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DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

[Docket No. PHMSA-2015-0283]

Pipeline Safety: Potential for Damage to Pipeline Facilities Caused by Flooding, River Scour, and River Channel Migration

AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA); DOT.

ACTION: Notice; Issuance of Advisory Bulletin.

SUMMARY: PHMSA is issuing this advisory bulletin 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 actions that operators should consider taking to ensure the integrity of pipelines in the event of flooding, river scour, and river channel migration.

FOR FURTHER INFORMATION CONTACT: Operators of pipelines subject to regulation by PHMSA should contact the appropriate PHMSA Region Office. The PHMSA Region Offices and their contact information are as follows:

- Central Region: 816-329-3800
  Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin
- Eastern Region: 609-989-2171
  Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia
- Southern Region: 404-832-1147
  Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, Puerto Rico, South Carolina, and Tennessee

- Southwest Region: 713-272-2859
  Arkansas, Louisiana, New Mexico, Oklahoma, and Texas

- Western Region: 720-963-3160
  Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming

Intrastate pipeline operators should contact the appropriate state pipeline safety authority. A list of state pipeline safety authorities is provided at: www.napsr.org

SUPPLEMENTARY INFORMATION:

I. Background

Section 192.613(a) of the Pipeline Safety Regulations (49 CFR Parts 190-199) states that ''[e]ach operator shall have a procedure for continuing surveillance of its facilities to determine and take appropriate action concerning changes in class location, failures, leakage history, corrosion, substantial changes in cathodic protection requirements, and other unusual operating and maintenance conditions.'' Section 192.613(b) further states that ''[i]f a segment of pipeline is determined to be in unsatisfactory condition but no immediate hazard exists, the operator shall initiate a program to recondition or phase out the segment involved, or, if the segment cannot be reconditioned or phased out, reduce the maximum allowable operating pressure in accordance with § 192.619(a) and (b).''

Likewise, § 195.401(b)(1) of the Pipeline Safety Regulations states that ''[w]henever an operator discovers any condition that could adversely affect the safe operation of its pipeline system, it

must correct the condition within a reasonable time. However, if the condition is of such a nature that it presents an immediate hazard to persons or property, the operator may not operate the affected part of the system until it has corrected the unsafe condition.'' Section 195.401(b)(2) further states that ''[w]hen an operator discovers a condition on a pipeline covered under [the integrity management requirements in] § 195.452, the operator must correct the condition as prescribed in § 195.452(h).'' Severe flooding, river scour, and river channel migration are the types of unusual operating conditions that can adversely affect the safe operation of a pipeline and require corrective action under §§ 192.613(a) and 195.401(b).

In addition, Part 194 requires operators of onshore oil pipelines to "include procedures and a list of resources for responding, to the maximum extent practicable, to a worst case discharge and to a substantial threat of such a discharge" under § 194.107(a). Per § 194.115, the operator must "identify, and ensure, by contract or other approved means, the resources necessary to remove, to the maximum extent practicable, a worst case discharge and to mitigate or prevent a substantial threat of a worst case discharge".

Furthermore, an operator must take additional preventative and mitigative measures beyond those already required in Parts 192, 194, and 195 to prevent a pipeline failure and to mitigate the consequences of a pipeline failure per §§ 192.935, 194.107(a) and 195.452(i). An operator must base the additional measures on the threats the operator has identified for each pipeline segment. If an operator determines outside force damage (e.g., earth movement, floods) is a threat to the pipeline, the operator must take steps to minimize the probability of damage and the consequences of a release.

PHMSA has released five Advisory Bulletins on this subject, with the earliest issued July 29, 1993, (ADB-93-03), and the most recent on July 27, 2011, (ADB-11-04; 76 FR 44985). Each of these bulletins followed an event that involved severe flooding that affected pipelines in the areas of rising waters. Four of the more notable events are briefly described below:

On August 13, 2011, Enterprise Products Operating, LLC discovered a release of 28,350 gallons (675 barrels) of natural gasoline in the Missouri River in Iowa. The rupture, according to the metallurgical report, was the result of fatigue crack growth driven by vibrations in the pipe from vortex shedding.

On July 1, 2011, ExxonMobil Pipeline Company experienced a pipeline failure near Laurel, Montana, resulting in the release of 63,000 gallons (1,500 barrels) of crude oil into the Yellowstone River. According to the results of PHMSA's accident investigation, the rupture was caused by channel migration and river bottom scour, leaving a large span of the pipeline exposed to prolonged current forces and debris washing downstream in the river. Those external forces damaged the exposed pipeline.

On July 15, 2011, NuStar Pipeline Operating Partnership, L.P. reported a 4,200 gallon (100 barrels) anhydrous ammonia spill in the Missouri River in Nebraska requiring extensive environmental response and causing supply disruption. The 6-inch-diameter pipeline was exposed by scouring during extreme flooding.

On January 17, 2015, a breach in the Bridger Pipeline Company's Poplar system resulted in another spill into the Yellowstone River near the town of Glendive, Montana, releasing an

estimated 28,434 gallons (677 barrels) of crude oil into the river and impacting local water supplies. Preliminary information indicates over 100 feet of pipeline was exposed on the river bottom, and a release point was near a girth weld.

