will conduct. The team has ILI results for 5 seam welds including 23 hook cracks (inside diameter (ID), outside diameter (OD), and ID connected), 11 cracks (ID, OD, ID connected, and OD connected), 13 lack of fusion defects (OD, ID, and intermittent), and 2 upset trim defects (ID). The project is reviewing candidate sections for computed tomography (CT) of 2 samples with 10 defects. The RDWG will determine how to formalize and share results of the project, complete Phase III, and compare results with the specifications of the ILI crack tools.

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 awareness campaigns. Where applicable, analytical computer programs help operators discern between system readings reflecting normal operational variances and a potential release. In 2020, industry promoted comprehensive leak detection efforts through API RP 1175 *Leak Detection Program (LDP) Management*, initially published in late 2015. API is currently revising RP 1175 and is scheduled to publish this 2nd edition revision by the end of the third quarter of 2021. In conjunction with the revisions to RP 1175, API shall update and publish RP 1130, *Computational Pipeline Monitoring*, to align with the revision changes to RP 1175 to ensure both RPs collaborate to enhance the industry's leak detection capabilities. Additionally, API is developing a leak detection program implementation survey (checklist) to enhance the company's understanding and development of their own program as it relates to RP 1175. Communication and guidance regarding the completion and new content of RP 1175 and RP 1130 shall begin at the end of the second quarter of 2021, for implementation to begin by the end of the year.

The pipeline industry is also pursuing technology advances toward better leak detection. In 2020, an industry funded project field-tested a cable-based technology that runs along the length of the pipe detecting the release of hydrocarbons. The project is testing pipe location and cable installation technologies that will allow for the safe retrofit of cable-based systems near existing pipelines. Industry is also funding research harnessing machine learning to better analyze patterns between pipeline operational data and leaks. In 2020, this project gathered operational data from pipeline companies and began algorithm development, In 2021, the machine learning project will validate newly developed algorithms with submitted data and the cable detection project intends to field-test mechanical installation methods.

Objective 2.3
Improve Corrosion Detection and Identify Mitigations

STRATEGIC INITIATIVE: IMPROVE CORROSION RISK

ASSESSMENT

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

Liquids pipeline operators are focused on decreasing the number of corrosion-related incidents, cultivating awareness of the number of corrosion-related incidents, increasing the number of operators who have completed a gap analysis against PHMSA data, and collaborating with outside organizations to formalize an industry-wide corrosion management document. In 2020, a corrosion subteam of API's Pipeline Integrity Group spent a significant amount of time evaluating PHMSA corrosion release data to better understand the root causes of corrosion-related releases – metrics that companies can use as they evaluate their systems. Last year, API also hosted a Virtual Tailgate specific to corrosion-related incidents. Finally, in 2020, the Subteam began collaborating with the Association for Materials Protection and Performance (formerly NACE) on TG-370: Pipeline Corrosion Management. TG-370 is a holistic corrosion management document that will incorporate aspects of RP 1173 to help operators identify, assess, and mitigate corrosion threats. In 2021, the Subteam will continue its work on this document while also evaluating technology gaps in the field to determine whether there are further research opportunities.

GOAL 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% AS COMPARED TO 2019 AND MAINTAIN WITH EVERGREEN CONTENT TO ENGAGE TARGETED AUDIENCES
2. INCREASE PAPERS PARTICIPATION TO 26 COMPANIES IN 2021
3. DEVELOP RECOMMENDED PRACTICE FOR PIPELINE PUBLIC ENGAGEMENT

The pipeline industry is working to improve how it engages with the public during the planning, construction, and operation of pipelines, as well as how it fulfills its public awareness obligations under federal regulation. API RP 1162, *Public Awareness Programs for Pipeline Operators*, provides operators guidance on ensuring stakeholders near operating pipelines are aware of an existing pipeline's operations. Industry is also leading an effort to develop guidance, API RP 1185, *Pipeline Public Engagement*, for pipeline operators, interested members of the public, and government safety regulators to improve communication and engagement around a pipeline's lifecycle.

In 2020, the pipeline industry collaborated on the revision and update of API RP 1162 revisions to add clarity and guidance for pipeline operators. API and AOPL also collaborated to revamp the www.Pipeline101.org website to improve the user experience and update content, graphics, and videos. In 2020, industry revised the approach to the Public Awareness Program Effectiveness Research Survey (PAPERS), cutting overhead costs and improving responses to compliance forms for the 2021 cycle.

The pipeline industry also kicked off the development of RP 1185, *Pipeline Public Engagement*, with government and public partners. The effort began with the development of key definitions, established scope, set expectations of individual members for the product and has evolved into more robust discussion around overarching principles, phases of a pipeline lifecycle, key audiences, delivery methods and opportunities for engagement.

In 2021, the group developing RP 1185 will draft guidance within the new RP to assist in identifying an operator's external stakeholders, the communication and engagement responsibilities of the operator, as well as the desired communication and engagement from the stakeholders. It will also provide recommendations for evaluating whether engagement is being conducted successfully in accordance with measuring and benchmarking as given in API RP 1173, *Pipeline Safety Management Systems*. The RP 1185 development group expects to ballot and finalize the RP by the end of 2021 or in early 2022.

Additionally, the RP 1162 Task Group will look to finalize changes in early 2021, with a ballot expected by the first half of the year, and encouragement of adoption by reference. Along with these two RPs, the industry has been committed to improving early and often public and community engagement through quarterly sharing of best practices among operators and coalition-building. In 2021, the industry will also maintain updated content on www.Pipeline101.org, support the ongoing PAPERS process, and develop an implementation guidance site for RP 1162.

Objective 3.2

Promote Innovative Approaches to Enhancing Damage Prevention

STRATEGIC INITIATIVE: REDUCE EXCAVATION DAMAGE

4. DECREASE THE NUMBER OF FIRST- AND SECOND-PARTY DAMAGES BY SHARING INFORMATION FOR SAFE DIGGING ALONG THE PIPELINE RIGHT-OF-WAY
5. DECREASE THE NUMBER OF THIRD-PARTY DAMAGES DURING PIPELINE OPERATOR EXCAVATION

Excavation damage to underground pipelines continues to be a source of incidents and a threat to critical infrastructure integrity. In 2020, the API/AOPL Damage Prevention Work Group (DPWG) focused on reducing first- and second-party excavation damages. Group members participated in the update and rewrite of RP 1162 throughout 2020 to improve public awareness and damage prevention best practices. Members also help revise the 2021 PAPERS program to support compliance improvements and reduce costs. Additionally, the DPWG revised the www.DPToolbox.org to better highlight best practice documents and developed a workplan for the site moving forward.

