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DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

[Docket No. PHMSA-2019-0047]

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:

- Eastern Region: 609-771-7800
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

- Central Region: 816-329-3800
Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin
- 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 available at www.napsr.org.

SUPPLEMENTARY INFORMATION:

I. Background

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 the Federal pipeline safety regulations.

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) states that “[w]hen 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).”

Operators should be aware that severe flooding, river scour, and river channel migration may create unusual operating conditions that can adversely affect the safe operation of a pipeline, and may require corrective action under §§ 192.613(a) and (b) and 195.401(b).

In addition, § 194.107(a) requires operators of onshore oil pipelines to create response plans that “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.” Section 194.115 further states that “[e]ach operator shall 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, §§ 192.935, 194.107, and 195.452(i) require an operator to take additional preventative and mitigative measures to prevent a pipeline failure and to mitigate the consequences of a pipeline failure. 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 under these regulations.

In December of 2017, the American Petroleum Institute (API) issued the second edition of Recommended Practice (RP) 1133, “Managing Hydrotechnical Hazards for Pipelines Located Onshore or Within Coastal Areas.” This RP applies to new and existing hydrocarbon pipelines that transport gas and hazardous liquids. It is intended to apply to onshore waterways and coastal zones that may be susceptible to hydro technical hazards. The RP provides guidelines and recommendations for identifying, assessing and managing risks to pipeline integrity associated with these hazards through the life-cycle of a pipeline.

PHMSA has released several advisory bulletins on this subject, with the earliest issued July 29, 1993, (ADB-93-03), and the most recent on January 19, 2016, (ADB-16-01; 81 FR 2944). These advisory bulletins are consistent with API RP 1133. Each of these advisory bulletins followed an event that involved severe flooding that affected pipelines in the areas of rising or fast moving waters. As shown in these events, river bottom scour, channel migration, and some cases soil subsidence, 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. Soil subsidence, particularly in variable, steep, and rugged terrain, can pose a threat to the integrity of a pipeline if those threats are not mitigated. 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-2019-01)

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 should 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 suggested 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. Ensure that pipeline controllers are aware of which pipeline sections are experiencing flooding or high flow conditions, and are familiar with the contingency plans to safely and quickly shut down and isolate the affected sections.
5. 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.
6. Extend regulator vents and relief stacks above the level of anticipated flooding as appropriate.
7. 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.
8. Coordinate with other pipeline operators in flood areas and establish emergency response centers to act as a liaison for pipeline problems and solutions.
9. Deploy personnel so that they will be in position to shut down, isolate, contain, or perform any other emergency action on an affected pipeline.
10. 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.
11. 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.
12. 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.
 13. Following flooding, 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.
 14. 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.
 15. 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 April 5, 2019, under authority delegated in 49 CFR 1.97.

Alan K. Mayberry,

Associate Administrator for Pipeline Safety.

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