THE SECRETARY OF TRANSPORTATION
WASHINGTON, DC 20590

July 20, 2017

The Honorable Rodney P. Frelinghuysen
Chairman
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

Enclosed is the U.S. Department of Transportation's Report on the Pipeline and Hazardous Materials Safety Administration's *(PHMSA) Incorporation of Real-time Monitoring of Flood Events to Address Challenges to Pipeline Safety,* as required by the Senate Committee Report 114-75, which requested PHMSA report on how real-time monitoring during flood events and pertinent data from other agencies such as the United States Geological Survey is being used to address challenges associated with preserving the integrity of pipeline infrastructure in riverine environments.

The *Results of Hazardous Liquid Accidents at Certain Inland Water Crossings Study*, submitted to Congress on August 27, 2013, concluded that PHMSA's existing legislative authority is adequate to address the risks of hazardous liquid pipeline failures at major river crossings. This 2013 report summarized hazardous liquid pipeline accidents at crossings of inland water bodies to determine if the depth of cover over the buried pipeline was a factor in any accidental release of hazardous liquids. Since the 2013 report to Congress, three additional accidents have occurred at river or creek crossings that were directly impacted or influenced by a flooding event.

The enclosed report expands upon the findings of the 2013 report by elaborating on measures PHMSA has to incorporate data from other governmental agencies and private entities. Furthermore, it not only addresses past releases in riverine environments but examines existing data, both static and real time, that can be used by the pipeline operator and PHMSA to quantify the risk to pipelines before a spill should occur.

Similar letters have been sent to the Ranking Member of the House Committee on Appropriations; the Chairman and Vice Chairman of the Senate Committee on Appropriations; the Chairman and Ranking Member of the House Subcommittee on Transportation, Housing and Urban Development, and Related Agencies; and the Chairman and Ranking Member of the Senate Subcommittee on Transportation, Housing and Urban Development, and Related Agencies.

Sincerely,

Elaine L. Chao

Enclosure

THE SECRETARY OF TRANSPORTATION
WASHINGTON, DC 20590

July 20, 2017

The Honorable Nita M. Lowey
Ranking Member
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Congresswoman Lowey:

Enclosed is the U.S. Department of Transportation's Report on the Pipeline and Hazardous Materials Safety Administration's *(PHMSA) Incorporation of Real-time Monitoring of Flood Events to Address Challenges to Pipeline Safety,* as required by the Senate Committee Report 114-75, which requested PHMSA report on how real-time monitoring during flood events and pertinent data from other agencies such as the United States Geological Survey is being used to address challenges associated with preserving the integrity of pipeline infrastructure in riverine environments.

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Similar letters have been sent to the Chairman of the House Committee on Appropriations; the Chairman and Vice Chairman of the Senate Committee on Appropriations; the Chairman and Ranking Member of the House Subcommittee on Transportation, Housing and Urban Development, and Related Agencies; and the Chairman and Ranking Member of the Senate Subcommittee on Transportation, Housing and Urban Development, and Related Agencies.

Sincerely,

Elaine L. Chao

Enclosure

THE SECRETARY OF TRANSPORTATION
WASHINGTON, DC 20590

July 20, 2017

The Honorable Thad Cochran
Chairman
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

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Sincerely,

Elaine L. Chao

Enclosure

THE SECRETARY OF TRANSPORTATION
WASHINGTON, DC 20590

July 20, 2017

The Honorable Patrick J. Leahy
Vice Chairman
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Senator Leahy:

Enclosed is the U.S. Department of Transportation's Report on the Pipeline and Hazardous Materials Safety Administration's *(PHMSA) Incorporation of Real-time Monitoring of Flood Events to Address Challenges to Pipeline Safety,* as required by the Senate Committee Report 114-75, which requested PHMSA report on how real-time monitoring during flood events and pertinent data from other agencies such as the United States Geological Survey is being used to address challenges associated with preserving the integrity of pipeline infrastructure in riverine environments.

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Sincerely,

Elaine L. Chao

Enclosure

THE SECRETARY OF TRANSPORTATION
WASHINGTON, DC 20590

July 20, 2017

The Honorable Mario Diaz-Balart
Chairman
Subcommittee on Transportation, Housing
and Urban Development and Related Agencies
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Congressman Diaz-Balart:

Enclosed is the U.S. Department of Transportation's Report on the Pipeline and Hazardous Materials Safety Administration's *(PHMSA) Incorporation of Real-time Monitoring of Flood Events to Address Challenges to Pipeline Safety,* as required by the Senate Committee Report 114-75, which requested PHMSA report on how real-time monitoring during flood events and pertinent data from other agencies such as the United States Geological Survey is being used to address challenges associated with preserving the integrity of pipeline infrastructure in riverine environments.

