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AMERICAN FUEL & PETROCHEMICAL MANUFACTURERS' COMMENTS ON THE PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION'S NOTICE AND REQUEST FOR COMMENT "GAS AND HAZARDOUS LIQUID PIPELINE RISK MODELS" DOCKET NO. PHMSA–2018–0050 83 FED. REG. 40843

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October 17, 2018

I. INTRODUCTION

The American Fuel & Petrochemical Manufacturers ("AFPM") welcomes the opportunity to comment on the Pipeline and Hazardous Materials Safety Administration's ("PHMSA") notice and request for comment entitled, "Gas and Hazardous Liquid Pipeline Risk Models" (the "Notice").[1] On August 16, 2018, PHMSA issued this Notice soliciting public comment on a report developed to support improvements in gas and hazardous liquid pipeline risk models titled "Pipeline Risk Modeling—Overview of Methods and Tools for Improved Implementation" ("Pipeline Risk Modeling Report").[2]

Pipeline risk models are a foundational part of the assessment of operational pipeline risk. Federal pipeline safety integrity management ("IM") regulations require pipeline operators to use risk assessments.[3] Based on the results of pipeline inspections and failure investigations, both PHMSA and the National Transportation Safety Board ("NTSB") have identified general weaknesses in the risk models often used by pipeline operators in performing risk assessments for their IM programs. The Pipeline Risk Modeling Report considers the major types of pipeline risk models, and the effectiveness of each type in supporting risk assessments, as applied to pipeline operator decisions.

Petroleum and petrochemical pipeline infrastructure include approximately 207,000 miles of mostly underground interstate and intrastate pipelines that carry crude oil, natural gas liquids (NGLs), and petroleum products.[4] Operators of these pipelines are required by PHMSA to develop and implement IM programs to ensure the integrity of their pipelines in populated areas (defined as High Consequence Areas or "HCAs") to reduce the risk of injuries and property damage from pipeline failures. An operator's IM program is a management system designed and implemented by pipeline operators to ensure their pipeline system is safe and reliable. An IM program consists of multiple components, including procedures and processes for identifying HCAs, determining likely threats to the pipeline within the HCA, evaluating the physical integrity of the pipe within the HCA, and repairing or remediating any pipeline defects found. These procedures and processes are complex and interconnected. Effective implementation of an IM program relies on ongoing evaluation and data integration. The IM program itself is periodically inspected by PHMSA and/or state regulatory agencies to ensure compliance with regulatory requirements.

On January 27, 2015, the NTSB adopted its safety study, "Integrity Management of Gas Transmission Pipelines in High Consequence Areas." The NTSB undertook this study because of concerns about deficiencies in the operators' integrity management programs and the oversight of these programs by PHMSA and state regulators. These concerns also were identified

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[1] *See* 83 Fed. Reg. 40843 "Gas and Hazardous Liquid Pipeline Risk Models" Notice and Request for Comment, Docket No. PHMSA–2018–0050, published August 16, 2018, https://www.gpo.gov/fdsys/pkg/FR-2018-08-16/pdf/2018-17659.pdf.

[2] *See* Pipeline Risk Modeling Overview of Methods and Tools for Improved Implementation Draft 1, published May 9, 2018, https://www.regulations.gov/document?D=PHMSA-2018-0050-0001.

[3] *See* 49 Code of Federal Regulations Part 192, Subpart O https://www.law.cornell.edu/cfr/text/49/part-192/subpart-O and 49 CFR Part 195.452 https://www.law.cornell.edu/cfr/text/49/part-195/subpart-F.

[4] *See* American Fuel & Petrochemical Manufacturers, "The Fuel and Petrochemical Supply Chains" page 5-6, published July 2018, https://www.afpm.org/infrastructure-report/.

in three gas transmission pipeline accident investigations conducted by the NTSB in the previous five years. The NTSB study used both quantitative and qualitative approaches. Data analysis was combined with insights on industry practices and inspectors' experiences obtained through interviews and discussions with pipeline operators, state and federal inspectors, industry associations, and other stakeholders.

Both PHMSA and the NTSB have identified a need to address the risk models used by pipeline operators in performing risk assessments for their IM programs and provide guidance where appropriate. This notice is part of PHMSA's effort to address the three recommendations to PHMSA in risk management.[5]

II. AFPM'S INTEREST IN PHMSA'S NOTICE

AFPM is a national trade association representing virtually all U.S. refining and petrochemical manufacturing capacity. AFPM's member companies produce the gasoline, diesel, and jet fuel that drive the modern economy, as well as the chemical building blocks that are used to make the millions of products that make modern life possible–from clothing to life-saving medical equipment and smartphones. As such, AFPM members strengthen economic and national security while supporting more than 3 million jobs nationwide. AFPM member companies also are leaders in human safety and environmental responsibility.

