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DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

[Docket No. PHMSA-2016-0065]

Pipeline Safety: High Consequence Area Identification Methods for Gas Transmission

Pipelines

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

ACTION: Notice; Issuance of Advisory Bulletin

SUMMARY: PHMSA is issuing this advisory bulletin to remind gas transmission pipeline operators of certain previously issued guidance and provide operators with additional guidance for the identification of High Consequence Areas (HCAs) along pipeline right-of-ways. This advisory bulletin provides suggestions for accurately mapping and integrating HCA data, documenting how mapping systems are used, periodically verifying and updating their mapping systems, utilizing buffer zones (tolerances) to provide additional protection around the calculated potential impact radius (PIR) along their pipelines, and ensuring the accuracy of class locations. The bulletin emphasizes that HCA identification relies on pipeline-specific information regarding the location, size, and operating characteristics of the line, as well as the identification of structures, specified sites, and their intended usage along the pipeline right-of-way.

FOR FURTHER INFORMATION CONTACT: Allan Beshore by phone at 405-834-8344 or email at allan.beshore@dot.gov. All materials in this docket may be accessed electronically at <http://www.regulations.gov>. Information about PHMSA may be found at <http://www.phmsa.dot.gov>.

SUPPLEMENTARY INFORMATION:

I. Background

A key component of PHMSA's pipeline safety regulations is its integrity management (IM) program. For gas transmission pipelines, this program is outlined in Subpart O of 49 CFR Part 192 and is based on the concept that pipeline operators need to identify those segments of their pipeline systems that pose the greatest risk to human life, property, and the environment, and to take extra precautions to ensure their safety. These higher-risk areas are known as "HCAs." Each operator is required to survey its entire pipeline system to identify all pipeline segments that could affect HCAs. Since the greatest risk posed by gas transmission pipelines is the risk of fire and explosion resulting from pipeline leaks and ruptures, gas HCAs consist of highly populated areas and "identified sites" where people regularly gather or live.

An operator's first step in developing a robust IM program is to properly identify and map all HCAs and perform periodic updates to the evaluation process to maintain accurate and current information. Subpart O of Part 192 allows operators flexibility in making determinations to identify HCAs by defining two different identification methods, generally referred to as Method 1 or Method 2.

Both methods require the operator to determine "identified sites" and calculate a PIR, using a formula to calculate the radius of a circle within which the potential failure of a pipeline could have significant impact on people or property. While Method 1 includes all pipe segments

within Class 3 and Class 4 locations¹ and “identified areas within a PIR in Class 1 and 2 locations,” Method 2 includes “identified sites”² within a PIR only, regardless of the class location, or the combination of “identified sites” with 20 or more buildings intended for human occupancy.

A review of PHMSA and state data from “first-round” IM inspections indicates a large percentage of intrastate and small operators have been inconsistent in determining HCAs using “identified sites,” and operators that initially used Method 1 to identify HCAs have since transitioned to Method 2.

On July 17, 2003, (68 FR 42458) PHMSA published an advisory bulletin titled “Identified Sites as Part of High Consequence Areas for Gas Integrity Management Programs” to provide guidance to gas transmission operators on the steps PHMSA expected them to take to determine “identified sites” along their pipelines. PHMSA intended the guidance in the advisory bulletin to support operators in identifying these sites for planning their IM programs and determined that certain measures, if properly applied, would satisfy the intent of the regulation.

¹ Under 49 CFR § 192.5, all transmission pipelines fall into one of four “class locations.” Class 1 locations are offshore areas and all segments (“class location units”) one mile in length that contain 10 or fewer buildings intended for human occupancy. Class 2 locations are units with more than 10, but fewer than 46, such buildings. Class 3 locations are units with 46 or more buildings or an area where the pipeline lies within 100 yards of either a building or a small, well-defined outside area (such as a playground or recreation area) that is occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12-month period. Class 4 locations are units where buildings with 4 or more stories are prevalent.

² “Identified sites” is a defined term under 49 CFR § 192.903 in PHMSA’s IM regulations and refers generally to the type of specific areas included under the Class 3 location definition above, plus facilities occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate, including schools, prisons, nursing homes, etc.