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Sincerely,

Elaine L. Chao

Enclosure

THE SECRETARY OF TRANSPORTATION
WASHINGTON, DC 20590

July 20, 2017

The Honorable David Price
Ranking Member
Subcommittee on Transportation, Housing
and Urban Development and Related Agencies
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Congressman Price:

Enclosed is the U.S. Department of Transportation's Report on the Pipeline and Hazardous Materials Safety Administration's *(PHMSA) Incorporation of Real-time Monitoring of Flood Events to Address Challenges to Pipeline Safety,* as required by the Senate Committee Report 114-75, which requested PHMSA report on how real-time monitoring during flood events and pertinent data from other agencies such as the United States Geological Survey is being used to address challenges associated with preserving the integrity of pipeline infrastructure in riverine environments.

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Sincerely,

Elaine L. Chao

Enclosure

THE SECRETARY OF TRANSPORTATION
WASHINGTON, DC 20590

July 20, 2017

The Honorable Susan Collins
Chairman
Subcommittee on Transportation, Housing
and Urban Development and Related Agencies
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Madam Chairman:

Enclosed is the U.S. Department of Transportation's Report on the Pipeline and Hazardous Materials Safety Administration's *(PHMSA) Incorporation of Real-time Monitoring of Flood Events to Address Challenges to Pipeline Safety,* as required by the Senate Committee Report 114-75, which requested PHMSA report on how real-time monitoring during flood events and pertinent data from other agencies such as the United States Geological Survey is being used to address challenges associated with preserving the integrity of pipeline infrastructure in riverine environments.

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Sincerely,

Elaine L. Chao

Enclosure

THE SECRETARY OF TRANSPORTATION
WASHINGTON, DC 20590

July 20, 2017

The Honorable Jack Reed
Ranking Member
Subcommittee on Transportation, Housing
and Urban Development and Related Agencies
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Congressman Reed:

Enclosed is the U.S. Department of Transportation's Report on the Pipeline and Hazardous Materials Safety Administration's *(PHMSA) Incorporation of Real-time Monitoring of Flood Events to Address Challenges to Pipeline Safety,* as required by the Senate Committee Report 114-75, which requested PHMSA report on how real-time monitoring during flood events and pertinent data from other agencies such as the United States Geological Survey is being used to address challenges associated with preserving the integrity of pipeline infrastructure in riverine environments.

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Sincerely,

Elaine L. Chao

Enclosure

REPORT TO CONGRESS

PHMSA's Incorporation of Real-time Monitoring of Flood Events to Address Challenges to Pipeline Safety

Report to Congress
Report on PHMSA's Incorporation of Real-time Monitoring of
Flood Events to Address Challenges to Pipeline Safety

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Appendices

A. Executive Summary

In Senate Committee Report 114-75, dated June 25, 2015, under *Title I: Department of Transportation*, the Committee requested the U.S. Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) to report on how real-time monitoring during flood events and pertinent data from other agencies such as the United States Geological Survey is being used to address challenges associated with preserving the integrity of pipeline infrastructure buried under river beds.

Riverine flooding is a known, significant threat to pipeline integrity, and PHMSA personnel continue to be proactive in identifying any existing data sources, both real-time and static, which may help identify or quantify risk to pipeline river crossings. One key data source is the United States Geological Survey (USGS). The USGS maintains a vast nationwide network of monitoring stations, which provide real-time data related to various aspects of riverine hydraulics – measured values of flow rate, velocities, water surface elevations, and numerous other parameters are made available to the public, private industry, and other government agencies. The USGS also provides an automatic notification service that generates an automatic alert when a user-defined parameter meets or exceeds a given threshold.

PHMSA personnel also regularly reference the National Oceanic and Atmospheric Administration's (NOAA) "Significant River Flood Outlook" geo-spatial data. NOAA's "river flood outlook" tool incorporates the National Weather Service's (NWS) precipitation forecasts to compute approximate floodplains based on known river hydraulics and/or topography. When overlaid and compared to National Pipeline Mapping System (NPMS) geo-spatial data, this computed "river flood outlook" helps generate a list of pipeline crossings potentially threatened by riverine flooding. The availability of such real-time data allows PHMSA personnel to establish direct contact with the affected operators to confirm situational awareness and that mitigative measures are in place to ensure safety of the pipeline infrastructure. Lines of communication are typically kept open until the threat subsides.

