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DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

[Docket No. PHMSA-2014-0040]

Pipeline Safety: Guidance for Pipeline Flow Reversals, Product Changes and Conversion to Service

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

ACTION: Notice; Issuance of Advisory Bulletin

SUMMARY: PHMSA is issuing this advisory bulletin to alert operators of hazardous liquid and gas transmission pipelines of the potential significant impact flow reversals, product changes and conversion to service may have on the integrity of a pipeline. Failures on natural gas transmission and hazardous liquid pipelines have occurred after these operational changes. This advisory bulletin describes specific notification requirements and general operating and maintenance (O&M) and integrity management actions regarding flow reversals, product changes and conversion to service. This advisory bulletin also recommends additional actions operators should take when these operational changes are made including the submission of a comprehensive written plan to the appropriate PHMSA regional office regarding these changes prior to implementation.

FOR FURTHER INFORMATION CONTACT: Julie Halliday by phone at 202-366-0287 or by email at julie.halliday@dot.gov. Information about PHMSA may be found at <http://www.phmsa.dot.gov>.

SUPPLEMENTARY INFORMATION:

I. Background

Two recent pipeline failures occurred on hazardous liquid pipelines where the flow had been reversed. The Tesoro High Plains Pipeline rupture was discovered on September 29, 2013, after leaking an estimated 20,000 barrels of crude oil in a North Dakota field. The location of pressure and flow monitoring equipment had not been changed to account for the reversed flow. The Pegasus Pipeline failed on March 29, 2013, releasing about 5,000 barrels of crude oil into a neighborhood in Faulkner County, Arkansas. The pipeline flow had been reversed in 2006. Due to these recent accidents and other information PHMSA has become aware of as a result of the large number of recent or proposed flow reversals, product changes and conversion to service projects, PHMSA is alerting operators to the potential significant impact these changes may have on the integrity of a pipeline.

In response to shifts in the supply of and demand for various products transported by gas and hazardous liquid pipelines, operators may consider making operational changes to their pipelines including flow reversal, product change (e.g., crude oil to refined product) and/or conversion to service (e.g., convert from natural gas to crude oil) (49 CFR 192.14 and 195.5). Flow reversals, product changes and conversions to service may impact various aspects of a pipeline's operation, maintenance, monitoring, integrity management and emergency response. Pressure gradient, velocity, and the location, magnitude, and frequency of pressure surges and cycles may change. Operators may also consider increasing the throughput capacity of the pipeline. Increasing throughput may also impact the pressure profile and pressure transients. Product changes may

warrant a material compatibility and corrosion susceptibility review. Leak detection and monitoring systems may be affected. Significant additions, removal or modifications of pump stations, compressor stations, tank farms and In-Line Inspection (ILI) launching/receiving facilities may be required. Appurtenances such as flow meters, strainers, liquid separators, corrosion control devices, leak detection devices, control valves and sectionalizing valves may need to be altered.

II. Advisory Bulletin (ADB–2014–04)

To: Owners and Operators of Onshore Oil Pipeline Systems.

Subject: Guidance for Pipeline Flow Reversals, Product Changes and Conversion to Service

Advisory: This advisory bulletin describes specific notification requirements and general O&M and integrity management requirements as well as additional actions operators should consider taking before, during and after flow reversals, product changes, and conversion to service.

PHMSA refers operators to detailed guidance published in the document, *Guidance to Operators Regarding Flow Reversals, Product Changes and Conversion to Service*, which provides operators with PHMSA's expectations with respect to complying with existing regulations and also contains recommendations that operators should consider prior to implementing these changes. The document addresses flow reversals, product changes and conversion to service individually. The document is located at:

<http://phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Pipeline/Regulations/GORRPPCS.pdf>.

Notification Requirements & Consideration

Pipeline operators are required to notify PHMSA when the cost to make these changes exceeds \$10 million per §§ 191.22(c) and 195.64(c). While not common, pre-existing special permits or state waivers may require the operator to contact PHMSA prior to significant operational changes such as flow reversal, product changes or conversion to service. Operators should contact PHMSA regarding changes to pipelines with a special permit irrespective of specific language requiring it.

Per § 192.909, operators of gas transmission pipelines must notify PHMSA if these changes will substantially affect their integrity management program, its implementation, or modify the schedule for carrying out the program elements. Under § 194.121, operators of onshore oil pipelines must submit a modified response plan within 30 days of making a change in operating conditions that substantially affects its implementation. Operators will need to reflect changes due to conversion to service and product changes on subsequent Annual Report (required by §§ 191.17 and 195.49) and National Pipeline Mapping System submissions (required by The Pipeline Safety Improvement Act of 2002). Interim NPMS submissions reflecting the changes are not required; operators should wait until their next scheduled NPMS submission. Operators are strongly encouraged to submit a comprehensive written plan to the appropriate PHMSA regional office prior to performing flow reversals, product changes and conversions to service.