On December 15, 2003, (68 FR 69778) PHMSA published a final rule titled: “Pipeline Integrity Management in High Consequence Areas (Gas Transmission Pipelines)” that provided requirements for the identification of HCAs and further explanation of how best to conduct the identification process.

In the preamble of the rule, PHMSA provided the basis for defining an identified site as follows:

Define an identified site as any of the following within a Potential Impact Circle:

- 1. A facility housing persons of limited mobility that is known to public safety officials, emergency response officials, or local emergency planning committee, and which meets one of the following three criteria: (a) is visibly marked, (b) is licensed or registered by a Federal, state, or local agency, or (c) is listed on a map maintained by or available from a Federal, State, or local agency, or*
- 2. An outdoor area where people congregate that is known to public safety officials, emergency response officials or local emergency planning committee and which is occupied by 20 or more people on at least 50 days per year, or*
- 3. A building occupied by 20 or more people 5 days per week, 10 weeks in any 12-month period (the days and weeks need not be consecutive).*

To assist operators in meeting the requirements of the regulation, PHMSA introduced a “buffer zone” concept. This additional safety margin was intended to compensate for inaccuracies (e.g., incorrect pipeline center data or mapping errors) when implementing the regulation and determining the PIR. As defined in § 192.903, a PIR is the radius of the potential impact circle (PIC), measured in feet surrounding the point of failure, within which the potential failure of a

pipeline could have significant impact on people or property. Part 192 provides the formula for determining a PIR that takes into account the Maximum Allowable Operating Pressure (MAOP) in the pipeline segment in pounds per square inch, the nominal diameter of the pipeline in inches, and a numeric factor, which varies for other gases depending upon their heat of combustion.³

Following the publication of the regulations and advisory bulletin, PHMSA inspections have revealed that operators may need further guidance regarding the identification of HCAs, as operators have been inconsistent in determining HCAs using “identified sites.”

Additionally, in CY 2015, the National Transportation Safety Board (NTSB) published SS-15-01, “Safety Study: Integrity Management of Gas Transmission Pipelines in High Consequence Areas.” The study was conducted in response to concerns about deficiencies in operators’ IM programs that had been identified by the NTSB in three gas transmission pipeline accidents from the previous 5 years. Recommendation P-15-06, issued as a part of the study, recommended that PHMSA “[a]ssess the limitations associated with the current process for identifying high consequence areas, and disseminate the results of [the] assessment to the pipeline industry, inspectors, and the public.” PHMSA has noted that proper identification of an HCA and periodic verification relies on two key types of information: (1) pipeline-specific information that includes the accurate location of the centerline of the pipeline, the nominal diameter of the pipeline, and the pipeline segment’s MAOP; and (2) all the structures and their usage (including occupancy) located along the pipeline. PHMSA subject matter experts performed an assessment

³ Operators transporting gas other than natural gas must use section 3.2 of ASME/ANSI B31.8S (incorporated by reference, see § 192.7) to calculate the impact radius formula. For flammable gases, additional information on factors may be found in TTO-13, Potential Impact Radius Formulae for Flammable Gases Other Than Natural Gas Subject to 49 CFR 192, June 2005, Table 7.1 which can be found in http://primis.phmsa.dot.gov/gasimp/docs/TTO13_PotentialImpactRadius_FinalReport_June2005.pdf).

of the impact of these two issues on identifying HCAs using Methods 1 and 2 as defined in § 192.903, by reviewing failure investigations, inspector experiences, and Gas IM inspection results and has documented these insights in this advisory bulletin. PHMSA will be including these insights in updated inspection materials, as appropriate.

PHMSA is publishing this advisory bulletin to meet NTSB Recommendation P-15-06 by providing operators with additional guidance on how to improve the accuracy of their class location identification process, which may also lead to operators improving HCA identification.