Aside from the above-referenced real-time data sources, PHMSA also uses many repositories for archived static data. The Federal Emergency Management Agency (FEMA) has developed flood maps and studies in support of the National Flood Insurance Program (NFIP). This data, while not real-time, is an invaluable resource for identifying the known, quantified risk for flooding sources captured by the nationwide studies. When coupled with real-time data from sources such as the USGS and NOAA, PHMSA personnel are kept continually updated as to the overall capabilities of a given flooding source. PHMSA also relies on soil data maintained by the National Resources Conservation Service to help identify areas prone to erosion.

The American Petroleum Institute's (API) Recommended Practice (RP) 1133, titled *Guidelines for Managing Hydrotechnical Hazards for Pipelines Located Onshore or Within Coastal Zone Areas*, is commonly referenced by industry as a standard for addressing and responding to riverine and flooding hazards. PHMSA personnel regularly reference this recommended practice when a risk, active or latent, is identified. Effective understanding of the RP has facilitated interaction with operators, with a shared, mutual interest in preserving the integrity and safety of at-risk pipelines. It should be noted that, at the time of this Report, API's RP 1133 is being revised to incorporate findings and lessons learned since the original document was produced. The forthcoming updated RP will reference additional best practices, and will include updated recommendations for incorporation of real-time data and monitoring. Upon review of the revisions and updates to the guidelines, PHMSA leadership has committed to consideration

of the RP for *Incorporation by Reference* into the relevant sections of the CFR (. i.e. §195.260(e) and §195.452(i)).

B. Background

In Senate Committee Report 114-75, the Committee directs PHMSA to report on how real-time monitoring during flood events and pertinent data from other agencies such as the United States Geological Survey is being used to address challenges associated with preserving the integrity of pipeline infrastructure buried under river beds, with a due date to Congress set as September 30, 2016.

As noted by the Committee, a report from PHMSA, titled *Results of Hazardous Liquid Accidents at Certain Inland Water Crossings Study*, was submitted to Congress on August 27, 2013. This report summarized hazardous liquid pipeline accidents at crossings of inland water bodies to determine if the depth of cover over the buried pipeline was a factor in any accidental release of hazardous liquids. The report concluded that depletion of cover, sometimes in the waterway and other times in new channels cut by floodwaters, had been a factor in at least 16 accidents reported to PHMSA from 1991 through late 2012. The study found that only 0.3 percent of all reported hazardous liquid accidents and 0.5 percent of significant hazardous liquid incidents between 1991 and October 2012 had depletion of cover at a major water crossing as a contributing factor in the accidents. PHMSA concluded that its existing legislative authority is adequate to address the risks of hazardous liquid pipeline failures at major river crossings. Since the 2013 report, three additional accidents have occurred at river or creek crossings that were directly impacted or influenced by a flooding event.

This report is intended to expand upon the findings of the 2013 report by elaborating on measures taken by PHMSA to incorporate data from other governmental agencies and private entities. Furthermore, this report expanded its scope to not only address past releases in riverine environments but to examine existing data – both static and real time – that can be used by the pipeline operator and PHMSA to quantify the risk to pipelines before a spill should occur.

C. Extent of Hazardous Liquid Pipeline Crossings of Inland Bodies of Water

The National Pipeline Mapping System (NPMS) dataset was used to identify the number of hazardous liquid pipelines that cross inland bodies of water. PHMSA is unaware of a Geographic Information System (GIS) dataset that provides inland water body width from high water mark to high water mark.

Metadata for the NPMS information does not specify river flow levels for the width data. Therefore, PHMSA created the most accurate water body dataset practicable by combining the 2011 hydroline and hydropoly datasets from the National Transportation Atlas Database (NTAD). When water features appeared in both datasets, PHMSA removed the duplicates before counting the pipeline crossings.

After combining the NPMS hazardous liquid pipeline dataset and the water body dataset, PHMSA determined that hazardous liquid pipelines currently cross inland bodies of water at 18,136 locations. Furthermore, the water body has a width greater than or equal to 100 feet at 5,110 locations.