In 2021, the DPWG will continue to support the revision of RP 1162, including the development of an implementation guidance site to help operators. The group will also further spread awareness about the 811 process through web-based solutions and applications to prevent underground line strikes. Over the next two years, the DPWG will routinely engage federal and state regulators and legislators and public safety advocates and will coordinate with like-minded associations on the shared goal of excavation damage prevention and critical infrastructure protection.

GOAL 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% year over year
3. CROSS – COMPANY LEARNINGS – Yearly summary published and 25% cross-company participation for all opportunities provided

The Oil Spill & Emergency Preparedness and Response, Emergency Response Group (ERG) is currently developing three tactical response guidance documents. The Swift Water Tactical Response Guide was started in 2019 and has been reviewed and approved by the ERG. It is currently being formatted for publication. The Highly Volatile Liquid/Liquified Petroleum Gas Tactical Response Guide is in draft form and being edited and revised by the ERG. Publication is anticipated by end of year, 2021. Lastly, the ERG is currently developing a scope of work and soliciting consultants to draft a tactical response guide for responding to inland spills during winter weather (icy) conditions. Publication of this new guide is planned for 2022.

In 2020, COVID impacts on the ERG's efforts included the cancelation or delay of many training and exercises that were planned. Member companies typically participate in each other's events as a way to share ideas and lessons learned and evaluate the exercise. In the second half of the year, many of these events were adapted to be held in a virtual setting, a trend that is continuing into 2021. Finally, API RP 1174, *Onshore Hazardous Liquid Pipeline Emergency Preparedness and Response*, has been extended to 2022. It is anticipated that a workgroup will be established in the second half of 2021 to evaluate the existing document for needed updates and revisions.

2020 PERFORMANCE REPORT

KEY PERFORMANCE INDICATORS

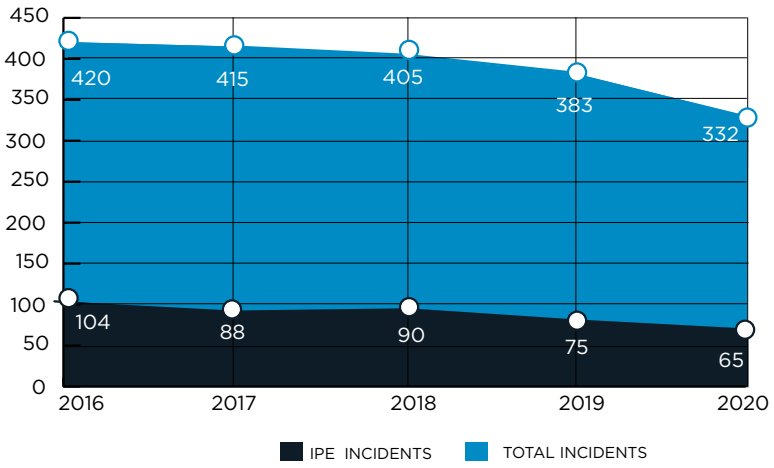
Measuring the performance of pipelines is a critical way to determine how safe they are and whether their safety is improving. Pipeline operators and PHMSA collect hundreds of different data points measuring how safely pipelines are operating and the reasons behind pipeline incidents when they occur.

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. In 2020, the pipeline industry faced the same dual challenges as the nation fighting through a pandemic and economic downturn. Even in these difficult times, the liquids pipeline industry kept its focus on safety with pipeline incidents declining across the board. Incidents impacting people or the environment are down 38% 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**

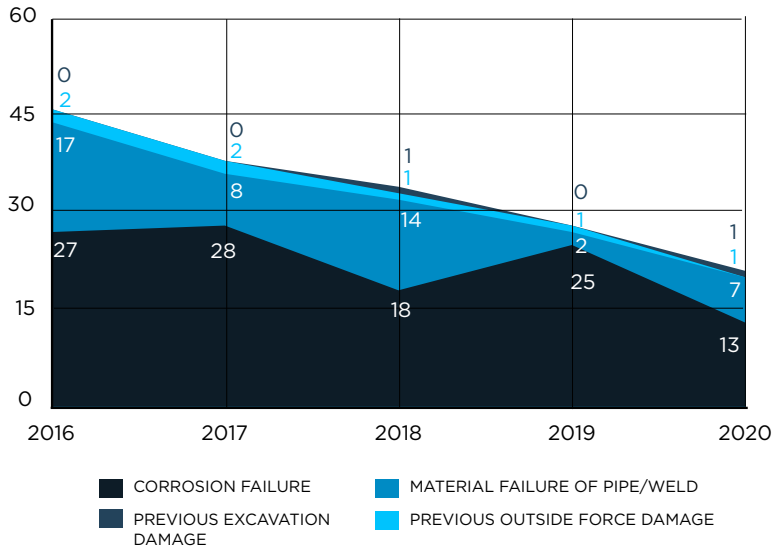
Integrity management incidents are those of the pipeline itself, such as corrosion, cracking or weld failure. Operations and maintenance causes include equipment failure or incorrect operations.

KEY PERFORMANCE INDICATORS



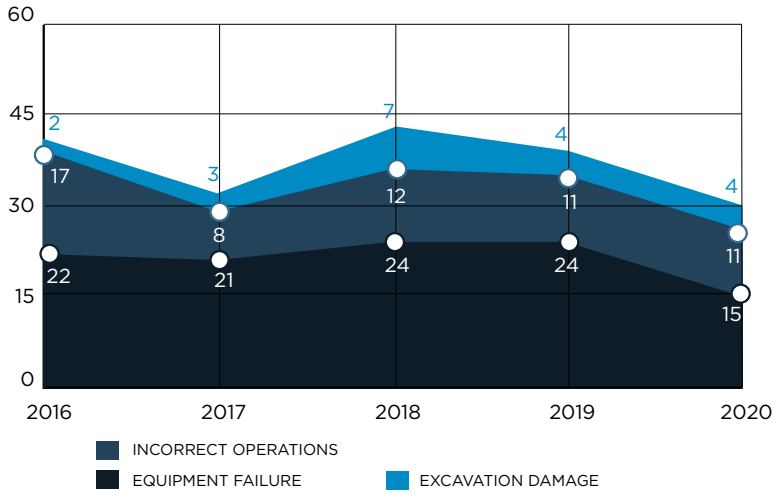
#1: TOTAL INCIDENTS VS INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2016 – 2020)

Pipeline incidents impacting people or the environment decreased 38% over the last 5 years. Total pipeline incidents were down as well, dropping 21% over 5 years with 88 fewer incidents in 2020 compared to 2016. A full description of the specific types of incidents impacting people or the environment can be found on page 46.