As shown in these events, river bottom scour and channel migration may occur due to seasonal flooding, increased stream velocities, and man-made and natural river bank restrictions. River scour and channel migration may damage a pipeline as a result of additional stresses imposed on the pipe by undermining underlying support soils, exposing the pipeline to lateral water forces and impact from waterborne debris. Lateral water forces may cause excessive bending loads that lead to pipeline failures, and possible impact forces from debris in the river or harmonic vibrations from water rapidly passing over pipelines can also increase the potential for pipeline failures.

Additionally, the safety of valves, regulators, relief sets, pressure sensors, and other facilities normally above ground or above water can be jeopardized when covered by water. Not only can these facilities become inoperable when submerged, but they are also at a greater risk of damage by outside forces, floating debris, river currents, and craft operating on the water. Boaters involved in rescue operations, emergency support functions, sightseeing, and other activities are generally not aware of the seriousness of an incident that could result from their craft damaging a pipeline facility that is unseen beneath the surface of the water. Depending on the size of the craft and the pipeline facility struck, significant pipeline damage may result.

Although accidents at river crossings account for less than one percent of the total number of pipeline accidents, the consequences of a release in water can be much more severe because of

the threats to drinking water supplies and the environment. Unlike hazardous liquid releases on land where it can be easier to respond to and contain spills, swift-moving river currents will carry hazardous liquids further downstream, potentially impacting much larger geographical areas and more communities. Product releases in rivers can create difficult, costly, and lengthy spill response and remediation scenarios and activities for operators, communities, and local, state, and federal responders.

II. Advisory Bulletin (ADB-2016-01)

To: Owners and Operators of Gas and Hazardous Liquid Pipeline Systems.

Subject: Potential for Damage to Pipeline Facilities Caused by Severe Flooding.

Advisory: Severe flooding can adversely affect the safe operation of a pipeline. Operators need to direct their resources in a manner that will enable them to determine and mitigate the potential effects of flooding on their pipeline systems in accordance with applicable regulations. Operators are urged to take the following actions to prevent and mitigate damage to pipeline facilities and ensure public and environmental safety in areas affected by flooding:

1. Utilize experts in river flow, such as hydrologists or fluvial geomorphologists, to evaluate a river's potential for scour or channel migration at each pipeline river crossing.
2. Evaluate each pipeline crossing a river to determine the pipeline's installation method and determine if that method (and the pipeline's current condition) is sufficient to withstand the risks posed by anticipated flood conditions, river scour, or river channel migration. In areas prone to these conditions and risks, consider installing pipelines using horizontal directional drilling to help place pipelines below elevations of maximum scour and outside the limits of lateral channel migration.

3. Determine the maximum flow or flooding conditions at rivers where pipeline integrity is at risk in the event of flooding (e.g., where scour can occur) and have contingency plans to shut down and isolate those pipelines when those conditions occur.
4. Evaluate the accessibility of pipeline facilities and components that may be in jeopardy, such as valve settings, which are needed to isolate water crossings or other sections of pipelines.
5. Extend regulator vents and relief stacks above the level of anticipated flooding as appropriate.
6. Coordinate with emergency and spill responders on pipeline locations, crossing conditions, and the commodities transported. Provide maps and other relevant information to such responders so they can develop appropriate response strategies.
7. Coordinate with other pipeline operators in flood areas and establish emergency response centers to act as a liaison for pipeline problems and solutions.
8. Deploy personnel so that they will be in position to shut down, isolate, contain, or perform any other emergency action on an affected pipeline.
9. Determine if facilities that are normally above ground (e.g., valves, regulators, relief sets, etc.) have become submerged and are in danger of being struck by vessels or debris and, if possible, mark such facilities with U.S. Coast Guard approval and an appropriate buoy.
10. Perform frequent patrols, including appropriate overflights, to evaluate right-of-way conditions at water crossings during flooding and after waters subside. Report any flooding, either localized or systemic, to integrity staff to determine if pipeline crossings may have been damaged or would be in imminent jeopardy from future flooding.
11. Have open communications with local and state officials to address their concerns regarding observed pipeline exposures, localized flooding, ice dams, debris dams, and extensive bank erosion that may affect the integrity of pipeline crossings.
12. Following floods, and when safe river access is first available, determine if flooding has exposed or undermined pipelines because of new river channel profiles. This is best done by a depth of cover survey.
13. Where appropriate, surveys of underwater pipe should include the use of visual inspection by divers or instrumented detection. Pipelines in recently flooded lands adjacent to rivers should also be evaluated to determine the remaining depth of cover.

You should share information gathered by these surveys with affected landowners. Agricultural agencies may help to inform farmers of potential hazards from reduced cover over pipelines.

14. Ensure that line markers are still in place or are replaced in a timely manner. Notify contractors, highway departments, and others involved in post-flood restoration activities of the presence of pipelines and the risks posed by reduced cover.

If a pipeline has suffered damage or is shut-in as a precautionary measure due to flooding, the operator should advise the appropriate PHMSA regional office or state pipeline safety authority before returning the line to service, increasing its operating pressure, or otherwise changing its operating status. Furthermore, reporting a Safety-Related Condition as prescribed in §§ 191.23 and 195.55 may also be required.

Issued in Washington, DC on January 12, 2016, under authority delegated in 49 CFR 1.97.

Alan K. Mayberry,

Deputy Associate Administrator for Policy and Programs.

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