D. Accidents from 2010 to April 2016

Hazardous liquid pipeline operators are required to submit to PHMSA Hazardous Liquid Pipeline Systems Accident reports (Form F 7000-1) upon the discovery of an accident. 49 CFR § 195.54. The

criteria that trigger the Form F 7000-1 reporting are set forth at 49 CFR § 195.50.[1] PHMSA substantially improved the data collection effort in 2010 by revising Form F 7000-1. The revised form collects detailed information on the location and operating condition of the pipeline where the accident occurred, including whether the accident occurred in a crossing and the type of the crossing (bridge, railroad, water). Since 2010, (data as of 4/30/2016), PHMSA received 2,450 onshore hazardous liquid accident reports. These accidents resulted in the unintentional discharge of about 513,000 barrels of hazardous liquid,7 fatalities, and 15 injuries. Equipment failure was reported as the most prevalent apparent cause (1,090 out of 2,450, or approximately 45 percent) of these onshore hazardous liquid accidents, while accidents caused by natural forces such as floods and hurricanes were reported only in 4 percent of the reports. *Chart 1 - Hazardous Liquid Accidents Reported by Cause – 2010 to Present*, presented in Appendix I, depicts the above data in graphical form.

Only 18 of these 2,450 reports, or 0.7 percent, indicated that the accident occurred in a water crossing. Searches of accident-related narratives including, but not limited to 30-day reports, U.S. Coast Guard's National Response Center (NRC) & DOT's Crisis Management Center (CMC) reports, and internal Failure Investigation Reports, as well as reviews of geospatial information available through accident reports and NPMS data identified 26 accidents where a release affected or was near a river or pipeline river crossing. These 26 accidents resulted in an estimated unintentional release of 26,922 barrels of hazardous liquid, or 5.2% of all unintentionally-released barrels during this time period. A single accident in 2010 attributed to operator error (coupled with material failure) in Marshall, Michigan, accounted for approximately 20,082 barrels of hazardous liquid, or 75 percent of the total volume spilled. There were no deaths or injuries arising from these 26 accidents. Of these 26 releases, 8 were identified as having been directly impacted or influenced by a flooding event. While this data captures pipeline accidents from 2010 to April 2016, it overlaps with the 2013 report, which captured accidents occurring through late 2012. For reference, "corrosion" was reported as the leading cause of these accidents, followed by "natural force damage," and "material failure of pipe or weld." Chart 2, titled *Reported Cause of Hazardous Liquid Accidents Near a River or Crossing – 2010 to Present,* included in Appendix I, shows the causes of accidents reported in these 26 reports in graphical form.

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[1] 49 C.F.R. § 195.50 states:

> **"§ 195.50. Reporting accidents.**
> An accident report is required for each failure in a pipeline system subject to this part in which there is a release of the hazardous liquid or carbon dioxide transported resulting in any of the following:
> (a) Explosion or fire not intentionally set by the operator.
> (b) Release of 5 gallons (19 liters) or more of hazardous liquid or carbon dioxide, except that no report is required for a release of less than 5 barrels (0.8 cubic meters) resulting from a pipeline maintenance activity if the release is:
> (1) Not otherwise reportable under this section;
> (2) Not one described in §195.52(a)(4);
> (3) Confined to company property or pipeline right-of-way; and
> (4) Cleaned up promptly;
> (c) Death of any person;
> (d) Personal injury necessitating hospitalization;
> (e) Estimated property damage, including cost of clean-up and recovery, value of lost product, and damage to the property of the operator or others, or both, exceeding $50,000."

PHMSA further categorized the 26 identified accidents using a color code as follows. For geographic reference, Figure 1 in Appendix II, titled *Hazardous Liquid Pipeline Accidents at River Crossings – 2010 to Present*, presents a map of the above-referenced 26 accidents.

Red – Accidents that occurred at a river or creek that were directly impacted or influenced by a flooding event. This also includes accidents that occurred in a large river pipeline crossing. The only exception in this group is an accident that occurred in Marshall, Michigan, by Enbridge, which was not caused as a direct result or influenced by flooding. The large volume released caused significant impact to the Kalamazoo River.

Orange – Accidents that occurred at a river or creek that were not influenced by a flooding event where a portion of the hazardous liquid reached water. This also includes accidents that had releases of less than 1 barrel of hazardous liquid.

Yellow – Accidents that occurred in the proximity of a river or creek where mitigating responses involved activities in or near a river or creek.

As illustrated by the accident history, only 4 percent of all hazardous liquid reports submitted since 2010 showed natural force damage as the apparent cause of the failure. However, as a precaution, during flood events, PHMSA regional offices generally communicate with pipeline operators to establish situational awareness when a state of emergency is issued.