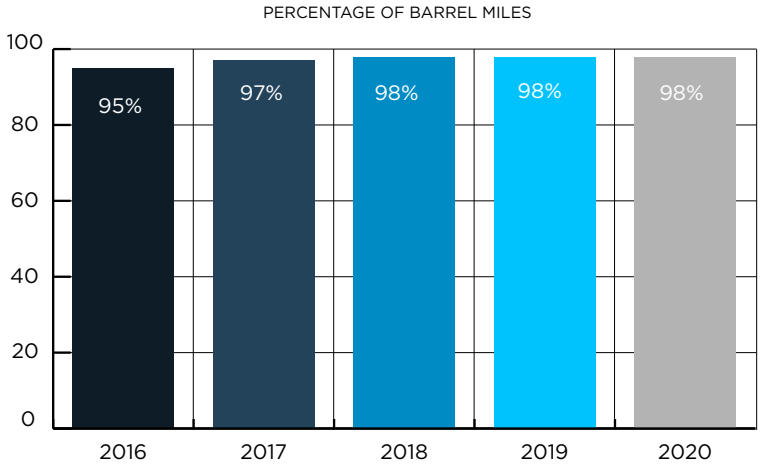
#2: INTEGRITY MANAGEMENT INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2016 – 2020)

Incidents related to the pipeline itself, such as corrosion, cracking or weld failure, were down 54% over the last 5 years in areas impacting people or the environment. In these areas, corrosion failures are down 52% from 2016 to 2020.



#3: OPERATIONS & MAINTENANCE INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2016 – 2020)

Incidents related to installing and maintaining pipeline equipment or operating the pipeline and its valves or pumps were down 27% over the last 5 years in areas impacting people or the environment. In these areas, incidents caused by incorrect operations decreased by 35% while equipment failure decreased 32% from 2016 to 2020.

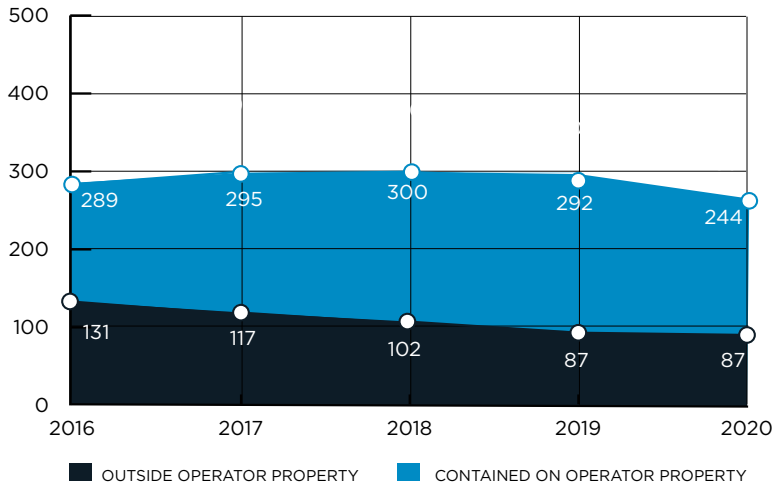


#4: PIPELINE SAFETY MANAGEMENT SYSTEM OPERATOR COMMITMENT (2016 – 2020)

In 2020, the pipeline industry maintained liquids pipeline operator commitment to Pipeline Safety Management Systems at 98% of industry barrel miles.

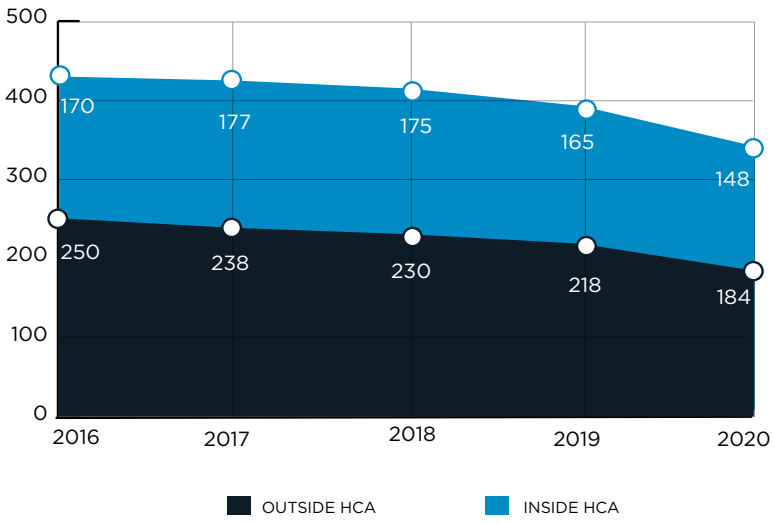
INCIDENTS BY LOCATION

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.



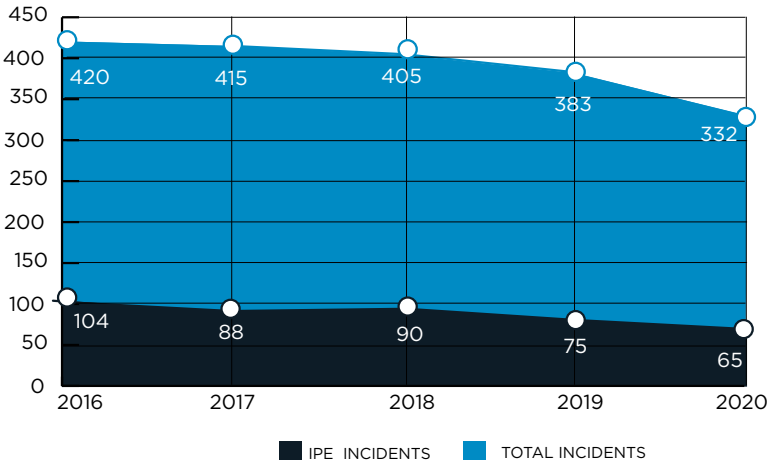
#5: PIPELINE INCIDENTS INSIDE AND OUTSIDE OPERATOR PROPERTY (2016 – 2020)

In 2020, 73% 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 34% from 2016 to 2020.



