SAFETY ALERT

NTSB National Transportation Safety Board

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AVIATION HIGHWAY MARINE RAILROAD PIPELINE

Pipeline Safety Management Systems: Vital for the Safe Operation of Pipelines

The problem

- The National Transportation Safety Board (NTSB) has found that pipeline safety would be enhanced if companies implemented Pipeline Safety Management Systems (PSMS).
- Although PSMS have been adopted by operators representing 85 percent of industry pipeline mileage, many operators, particularly smaller operators, have not yet adopted PSMS.[1]
- The pipeline industry continues to have accidents that could have been prevented or the consequences more effectively mitigated had risks been more thoroughly identified and addressed.
- Without full commitment from the pipeline industry to implement and mature PSMS, pipeline accidents will continue to occur and the industry will not be able to meet their goal of zero accidents, fatalities, and serious injuries.

Related accidents

Between 2010 and 2021, the NTSB investigated four accidents that demonstrated how pipeline safety would be enhanced if companies implement a PSMS. With a PSMS, operators will be better positioned to evaluate their systems and respond efficiently because they will have reduced the possibility of accidents and employees will be better prepared to respond if an accident occurs.

- Marshall, Michigan: On July 25, 2010, a 30-inch-diameter pipeline ruptured and released more than 840,000 gallons of crude oil into nearby wetlands and a creek. The rupture was not discovered or addressed for over 17 hours. Had a PSMS been in place, the company would have been better able to identify training shortfalls and implemented programs that would have prepared personnel to identify the rupture and remediate it sooner.
- San Bruno, California: On September 9, 2010, due to a weld flaw, a 30-inch-diameter natural gas transmission pipeline ruptured in a residential area, killing 8 people, injuring many others, and destroying 38 homes. Had a PSMS been in place, the operator could have detected and remediated the weld flaw and prevented the rupture. Further, the company's emergency response time was excessively long, contributing to the overall severity of losses and costs of repair. With a

[1] Pipeline Safety Management Systems Industry Team, *2022 Pipeline SMS Annual Report*, (Washington, DC: American Petroleum Institute, 2023).

PSMS, the company could have identified opportunities to improve emergency response training and procedures and, consequently, reduce response times and losses.

- Merrimack Valley, Massachusetts: On September 13, 2018, high-pressure natural gas was released into a low-pressure natural gas distribution system, resulting in a series of structure fires and explosions, damaging over 130 structures in three municipalities. The natural gas distribution system was owned by a company that initiated implementation of a PSMS in 2015, with the intention of having all the primary elements in place by 2019. Had the owner had a fully implemented PSMS, it could have identified and corrected its risk management process deficiencies and prevented this accident by adequately planning, reviewing, sequencing, and overseeing the construction project that caused it. Risk management is a required element of PSMS.
- Huntington Beach, California: On October 1, 2021, San Pedro Bay Pipeline controllers received the first of a series of leak detection system alarms for a 588-barrel crude oil release on their underwater pipeline due to a previous anchor strike. The operator's response included 14 hours of troubleshooting before shutting down operations for the last time. A PSMS could have ensured employees were properly trained on prompt and effective emergency response and reduced the overall consequences caused by the leak.

As a result of the Marshall and San Bruno accidents, we issued Safety Recommendation P-12-17, asking the American Petroleum Institute (API) to facilitate the development of a PSMS that could be adopted by its members. The recommendation was classified Closed—Exceeds Recommended Action after API published Recommended Practice (RP) 1173, which provides a framework for PSMS designed specifically for pipeline operators. As a result of the Huntington Beach accident, we issued Safety Recommendation P-24-2, asking the Pipeline and Hazardous Materials Safety Administration (PHMSA) to issue an advisory bulletin to all PHMSA-regulated pipeline owners and operators to promote the benefits of PSMS. The recommendation is currently classified Open—Acceptable Response.

What can pipeline operators do?

- **Implement a robust PSMS as described in API RP 1173.** API RP 1173 *Pipeline Safety Management System Requirements* provides guidance for operators to establish a system to continuously track and improve safety.[2]
- **For those who have incorporated PSMS into their practices, continue to improve operations and training.** Pipeline operators with PSMS cannot be complacent. One of the hallmarks of a good PSMS is that it continuously evolves and improves safety programs.
- **Support revisions to API RP 1173 and other guidance as it is developed to include small operators and contractors in their efforts to establish a PSMS.** According to the *2022 Pipeline SMS Annual Report*, "Last year also featured important initiatives to support small operator and contractor implementation of RP 1173 along their journey of continuous improvement and the combined vision of One Industry, One Team, One Mission, Pipeline Safety."[3]

[2] American National Standards Institute/American Petroleum Institute *Recommended Practice 1173, Pipeline Safety Management System Requirements*, First edition, July 2015.

[3] Pipeline Safety Management Systems Industry Team, *2022 Pipeline SMS Annual Report*, (Washington, DC: American Petroleum Institute, 2023).

- **With a PSMS, operators can ensure pipelines are designed, constructed, operated, and maintained in a way that complies with more than the minimum safety standards found in regulations.** Experience has shown that using a PSMS can be effective and result in significant reductions of serious pipeline accidents each year.[4]

Interested in more information?

More thorough guidance for the implementation and continuous improvement of PSMS can be found in:

- API RP 1173, which discusses the requirements of PSMS programs.
- The PSMS Industry Team's *2022 Pipeline SMS Annual Report*, which provides recent data on PSMS implementation.
- The PSMS Industry Team's website provides tools that may assist operators.

NTSB Safety Alerts can be accessed from the Safety Alerts page at www.ntsb.gov. For additional information on the NTSB investigations in this alert, access the public docket using the investigation numbers (NTSB Accident ID) cited above. Use the CAROL Query to search NTSB safety recommendations and investigations.

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[4] Pipeline and Hazardous Materials Safety Administration, *Pipeline Incident 20 Year Trends*, updated November 15, 2022.