E. Pipeline Safety Advisory Bulletins

Since the 2013 report, PHMSA has published three Advisory Bulletins (ADBs) in the Federal Register related to pipeline crossings of inland water bodies, as follows:

- PHMSA Advisory Bulletin ADB-2016-01, 81 Fed. Reg. 2,943 (Jan. 19, 2016)

Issued to remind all owners and operators of gas and hazardous liquid pipelines of the potential for damage to pipeline facilities caused by severe flooding, and described actions that operators should consider taking to ensure the integrity of pipelines in the event of flooding, river scour, and river channel migration.

- PHMSA Advisory Bulletin ADB-2015-01, 80 Fed. Reg. 19,114 (April 9, 2015)

Issued to pipeline operators to communicate the potential for damage to pipeline facilities caused by severe flooding. This bulletin included actions that operators should consider taking to ensure the integrity of pipelines in the event of flooding, river scour, and river channel migration. This bulletin significantly expanded the advice given to operators on what data should be considered when determining the unique integrity risks posed to their pipelines depending on their existing installation methods, local geology, surrounding topography, and river characteristics.

- PHMSA Advisory Bulletin ADB – 2013-02, 78 Fed. Reg. 41,991 (July 12, 2013)

Issued to communicate the potential for damage to pipeline facilities caused by severe flooding. This bulletin included actions that operators should consider taking to ensure the integrity of pipelines in case of flooding.

The following ADBs were captured in PHMSA's above-referenced 2013 report:

- PHMSA Advisory Bulletin ADB-11-04, 76 Fed. Reg. 44,985 (July 27, 2011)

Advises operators to direct resources to determine the potential effects to their pipeline systems, perform frequent patrols to evaluate right-of-way conditions at water crossings during flooding and after flooding subsidies, determine if flooding has exposed or undermined pipelines as a result of flooding, and perform surveys to determine the depth of cover.

- RSPA Advisory Bulletin ADB-94-05, 59 Fed. Reg. 55,152 (Nov. 3, 1994)

Advises operators to evaluate rights-of-way condition at water crossings affected by flooding and perform surveys to determine the depth of cover and identify exposed pipelines.

- RSPA Advisory Bulletin ADB-93-03, 58 FR 41,321 (Aug. 3, 1993)

Advises operators to perform frequent patrols to evaluate right-of-way conditions at water crossings during flooding and perform surveys to determine depth of cover.

The complete text of these Advisory Bulletins is shown in Appendix III.

F. Real-Time Monitoring Efforts

The USGS maintains a network of stream gauges and monitors, as well as historic records related to such monitoring. The gauges record many different parameters, including (but not limited to) stream velocity, flow rate, and water surface elevation. Data is typically recorded at 15- to 60-minute intervals, stored onsite (i.e. stored in the internal memory/logger of the monitoring device), and then transmitted to USGS offices every 1 to 4 hours. The collected data, both real-time and historic, is archived and made available to the public. A component of this service is the USGS' automated data access services. Users can sign up for automatic notification when a parameter of interest meets or exceeds a defined threshold in relatively real-time. PHMSA personnel regularly reference this data, both archival and through the USGS' automated data services, and maintain awareness of potential threats to known pipeline crossings. The data is factored in to operator-specific inspection plans as a driver for known risks to address with the operator. The data is also readily available in real-time should river conditions rise to, or exceed, the predetermined alert settings.

PHMSA personnel also regularly reference NOAA's "significant river flood outlook" geo-spatial data. During times of heightened risk of flooding, known seasonal patterns or isolated storms, PHMSA can access the NOAA data to determine which operators, if any, need to be contacted. By over-laying the computed NOAA flood outlook geo-spatial data with the NPMS geo-spatial data, PHMSA is able to export a list of pipelines potentially affected by flooding reference it for operator outreach. Regional personnel establish direct contact with the affected operators to ensure situational awareness and mitigative measures are in place to ensure safety of the pipeline infrastructure. The pipeline operators provide status updates to PHMSA regional offices until the potential threat subsides. Figure 2, titled *Example of NPMS Pipelines Included in NOAA Flooding Outlook - April 17, 2013*, included in Appendix II, shows an example of how PHMSA utilizes geo-spatial information collected through its NPMS along with NOAA flood outlook to monitor safety of the pipelines during a wide spread flooding event and alert operators, if necessary.

Furthermore, while not specific to monitoring of riverine threats, affected PHMSA Regions maintain a live database of pipeline systems potentially impacted by hurricanes. NOAA continually monitors, tracks, and predicts hurricane paths as they develop, and the agency makes this data available on its website. By overlaying and comparing the regularly updated projected paths of known storms to the

NPMS data, PHMSA personnel are able to identify potentially affected systems and initiate operator outreach. As a hurricane or major storm's path is confirmed, ongoing communication with any affected operators is maintained, which allows for PHMSA to keep abreast of any known or anticipated system-specific threats.