#6: PIPELINE INCIDENTS INSIDE & OUTSIDE HCAs

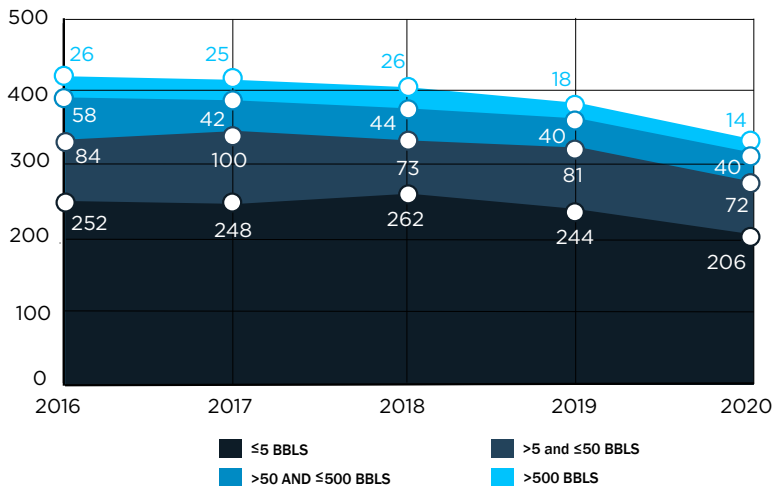
Liquids pipeline incidents occurring in high consequence areas (HCAs) declined 13% over the last 5 years. Through federal regulation, PHMSA defines HCAs as areas of population concentration, commercially navigable waterways, or sensitive environmental locations. Fewer than half (45%) of pipeline incidents occurred in HCAs in 2020. 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. TOTAL IPE INCIDENTS (2016 – 2020)

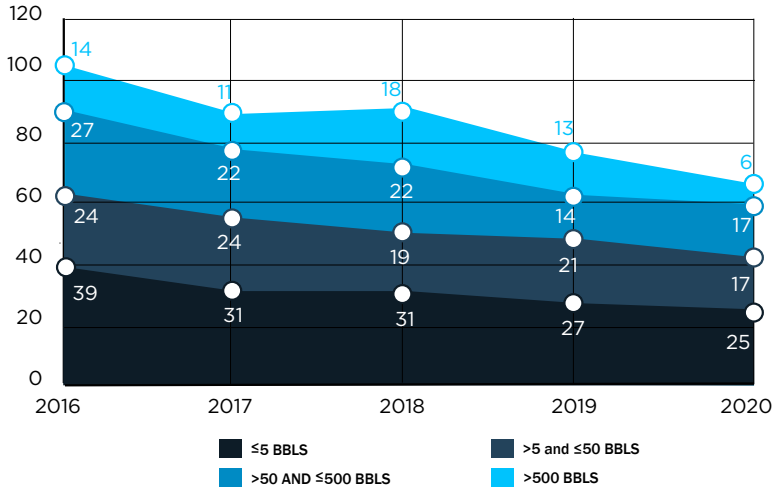
In 2020, 65 liquids pipeline incidents impacted people or the environment, a 38% decrease over the last 5 years. Total pipeline incidents were down as well, dropping 21% over 5 years with 88 fewer incidents in 2020 compared to 2016. A full description of the specific types of incidents impacting people or the environment can be found on page 46.

INCIDENTS BY SIZE



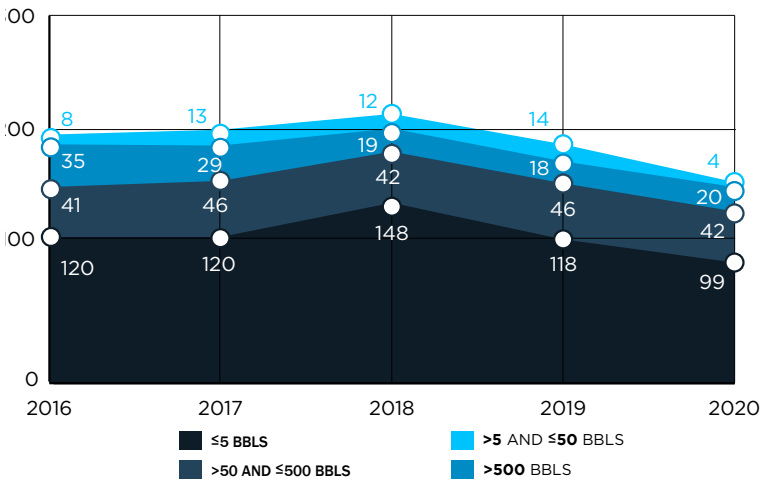
#8: LIQUIDS PIPELINE INCIDENTS BY SIZE (2016 – 2020)

Most pipeline incidents are small in size. In 2020, 62% of incidents were less than 5 barrels and 84% were less than 50 barrels. Large pipeline incidents are also the rarest. In 2020, only 4% of incidents were 500 barrels or larger.



#9: IPE INCIDENTS BY SIZE (2016 – 2020)

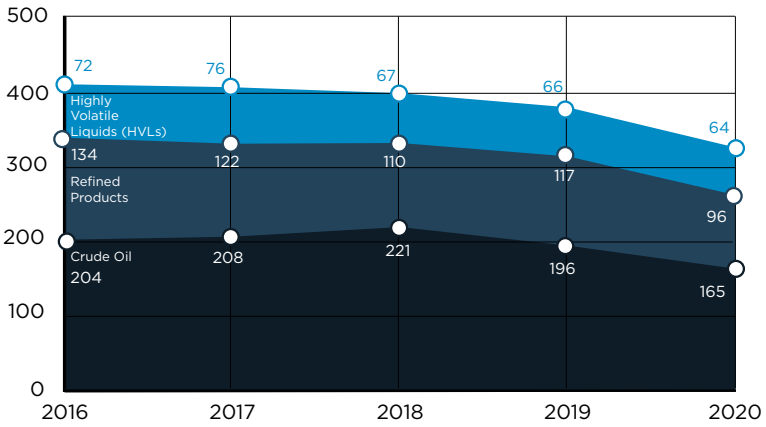
Most incidents impacting people or the environment are small in size. In 2020, approximately 65% of such incidents were less than 50 barrels, with only 9% of incidents impacting people or the environment 500 barrels or larger.