O&M and Integrity Management Requirements and Considerations

Requirements to address O&M and integrity issues inherent with flow reversals, product changes and conversions to service are embedded in many parts of the code. While review of O&M and

integrity management plan aspects are carried out during regular compliance and verification activities, these matters may be reviewed to the extent that the incremental increase in risk as a result of these changes may be relevant. Operators should be prepared to demonstrate how they addressed impacts to O&M, emergency plans, control room management, operator qualification training, emergency responder training, public awareness, spill response, maps and records, and integrity management programs and plans for the affected pipeline facilities. Integrity management requires operators to proactively anticipate hazards, evaluate risks and identify preventative and mitigative actions to manage operational changes that have the potential to increase the risk of failure or the increase in potential consequences of a failure. Flow reversal, product change or conversion to service meet these criteria. Operators must document the reason for, and resulting changes to, their integrity management program prior to implementation. The safe operation of an existing pipeline for use under these proposed operating conditions is dependent on the integrity of the pipeline. Facilities built under older versions of the code may need additional assessment to determine whether they remain safe to operate under these changed conditions. The integrity assessments are done in accordance with the most recent version of the code.

Operators should review past integrity assessments, assessment tools and inspections. As a result of these changes, the location of certain threats may change. Previous assessments may not have evaluated the integrity of the pipeline at the location where the threat will be after these operational changes have been implemented. Reassessment may be in order. Operators should incorporate applicable findings from PHMSA's research and development program into their integrity management program. For low frequency electric resistance welded (LF-ERW) pipe,

operators should review Project #390, *Comprehensive Study to Understand Longitudinal ERW Seam Failures*. These reports review findings from seam cracking issues from many failures such as: pressure tests, predictive model accuracies for crack type and fracture mode, ILI and in-the-ditch evaluation tool findings. The reports are located on PHMSA's website <http://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=390>.

Conversion to service allows previously used steel pipelines to qualify for use without meeting the design and construction requirements applicable to new pipelines, but the regulations require the pipeline be tested in accordance with 192 subpart J or 195 subpart E per §§ 192.14(a)(4) and 195.5(a)(4) respectively. This includes the requirement to perform a new pressure test. The procedure to carry out the pressure test must be included in the written procedure required in §§ 192.14(a) and 195.5(a). Operators should consider performing ILI and hydrostatic pressure with a spike test prior to implementing any of these changes especially if historical records have indications of previous in-service or hydrostatic pressure test failures, selective seam corrosion, stress corrosion cracking, other cracking threats or other systemic concerns. A spike test 30 minutes in duration at 100 percent to 110 percent specified minimum yield strength or between 1.39 to 1.5 times the maximum allowable operating pressure for gas and the maximum operating pressure for hazardous liquids is suggested as it is the best method for evaluating cracking threats at this time.

Integrity depends on accurate records to make suitable decisions. Operators should validate material and strength test records for all affected segments of pipe as reminded in an advisory bulletin (ADB 12-06) published on May 7, 2012; 77 FR 26822 titled: Pipeline Safety: Verification of Records. If the operator is missing records, they should create and implement a

plan to obtain material documentation. If mechanical and/or chemical properties (mill test reports) are missing, the plan should require destructive tests to confirm material properties of pipeline. Certain high risk pipelines merit a greater level of due diligence. While a new hydrostatic pressure test with a spike test is an important part of confirming the integrity of a pipeline, it may not be advisable to perform flow reversals, product changes or conversion to service under the following conditions:

- Grandfathered pipelines that operate without a Part 192, Subpart J pressure test or where sufficient historical test or material strength records are not available.
- LF-ERW pipe, lap welded, unknown seam types and with seam factors less than 1.0 as defined in §§ 192.113 and 195.106.
- Pipelines that have had a history of failures and leaks most especially those due to stress corrosion cracking, internal/external corrosion, selective seam corrosion or manufacturing defects.
- Pipelines that operate above Part 192 design factors (above 72% SMYS).
- Product change from unrefined products to highly volatile liquids.

Sectionalizing valves and leak detection systems are important facility components to reduce the consequences of failure. The integrity assessment should also include a review of the adequacy of the number, location and time for closure of existing valves and its leak detection capability. Operators should enhance their communication with affected stakeholders concerning the

changes with supplemental messages per API RP 1162 (incorporated by reference §§ 192.7 and 195.3). Public awareness communication should start in the projects planning stage, continue into the operations phase, provide project specific information and be responsive to the concerns of potentially affected persons. Operators should use the information in *Guidance to Operators Regarding Flow Reversals, Product Changes and Conversion to Service* and develop a comprehensive written plan when performing flow reversals, product changes and conversions to service. Operators are strongly encouraged to submit their plan to the appropriate PHMSA regional office.

Authority: 49 U.S.C. Chapter 601 and 49 CFR 1.53.

Issued in Washington, DC, on September 12, 2014.

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Deputy Associate Administrator for Policy and Programs.

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