G. Coordination & Cooperation With Industry

Through various inspection and integrity management activities and after multiple distinct and discreet releases (presented in Figure 1 of Appendix II), PHMSA determined that pipeline operators have regularly underestimated the dynamic nature of riverine flooding sources and have not adequately captured the risk associated with such threats. Based on deficiencies identified through both routine inspection activities, as well as accident response, PHMSA Western Region (WR) made efforts in 2011 to better assess the flooding risks to pipelines within its region. The purpose of these efforts was to assess the susceptibility of existing pipeline crossings to threats related to flooding and riverine dynamics. PHMSA also considered methods that operators were using to conduct real-time monitoring and to respond to flooding events relative to our regulations and advisory bulletins. In these evaluations, PHMSA considered the following information:

1. Pipeline depth of cover surveys performed on major water crossings since 2011/2012. "Major water crossings" are considered to be those greater than 100 feet wide from high-water mark to high-water mark (as related to §195.260(e)).

2. Mainline valve locations at each major water crossing, including type of valve and actuation method.

3. Worst case discharge amounts, considering a complete "guillotine" rupture, at each major water crossing. These amounts included assumptions regarding pump shutdown times and the time needed to isolate the nearest valves to the river.

4. Identification of potential or actual integrity threats to the major water crossings, based on the pipeline installation method; current depth of cover; potential for erosion, scour, or channel migration; and possibility of external force damage, e.g., ice flows, debris.

5. Consideration of the need, timing, and type (including lateral extent) of remedial actions at the major water crossings where integrity threats were identified in item 4. The continuous depth of cover survey at each crossing and USGS stream flow data was considered relative to the remedial action.

6. Remedial actions taken this year to address previously identified erosion, scour, or flood-related issues affecting the major water crossings.

7. Procedures on how companies monitor their stream crossings during flood events, and what actions they will take to minimize the possibility and magnitude of any release during a flood.

Through its efforts, PHMSA learned that some operators are choosing to perform horizontal directional drills (HDD) to help ensure that a pipeline is deep enough as to not be affected by flooding, and some are performing real-time monitoring of the rivers. Since 2011, operators have installed 18 HDD crossings in Montana, 3 in Idaho, 17 in Colorado, and 13 in Wyoming. This may be attributable, in large part, to

PHMSA's proactive efforts to make operators aware of the threats to their pipelines and to encourage them to proactively reduce risk.

As an example of PHMSA's cooperation with industry, PHMSA WR has worked continually with pipeline operators to develop proactive monitoring and mitigation procedures for their water body crossings. For example, one operator's program revolves around a continual "Assess – Mitigate Risk – Monitor- Adjust" cycle. Operator personnel and external technical experts assess each crossing, develop and execute mitigation plans, monitor the performance of the mitigated solutions and the status of existing acceptable crossings, and adjust the future plan as needed. Ongoing data sharing continues to benefit both PHMSA and industry, as new and innovative approaches to pipeline safety are identified through multiple parties approaching pipeline safety from different frames of reference but with a common goal.

Further, PHMSA personnel maintain familiarity with API RP 1133, titled *Guidelines for Managing Hydrotechnical Hazards for Pipelines Located Onshore or Within Coastal Zone Areas*, and regularly reference the guideline when discussing the riverine and flooding threats with affected operators. As this RP is considered one of the industry-standard references for addressing "hydrotechnical hazards" to pipelines, understanding of the recommended preventative and mitigative efforts included in the RP has facilitated interaction with operators. At the time of this Report, RP 1133 is under revision, with significant expansion expected, based on best practices and lessons learned since the initial drafting. Upon review of the revisions and updates to the guidelines, PHMSA leadership has committed to consideration of the RP for *Incorporation by Reference* into the relevant sections of the CFR (. i.e. §195.260(e) and §195.452(i)).

H. Updated Enforcement Guidance Used by PHMSA Inspectors

PHMSA has implemented new inspection guidance that directs inspectors to consider the operator's actions to evaluate, address, and if needed, enhance pipeline river crossings. Specifically, that guidance focuses on the preventative and mitigative measures required by 195.452(i) and our advisory bulletins. This revised guidance has been incorporated into our inspection tools. An excerpt of that guidance is attached in Appendix IV.