#10: CRUDE OIL INCIDENTS BY SIZE (2016 – 2020)

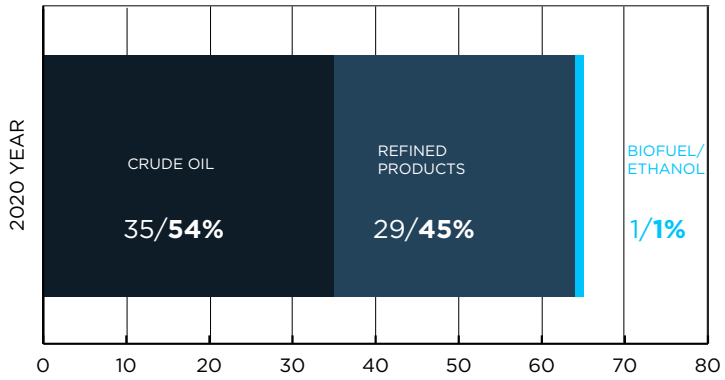
Similar to total incident trends, the majority of crude oil pipeline incidents are small in size. In 2020, 60% of crude oil incidents were 5 barrels or smaller and 85% of crude oil incidents were smaller than 50 barrels. Over the last 5 years, only 2% of crude oil incidents were over 500 barrels.

INCIDENTS BY COMMODITY



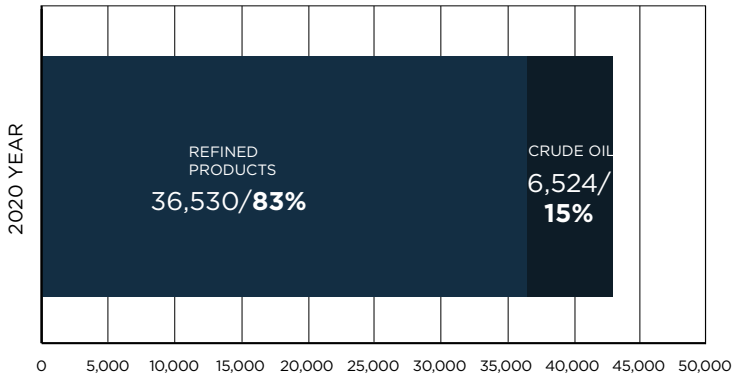
#11: ALL INCIDENTS BY COMMODITY (2016 – 2020)

In 2020, crude oil incidents represented 50% of total incidents, with refined products at 29% and natural gas liquids at 19% of total incidents. The number of annual crude oil incidents are down 19% from 2016.



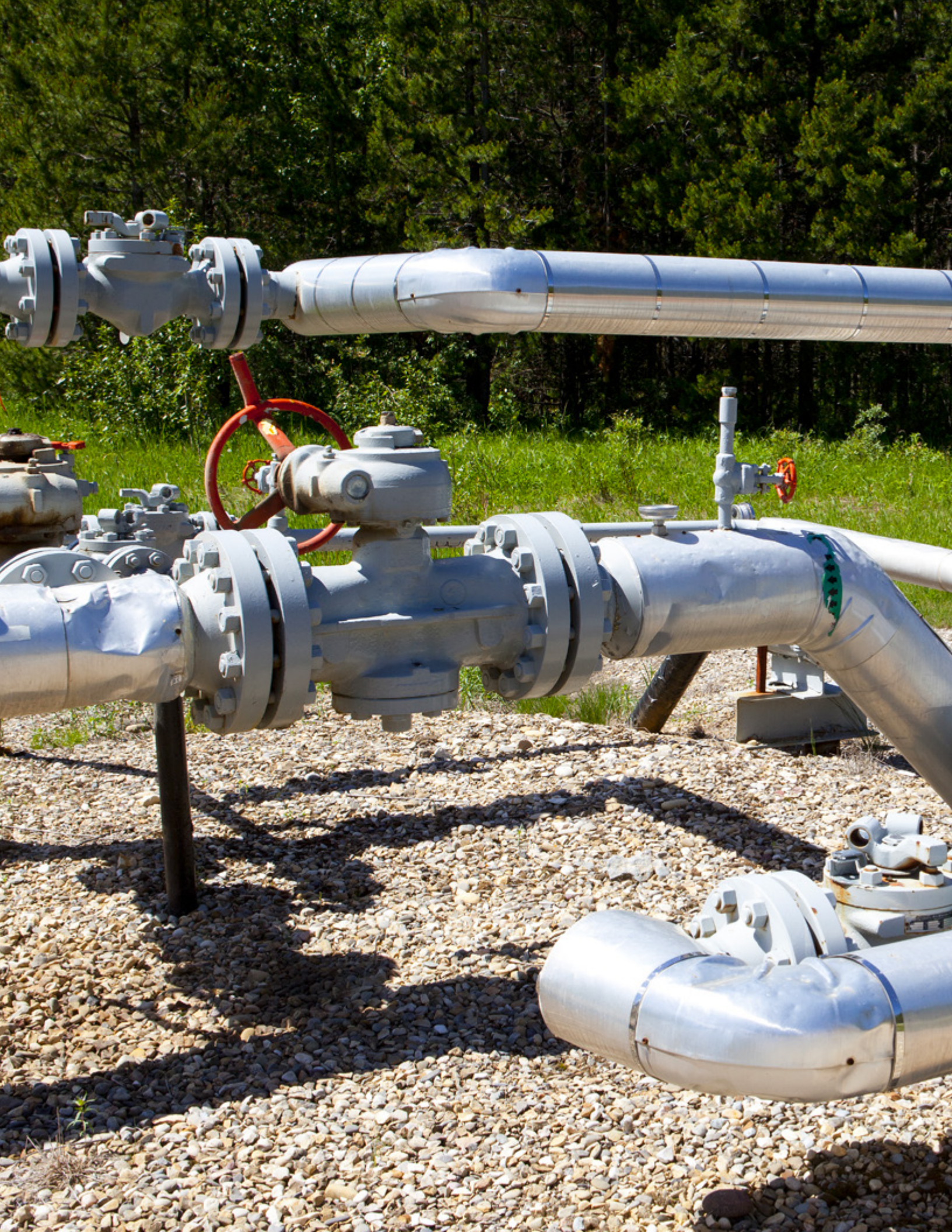
#12: TOTAL IPE INCIDENTS BY COMMODITY (2020)

In 2020, there were 35 crude oil and 29 refined products incidents impacting people or the environment.