II. Advisory Bulletin (ADB-2016-07)

To: Owners and Operators of Natural Gas Pipelines

Subject: High Consequence Area Identification Methods

Advisory: PHMSA is issuing this advisory bulletin to inform owners and operators of gas transmission pipelines that PHMSA has developed guidance on the identification and periodic verification of HCAs, including the application of a buffer zone to the PIR, and information regarding the accuracy of class locations. PHMSA is recommending that operators review and consistently monitor class location and PIR data on an annual basis as part of their IM program. PHMSA anticipates this annual review will improve the accuracy of operator HCA determinations.

A review of early PHMSA inspections has shown that many operators (28%) did not have procedures to adequately describe how to identify HCAs, using Method 1 or Method 2. To effectively use Method 2, operators should have a detailed and documented process in place to

monitor the conditions surrounding their pipelines, including the existence of “identified sites.” Therefore, PHMSA is reminding operators of the existing guidance for making those determinations and is providing additional recommendations on how to improve the accuracy of HCA identification. Specifically:

- PHMSA expects that most large operators will use a geographic information system or similar mapping software for segment identification. Operators should be able to demonstrate the usability of their system and show a graphical overlay of HCAs with their pipeline system.
- An operator not using geographic information system or similar mapping software should describe or demonstrate how it performed its HCA segment identifications.
- For both geographic information system-based and non-geographic information system-based HCA identification processes, the operator should address how it will deal with tolerances (or buffers) on top of the calculated PIR regarding the accuracy of measured distances to structures and the location of the pipeline centerline. PHMSA recognizes that global positioning system measurements and maps have some limitations in their accuracy; however, the rule applies to pipelines—and distances from those pipelines—as they actually exist in the field.

PHMSA also reminds operators of the need to continually improve the accuracy of their pipeline data. As technology advances, pipeline operators have more access to tools that provide improved accuracy for determining class locations (including the determination of the centerline of the pipeline), the application of aerial photography, pipeline operating characteristics (diameter, grade, MAOP), population studies, and mapping software. It is important that

operators continuously improve the accuracy of the data and conduct the required class location studies as required in § 192.609, along with the confirmation or revision of MAOP in § 192.611, as this affects the operation of their pipelines. Operators should include provisions in their continuing surveillance monitoring procedures (§ 192.613) to constantly monitor the surrounding conditions, report that information, and update their maps each calendar year. This is similar to the requirements for including newly identified areas for segments in HCAs (§ 192.905(c)) and for filing annual report information relating to the performance of IM plans (§ 191.17).

Operators must use MAOP when calculating PIR, and accurate pipeline data is necessary to ensure that operators are correctly applying the MAOP value in the PIR calculation when determining whether areas qualify as HCAs. PHMSA also recommends that operators review their pipeline centerline and map data to account for any potential inaccuracies or data limitations and to add an appropriate buffer zone to the calculated PIR. This would establish a PIR that includes any areas that could potentially be excluded due to data limitations.

A list of PHMSA-provided frequently asked questions on this subject can be found on the gas IM site at: <https://primis.phmsa.dot.gov/gasimp/index.htm>. Gas IM Frequently Asked Question Number 174 reminds operators that they should consider the uncertainties in the distances they measure or infer when evaluating PICs and consider geographic information system accuracy in locating HCAs:

“...Operators may use a combination of techniques in order to account for these inaccuracies. For instance, aerial photography may be used as an initial screen. Field measurements (such as pipeline locators along with chainage measurements or survey quality range finders) may be used to verify if structures near the edge of the PIC (i.e.,

within the range of mapping/geographic information system inaccuracies) are actually inside or outside the PIC. PHMSA will inspect each operator's approach to assure that the operator's process is adequate to identify all covered segments.”

PHMSA recommends operators frequently and consistently review their data—including class location data—for potential inaccuracies or limitations, and add a buffer zone to the calculated PIR to help ensure proper HCA identification. The purpose and usage of buildings, open structures, and outside areas can shift over time, changing the number of “identified sites” in a PIR, and therefore, whether an area is an HCA. PHMSA believes that if operators review class location and PIR data on an annual basis as a part of their IM programs, the accuracy of HCA determinations will be greatly improved.

Issued in Washington, DC, on December 8, 2016, under authority delegated in 49 CFR 1.97.

Alan K. Mayberry,

Acting Associate Administrator for Pipeline Safety.

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