I. Limitations of Indirect Pipeline Monitoring Techniques and Promising Direct Monitoring Techniques

The dynamic nature of fluvial geomorphology presents challenges to accurately predict the channel avulsion, channel degradation, pipeline exposure, and/or scour during flood events. While real-time riverine flooding data is available, pipeline operators are generally limited to predictive and risk-based measures, rather than true real-time monitoring of the actual physical conditions at the point of their pipeline crossing. Indirect and periodic monitoring, worst-case scour modeling, and similar theoretical analyses are all non-empirical – such predictive methods cannot alert the operator to conditions at pipeline crossings in real-time.

Real-time monitoring techniques are generally limited to *monitoring* the stage/velocity at a USGS gage station at or near a pipeline river crossing. Based on the known (or historically demonstrated) hydraulic behavior of a flooding source, real-time monitoring of available data allows an operator to establish a risk-based system and take action as necessary. Such responsive actions typically include, but are not limited to, increased patrol and shutting down/shutting in the pipeline in order to minimize the potential volumetric release. Real-time information such as USGS gage data can help an operator understand the

potential *risk* to a pipeline crossing at a given time. Such information, however, is not based on direct monitoring of the pipeline itself – the risk is inferred. The gages cannot measure the direct effects of a 5-, 10-, 25-, or 100-year flood event on a pipeline, but merely provides relative indication that a pipeline in the vicinity of a USGS gage is at a higher risk due to a flood event.

Several promising real-time survey techniques are currently in the early stages of technological development/testing by a few pipeline operators to monitor the actual physical conditions along a pipeline in real-time. One such technology is the smart hydrophone or acoustic leak detector. Acoustic leak detectors have been widely used in water distribution systems to detect for water line leaks, but their applications to larger-scale, hazardous material pipelines are more recently being explored. The hydrophone "listens" through a medium such as water or the soil for unique acoustic signature and pressure waveform indicative of a leak. The hydrophone can also be mounted directly on the pipe made of various materials or on its components. Such devices can be equipped with a remote logger and a transmitter to transmit the acoustic/waveform data offsite in real-time.

Other real-time monitoring technologies being explored are accelerometers and automated remotely operated towed vehicles (ROTVs). Accelerometers monitor for vibration outside of an established baseline – data loggers and transmitters could potentially alert pipeline operators on the pipe surface to detect for leaks or exposure. Any exposure of the pipeline to vibration outside of an established baseline (i.e. a span of pipe not previously exposed to riverine currents reporting a new vibration pattern) could theoretically be reported real-time. ROTVs are an evolution of existing sonar technology that allows for automated operation and steering along the pipeline in the water. ROTVs could be deployed on an on-demand basis at select crossings by an operator to measure depth of cover of a pipeline at a water crossing in real-time using sonar reflections from the pipeline and the riverbed. These newer technologies are being explored, but are still in their nascent stages. Their applicability in flood conditions would be a significant variable.

PHMSA personnel have a specific, vested interest in ensuring and improving public and environmental safety. As such, PHMSA will continue to promote further research of real-time monitoring techniques at various R&D fora since burgeoning technologies have promising potential to aid in its mission.

J. Conclusions

PHMSA's incorporation of real-time monitoring of threats related to flooding is proactive and continually evolving. PHMSA's commitment to pipeline safety, specific to the threats from riverine flooding, has helped serve as the driver for the agency to stay abreast of existing information available across other federal agencies and opportunities for improvement. PHMSA encourages operators of hazardous liquid pipelines to develop and implement proactive, real-time monitoring of hazardous liquid pipeline river crossings before and during a flood event to take proper mitigative measures should the pipeline be breached and product released. In support of this, PHMSA has committed to promote research and development through the agency's R&D program and related R&D fora.

One continuing challenge to further addressing this issue is incomplete regulatory specifications on proactive measures for riverine flooding and pipeline crossings. Finally, PHMSA has enforcement mechanisms such as Corrective Action Orders (CAOs) and Safety Orders (SOs), which allow PHMSA to suspend or restrict a pipeline facility until the pipeline operator complies with situation-specific requirements. Given a specific threat, PHMSA can use such enforcement tools to require pipeline operators to develop and implement proactive real-time monitoring measures at river crossings.

PROGRAM DESCRIPTION

The Office of Pipeline Safety [OPS] is designed to promote the safe, reliable, and sound transportation of natural gas and hazardous liquids through the Nation's 2.6 million miles of privately owned and operated pipelines.