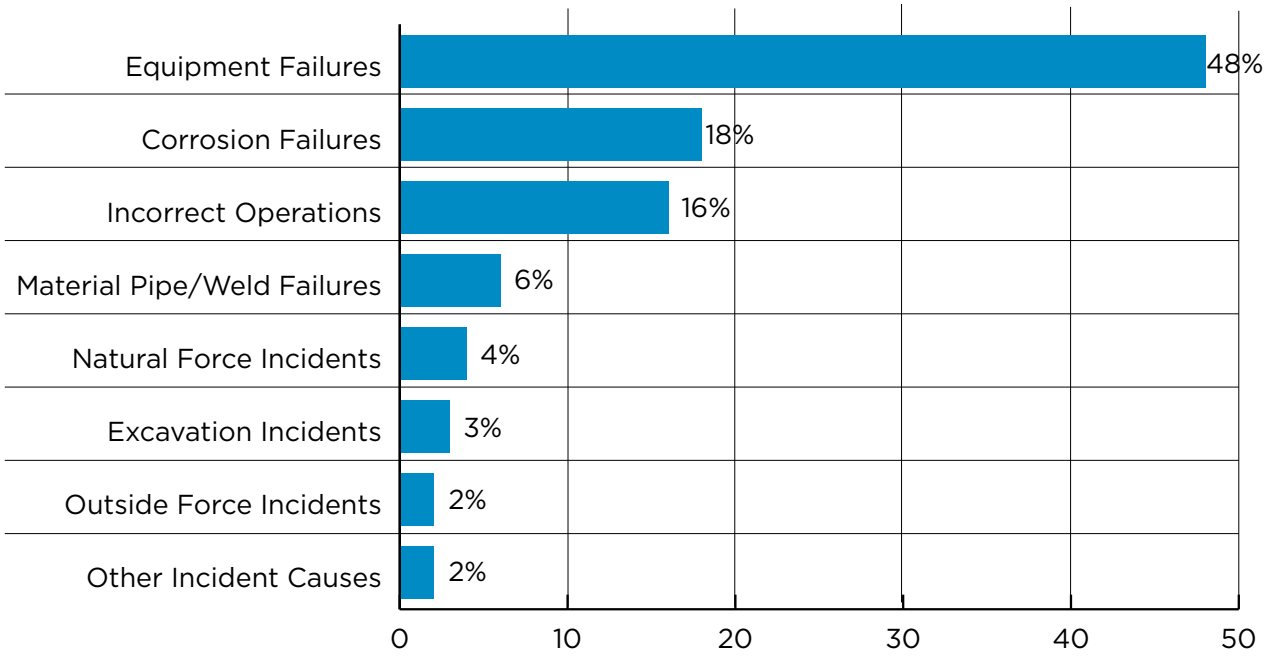


#13: PERCENT OF IPE BARRELS RELEASED BY COMMODITY (2020)

Crude oil incidents impacting people or the environment in 2020 represented 15% of the total, with refined products reflecting 85% of released barrels from liquids pipelines.

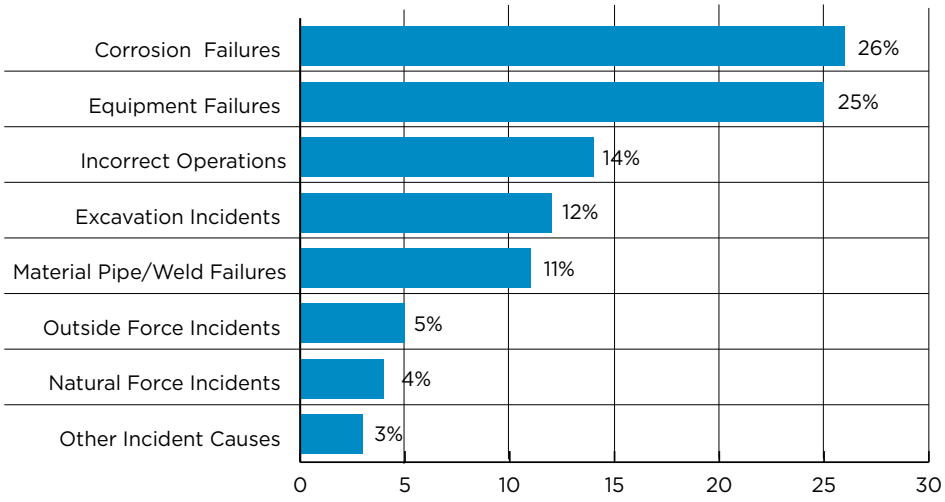


INCIDENTS BY CAUSE



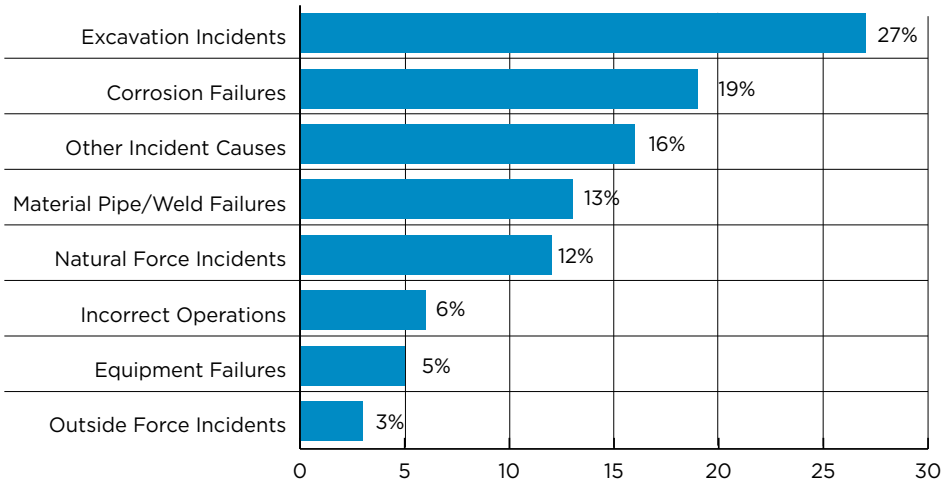
#14: LIQUIDS PIPELINE INCIDENTS BY CAUSE (2016 – 2020)

Equipment failure is the most frequent cause of all liquids pipeline incidents. Over the last 5 years, equipment failure represented 48% of incidents, corrosion failure 18% and incorrect operation 16% of incidents. Material pipe/weld failures, which include cracking, a primary source of large volume releases, represented only 6% of incidents over the last 5 years.