To produce these essential goods, AFPM members depend on all modes of transportation to move their products to and from refineries and petrochemical facilities and have made significant infrastructure investments to support and improve the safety and efficiency of the transportation system. AFPM member companies depend upon an uninterrupted, affordable supply of crude oil and natural gas as feedstocks for the transportation fuels and petrochemicals they manufacture. Pipelines are the primary mode for transporting crude oil and natural gas to refiners and petrochemical facilities and refined products from those same facilities to distribution terminals serving consumer markets. Pipelines provide a safe, reliable, efficient and cost-effective way to move bulk liquids, particularly over long distances. AFPM member companies own, operate, and rely on pipeline transportation as part of their daily operations.

Pipelines move millions of barrels of crude oil, refined products and NGLs each

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[5] **NTSB Recommendation P-15-10**: PHMSA should update guidance for gas transmission pipeline operators and inspectors on the evaluation of interactive threats, including the listing of all threat interactions that must be evaluated and acceptable methods to be used. Issued February 2, 2015. https://ntsb.gov/safety/safety-recs/_layouts/ntsb.recsearch/Recommendation.aspx?Rec=P-15-010.
NTSB Safety Recommendation P-15-12: PHMSA should evaluate the safety benefits of the four risk assessment approaches currently allowed by the gas integrity management regulations; determine whether they produce a comparable safety benefit; and disseminate the results of your evaluation to the pipeline industry, inspectors, and the public. Issued February 2, 2015. https://ntsb.gov/safety/safety-recs/_layouts/ntsb.recsearch/Recommendation.aspx?Rec=P-15-012.
NTSB Recommendation P-15-13: PHMSA should update guidance for gas transmission pipeline operators and inspectors on critical components of risk assessment approaches, including (1) methods for setting weighting factors, (2) factors that should be included in consequence of failure calculations, and (3) appropriate risk metrics and methods for aggregating risk along a pipeline. Issued February 2, 2015. https://ntsb.gov/safety/safety-recs/_layouts/ntsb.recsearch/Recommendation.aspx?Rec=P-15-013.

day. According to PHMSA, there are 76,000 miles of crude oil pipelines, 69,000 miles of NGL pipelines and 62,000 miles of refined product pipelines in operation in the United States. As U.S. oil and gas production has increased, thousands of miles of new pipeline have been added. According to PHMSA data from 2010 to 2016, crude oil and NGL pipeline mileage increased by more than 25 percent.[6] In 2016, U.S. refineries received 10.2 million barrels per day of crude oil via pipeline, an increase in refinery pipeline receipts of more than 30 percent since 2010.[7]

AFPM members are committed to protecting the health and safety of their workers, contractors, customers, and the communities where fuels and petrochemical products are transported. A regulatory scheme that fosters the safe movement of essential products on our nation's transportation system is critical. AFPM supports informed, risk-based, and cost-justified regulations related to pipelines, and is committed to working with PHMSA on this issue.

III. AFPM'S COMMENTS ON PHMSA'S NOTICE

AFPM appreciates PHMSA taking this step and the opportunity to provide feedback on pipeline risk models. Pipeline risk models are a foundational part of the assessment of operational pipeline risk, and this request for comment has the potential to impact federal pipeline safety IM regulations. Overall, AFPM believes the Pipeline Risk Modeling Report is a good review of the current state of the pipeline risk assessment and will prove to be useful tool for pipeline operators to evaluate their Risk Assessment programs. That said, AFPM provides some specific comments below.

A. PHMSA's Risk Assessment Approach Should Remain Performance Based, not Prescriptive

PHMSA has long endorsed the "performance based" methodology for assessing pipeline risks rather than prescriptive approaches. In 2017, PHMSA sponsored a National Academy of Sciences report supporting PHMSA's continued reliance on performance-based standards.[8] PHMSA's stated rationale is that individual operators are best placed to identify and manage risks that may be unknown to regulators or other industry participants. Performance-based regulations and standards are the often the best means to improve safety where a command and control one size fits all approach is inappropriate.[9] Although PHMSA's May 9th report continues to ostensibly ascribe to performance-based standards, it clearly favors two out of the four possible risk assessment models it discusses (more on this below). We think that the Report's

[6] *See* PHMSA, Pipeline Mileage and Facilities, accessed October 2, 2018, https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-mileage-and-facilities.
[7] *See* U.S. Energy Information Agency, Refinery Receipts of Crude Oil by Method of Transportation Pipeline Mileage and Facilities, accessed October 2, 2018, https://www.eia.gov/dnav/pet/pet_pnp_caprec_dcu_nus_a.htm.
[8] *See* Transportation Research Board, Special Report 325, "Safely Transportation Hazardous Liquids and Gases in a Changing U.S. Energy Landscape," Committee for a Study of Domestic Transportation of Petroleum, Natural Gas, and Ethanol, https://doi.org/10.17226/24923.
[9] *See* National Academies of Sciences, Engineering, and Medicine. 2018. Designing Safety Regulations for High-Hazard Industries. Washington, DC: The National Academies Press. https://doi.org/10.17226/24907

implied disapproval of the two other risk assessment methods may represent a problematic move towards prescriptive rulemaking.