COMMITTEE RECOMMENDATION

The Pipeline Safety Office has the important responsibility of ensuring the safety and integrity of the pipelines that run through every community in our Nation. Efforts by Congress and the OPS to invest in promising safety technologies, increase civil penalties, and educate communities about the potential risks of pipelines have resulted in a reduction in serious pipeline incidents. It is essential that the agency continue to make strides in protecting communities from pipeline failures and incidents. To that end, the Committee recommends an appropriation of $146,623,000 for the Office of Pipeline Safety. The amount is $623,000 more than the fiscal year 2015 enacted level and $28,481,000 less than the budget request. Of the funding provided, $19,500,000 shall be derived from the Oil Spill Liability Trust Fund and $127,123,000 shall be derived from the Pipeline Safety Fund.

The Committee's recommended level of funding, in addition to unused funding in the current fiscal year, fully funds the additional staff previously provided for the Pipeline Safety Reform initiative. The Committee's recommendation provides no additional funding for National Pipeline Information Exchange. The Committee provided a substantial increase for State Pipeline Safety Grants [SPSG] in fiscal year 2015 and is concerned about the ability of States to provide the 20 percent match required to access these funds. The Committee directs PHMSA to include in future budget justifications an analysis of the ability of States to obligate the funding for SPSG within the 3-year period of availability of these funds. Of the funds recommended for research and development up to $2,000,000 shall be used for the Pipeline Safety Research Competitive Academic Agreement Program [CAAP] to focus on near-term solutions, such as advanced sensor technologies and coating technologies, to improve the safety and reliability of the Nation's pipeline transportation system.

Pipeline Safety User Fee Allocation.—The pipeline safety program is largely funded through user fees on natural gas transmission pipelines, jurisdictional hazardous liquid pipelines, and liquefied natural gas terminal operators. Recent authorizations have increased the responsibilities for PHMSA and the States with respect to the safety of our Nation's pipelines. Given this change in scope of the pipeline safety program, the Committee directs PHMSA to review the user fee collection process to determine if it should be modified to more equitably allocate the cost of the pipeline safety program across the industry segments covered by Federal and State oversight. PHMSA shall submit a report to both the House and Senate Committees on Appropriations within 60 days of enactment of this act, that summarizes the agency's statutory authority to revise the fee structure, its assessment of the current fee structure, and any recommendations for changes to the fee structure

that should be considered by Congress it considers reauthorization of PHMSA.

Pipeline Safety at River Crossings.—The Committee recognizes the importance of protecting the integrity of pipelines at river crossings. River crossings present unique challenges to preserving pipeline infrastructure buried under a river bed. Fast-moving water and erosion can change the characteristics of rivers rapidly, exposing these pipelines and making them more susceptible to rupture. The Committee recognizes that PHMSA has recently studied this issue. Given the importance of safeguarding our waterways, the Committee directs the Department to report on how real-time monitoring during flood events and pertinent data from other agencies such as the United States Geological Survey is being used to address challenges associated with the dynamic and unique nature of rivers and flood plains.

EMERGENCY PREPAREDNESS GRANTS

(EMERGENCY PREPAREDNESS FUND)

Appropriations, 2015	$28,318,000
Budget estimate, 2016	28,318,000
House allowance	28,318,000
Committee recommendation	28,318,000

PROGRAM DESCRIPTION

The Hazardous Materials Transportation Uniform Safety Act of 1990 [HMTUSA] requires PHMSA to (1) develop and implement a reimbursable emergency preparedness grant program; (2) monitor public sector emergency response training and planning, and provide technical assistance to States, political subdivisions, and Indian tribes; and (3) develop and periodically update a mandatory training curriculum for emergency responders.

COMMITTEE RECOMMENDATION

The Committee recommends $28,318,000 and an equal obligation limitation for the emergency preparedness grant program. The recommendation continues to provide PHMSA the authority to use prior year carryover and recaptures for the development of a Web-based hazardous materials response training curriculum for emergency responders, including response activities for crude oil, ethanol and other flammable liquids by rail. The training curriculum shall be developed in coordination with the FRA and be consistent with National Fire Protection Association standards. The Committee encourages PHMSA to complete its work and make the Web-based curriculum available to local emergency responders as expeditiously as possible. Prior years' carry over may also be used to train public sector emergency response personnel in communities on or near rail lines that transport a significant volume of high-risk energy commodities or toxic inhalation hazards. The Committee continues a provision increasing the administrative costs available from 2 percent to 4 percent and directs the agency to address the OIG's recommendations.