#15: TOTAL IPE INCIDENTS BY CAUSE (2016 – 2020)

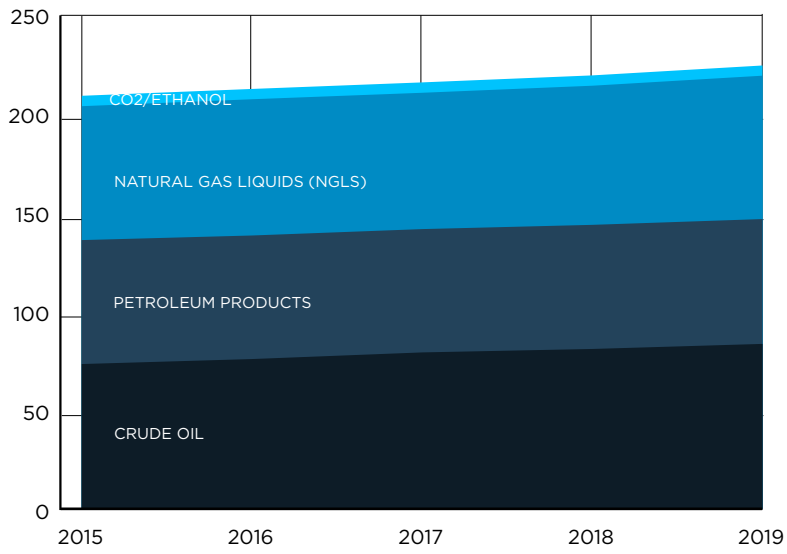
Over the last 5 years, corrosion (26%) was the most frequent cause of incidents impacting people or the environment, followed by equipment failure (25%), incorrect operations (14%) and excavation incidents (12%).



#16: PERCENT OF IPE BARRELS BY CAUSE (2016 – 2020)

Excavation incidents (27%) were responsible for the most barrels released in incidents impacting people or the environment, followed by corrosion (19%) and material pipe/weld failures (16%). Equipment failure, the most frequent cause of all incidents, was the cause of only 5% of barrels released, reflecting the reduced proportion of operator property incidents impacting people or the environment and the smaller average size of equipment failure incidents.

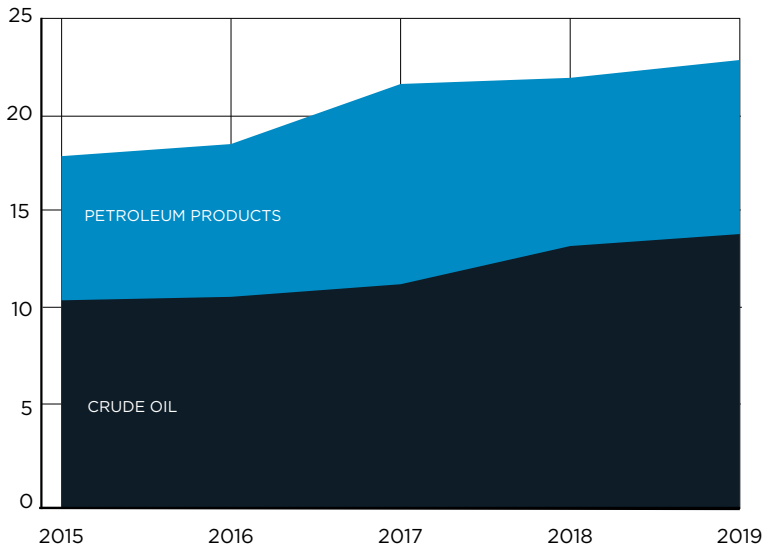
PIPELINE MILES & BARRELS DELIVERED



#17: MILES OF U.S. PIPELINE BY PRODUCTS (2015 – 2019)

(Thousands)

At the end of 2019 (the most recent year this data is available), there were 224,045 total miles of liquids pipelines, with crude oil pipelines representing 37% of the total at 83,351 miles, refined products at 28% or 63,090 miles, and natural gas liquids reflecting 32% or 72,446 miles.



#18: BARRELS DELIVERED BY U.S. PIPELINE (2015 – 2019)

(Billions)

In 2019, there were a total of 22,794,449,839 crude oil and refined products barrels delivered by pipeline, with crude oil representing approximately 61% or 13,937,983,692 of the barrels delivered and refined products 39% or 8,856,466,147 barrels.

GRAPH #1: TOTAL INCIDENTS VS INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2016 – 2020)

Year	IPE Incidents	Non-IPE Incidents	Total Incidents
2016	104	316	420
2017	88	327	415
2018	90	315	405
2019	75	308	383
2020	65	267	332
% Change from 2016	**-38%**	**-16%**	**-21%**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #2: INTEGRITY MANAGEMENT INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2016 – 2020)

Year	Corrosion Failure	Material Failure Of Pipe/Weld	Previous Excavation Damage	Previous Outside Force Damage	Total Incidents
2016	27	17	2	0	46
2017	28	8	2	0	38
2018	18	14	1	1	34
2019	25	2	1	0	28
2020	13	7	0	1	21
% Change from 2016	**-52%**	**-59%**	**-100%**	**-**	**-54%**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #3: OPERATIONS & MAINTENANCE INCIDENTS IMPACTING PEOPLE OR THE ENVIRONMENT (2016 – 2020)

Year	Equipment Failure	Incorrect Operation	Excavation Damage	Total O&M IPE Incidents
2016	22	17	2	41
2017	21	8	3	32
2018	24	12	7	43
2019	24	11	4	39
2020	15	11	4	30
% Change from 2016	**-32%**	**-35%**	**100%**	**-27%**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #4:	PIPELINE SAFETY MANAGEMENT SYSTEM OPERATOR COMMITMENT (2016 – 2020)
Year	**% Commitment**
2016	95
2017	97
2018	98
2019	98
2020	98

Source: API and AOPL Membership Survey.