B. The Report Erroneously Rejects Two Valuable Risk Assessment Models

Despite intermittent language qualifying its conclusions, in our view the Report comes close to completely rejecting the "Qualitative" and "Relative/Index Model" approaches to risk modeling, at least for large operators.[10]

> *"In general, application of Qualitative and Relative/Index models is invalid for applications where the degree of difference between different scenarios, options, etc., or the risk as compared to a quantitative risk criterion is important in addition to simply knowing a relatively higher or lower risk."*

The Qualitative and Relative/Index models are both currently used extensively in industry and they remain very useful. By calling these techniques "invalid," PHMSA appears to be rejecting common, and currently permissible, approaches to risk modeling. AFPM members know from experience that these modeling techniques can be extremely important and useful for generating preliminary data that would be inadequate to populate the more complex models favored by the Report. In our view, the Report prematurely discards these models by failing to assess the benefits they provide.

C. The Report Makes Simplistic Assumptions Regarding Data Quality

Just as the Report too easily dismisses the "Qualitative" and "Relative/Index Model," it too readily embraces the "Quantitative" and "Probabilistic" models based on overly optimistic assumptions about data quality. While the Report recognizes that pipelines often lack full data, it assumes that the missing data can be fabricated using generic or default average values. However, operator experience shows that in some cases generic or default average values are incorrect.

The Quantitative and Probabilistic approaches do not always allow such real-life experience to be substituted. For example, a common approach to unknown data used in the Relative /Index model, is to use a worst-case scenario (as an overly conservative estimate), which has the benefit of inherently flagging data deficiencies in the risk model database and generating risk results that can drive operational measures that address the data deficiency. The Report's recommendations, if fully implemented, may eliminate that flexibility.

D. Probabilistic Models May Lack Validation

Quantitative model output quality is dependent upon data input quality. In other words, Quantitative and Probabilistic models are sometimes impractical but also less accurate when

[10] *See* Pipeline and Hazardous Materials Safety Administration, "Pipeline Risk Modeling Overview of Methods and Tools for Improved Implementation," pg. 25, accessed October 10, 2018, https://www.regulations.gov/document?D=PHMSA-2018-0050-0001.

basic input variables are unknown or inaccurate. Currently, at least some unknown and inaccurate input data is the norm for most operators.

This is the problem with the Report's supposition that operators can "readily" convert existing Qualitative and Relative/Index models to the preferred Quantitative and Probabilistic models.[11] It is true that most operators already have some data in their current models that could in fact be imported into different models. But the power of a quantitative or probabilistic model depends on how accurately it predicts reality. The challenge is not populating a model with a number of independent variables, but instead how well the dependent variables it produces correspond to reality. It is easy to create a mathematical model that says risk A is twice as likely as risk B. But it much harder to make a model that confidently demonstrates that relationship.

E. The Report Limits Experience-Based Weighting

In our view, the Report does not adequately value one of the key components of a good risk assessment model—namely, the ability to use experience-based or judgment-based weighting factors to differentiate risk-model results and effectively model real-world experience. An operator can use weighting factors to refine risk results by eliminating irrelevant or common model inputs (for instance, in situations where all product types or all pipe grades are the same those constants would not need to be evaluated).

Similarly, an operator can effectively increase or decrease weighting factors to emphasize or deemphasize model inputs that the operator knows from experience are more or less prevalent on a given system. Industry experience has repeatedly demonstrated that Relative/Index models—which include judgment-based weighting methodologies—can lead to efficient and informed risk-based decision-making.

F. Frequency of Update Requirements Are Well Beyond the Scope of Current Regulations

Our final major concern with the Report is its apparent endorsement of a more continuous validation and improvement cycle, which goes far beyond what PHMSA's regulations require.[12] For example, the Report says that "[t]he IM regulations also require operators to continuously improve their IM programs," Report, p.19, but the actual regulation for liquids pipelines cited in the appendix requires a "periodic" evaluation "as frequently as needed to assure pipeline integrity," id. p.105. And Figure III-2 on p.28 tells a similar story. The "evergreen" approach the Report suggests may prove to be unworkable in practice, where risk models need to drive specific decisions and cannot continuously be revisited and reanalyzed.

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[11] *See* Pipeline and Hazardous Materials Safety Administration, "Pipeline Risk Modeling Overview of Methods and Tools for Improved Implementation," pg. 27, accessed October 10, 2018, https://www.regulations.gov/document?D=PHMSA-2018-0050-0001.

[12] *See* 49 Code of Federal Regulations Part 192, Subpart O https://www.law.cornell.edu/cfr/text/49/part-192/subpart-O and 49 CFR Part 195.452 https://www.law.cornell.edu/cfr/text/49/part-195/subpart-F.

IV. CONCLUSION

AFPM thanks PHMSA for its time and consideration of our comments related to improvements in gas and hazardous liquid pipeline risk models. AFPM acknowledges the need for robust analyses of impacts that IM programs provide. Collecting additional safety-related data for natural gas and hazardous liquid pipelines is essential to informing policy decisions. We encourage PHMSA to work with industry on accomplishing this goal prior to implementing the rules in the absence of appropriate safety data on the subject. AFPM shares PHMSA's goal of increasing pipeline safety and we look forward to the opportunity to work together on this. Please contact me at (202) 457-0480 or rbenedict@afpm.org if you wish to discuss these issues further.

Sincerely,

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