GRAPH #5:	PIPELINE INCIDENTS INSIDE AND OUTSIDE OPERATOR PROPERTY (2016 – 2020)		
Year	**Outside Operator Property**	**Contained on Operator Property**	**Total Incidents**
2016	131	289	420
2017	117	295	415
2018	102	300	405
2019	87	292	383
2020	87	244	332
% Change from 2016	**-34%**	**-16%**	**-21%**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #6:	PIPELINE INCIDENTS INSIDE & OUTSIDE HCAS (2016 – 2020)		
Year	**Outside HCA**	**Inside HCA**	**Total Incidents**
2016	250	170	420
2017	238	177	415
2018	230	175	405
2019	218	165	383
2020	184	148	332
% Change from 2016	**-57%**	**-13%**	**-21%**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #7:	TOTAL INCIDENTS VS. IPE INCIDENTS (2016 – 2020)		
Year	**IPE Incidents**	**Non-IPE Incidents**	**Total Incidents**
2016	104	316	420
2017	88	327	415
2018	90	315	405
2019	75	308	383
2020	65	267	332
% Change from 2016	**-38%**	**-16%**	**-21%**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #8:	LIQUID PIPELINE INCIDENTS BY SIZE (2016 – 2020)				
Year	**≤ 5 Bbls**	**> 5 and ≤ 50 Bbls**	**> 50 and ≤ 500 Bbls**	**> 500 Bbls**	**Total Incidents**
2016	252	84	58	26	420
2017	248	100	42	25	415
2018	262	73	44	26	405
2019	244	81	40	18	383
2020	206	72	40	14	332
% Change from 2016	**-18%**	**-14%**	**-31%**	**-46%**	**-21%**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #9:	IPE INCIDENTS BY SIZE (2016-2020)				
Year	**≤ 5 Bbls**	**> 5 and ≤ 50 Bbls**	**> 50 and ≤ 500 Bbls**	**> 500 Bbls**	**Total Incidents**
2016	39	24	27	14	104
2017	31	24	22	11	88
2018	31	19	22	18	90
2019	27	21	14	13	75
2020	25	17	17	6	65
% Change from 2016	**-36%**	**-29%**	**-37%**	**-57%**	**-38%**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #10:	CRUDE OIL INCIDENTS BY SIZE (2016-2020)				
Year	**≤ 5 Bbls**	**> 5 and ≤ 50 Bbls**	**> 50 and ≤ 500 Bbls**	**> 500 Bbls**	**Total Incidents**
2016	120	41	35	8	204
2017	120	46	29	13	208
2018	148	42	19	12	221
2019	118	46	18	14	196
2020	99	42	20	4	165
% Change from 2016	**-18%**	**2%**	**-43%**	**-50%**	**-19%**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #11: ALL INCIDENTS BY COMMODITY (2016 – 2020)

Year	Crude Oil	Refined Products	Highly Volatile Liquids (HVLs)	CO_2	Biofuel/Ethanol	Total Incidents
2016	204	134	72	9	1	420
2017	208	122	76	9	0	415
2018	221	110	67	5	2	405
2019	196	117	66	4	0	383
2020	165	96	64	6	1	332
% Change from 2016	**-19%**	**-28%**	**-11%**	**-33%**	**0%**	**-21%**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #12: TOTAL IPE INCIDENTS BY COMMODITY (2016 – 2020)

Year	Crude Oil	Refined Products
2016	69	35
2017	54	34
2018	56	34
2019	50	25
2020	35	29
% Change from 2016	**-49%**	**-17%**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #13: PERCENT OF IPE BARRELS RELEASED BY COMMODITY (2016 – 2020)

Year	Crude Oil	Refined Products
2016	64%	36%
2017	56%	44%
2018	53%	47%
2019	71%	29%
2020	15%	85%
% Change from 2016	**-83%**	**67%**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #14: LIQUIDS PIPELINE INCIDENTS BY CAUSE (2016 – 2020)

Cause	Total Incidents	Percentage
Equipment Failures	940	48%
Corrosion Failures	354	18%
Incorrect Operations	316	16%
Material Pipe/Weld Failures	122	6%
Natural Force Incidents	82	4%
Excavation Incidents	68	3%
Outside Force Incidents	37	2%
Other Incident Causes	36	2%
Total	**1,955**	

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #15: TOTAL IPE INCIDENTS BY CAUSE (2016 – 2020)

Cause	Total Incidents	Percentage
Corrosion Failures	111	26%
Equipment Failures	106	25%
Incorrect Operations	59	14%
Excavation Incidents	50	12%
Material Pipe/Weld Failures	48	11%
Outside Force Incidents	19	5%
Natural Force Incidents	15	4%
Other Incident Causes	14	3%
Total	**422**	

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #16: PERCENT OF IPE BARRELS BY CAUSE (2016 – 2020)

Cause	Barrels Released	Percentage
Excavation Incidents	61,824	27%
Corrosion Failures	42,195	19%
Material Pipe/Weld Failures	29,070	13%
Natural Force Incidents	26,652	12%
Other Incident Causes	37,000	16%
Incorrect Operations	12,890	6%
Equipment Failures	11,394	5%
Outside Force Incidents	6,350	3%
Total	**227,376**	

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #17: MILES OF U.S. PIPELINE BY PRODUCTS (2015 – 2019)

	2015	2016	2017	2018	2019
Crude Oil	73,171	75,695	79,047	80,790	83,351
Petroleum Products	62,634	62,435	62,317	62,720	63,090
Natural Gas Liquids (NGLs)	67,667	68,849	68,887	70,306	72,446
CO_2/Ethanol	5,256	5,210	5,250	5,221	5,158
Total Miles	**208,728**	**212,189**	**215,502**	**219,038**	**224,045**

Source: Pipeline and Hazardous Materials Safety Administration, PHMSA Pipeline Safety as of March 2019.

GRAPH #18: BARRELS DELIVERED BY U.S. PIPELINE (2015 – 2019)

	2015	2016	2017	2018	2019
Crude Oil	10,563,693,124	10,760,706,300	11,382,453,374	13,245,357,486	13,937,983,692
Petroleum Products	7,335,091,475	7,774,085,019	10,189,745,566	8,558,867,781	8,856,466,147
Total Barrels	**17,898,784,599**	**18,534,791,319**	**21,572,198,940**	**21,804,225,267**	**22,794,449,839**

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 forms the basis of barrels released data and analysis in this report. PHMSA also requires operators to report intentional releases of natural gas liquids in gas form into the atmosphere during maintenance activities. 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 sent to manufacturers 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; or
Injury requiring in-patient hospitalization; or
Ignition; or
Explosion; or
Evacuation; or
Wildlife impact; or
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 2020.

API RECOMMEND 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.

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