U.S. DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
FINAL ENVIRONMENTAL ASSESSMENT
and
FINDING OF NO SIGNIFICANT IMPACT

Special Permit Information:

Docket Number:	PHMSA-2016-0004
Requested By:	Tennessee Gas Pipeline Company, LLC
Operator ID#:	19160
Date Requested:	January 11, 2016
Original Issuance Date:	September 1, 2016
1st Renewal Issuance Date:	March 17, 2023
Code Section(s):	49 CFR 192.611(a) and (d), 192.619(a), and 192.5

I. Background

The National Environmental Policy Act (NEPA), 42 United States Code (USC) 4321 – 4375, Council on Environmental Quality regulations, 40 Code of Federal Regulations (CFR) 1500-1508, and U.S. Department of Transportation (DOT) Order 5610.1C, require that the Pipeline and Hazardous Materials Safety Administration (PHMSA) analyze a proposed action to determine whether the action will have a significant impact on the human environment. PHMSA analyzes special permit requests for potential risks to public safety and the environment that could result from our decision to grant or deny the request. As part of this analysis, PHMSA evaluates whether a special permit would impact the likelihood or consequence of a pipeline failure when compared to operation of the pipeline in full compliance with the Federal pipeline safety regulations.

PHMSA may grant the special permit request with additional conditions or deny the request. PHMSA developed this assessment to determine the effects of our decision, if any, on the environment.

Pursuant to 49 USC 60118(c) and 49 CFR 190.341, PHMSA may only grant special permit requests that are not inconsistent with pipeline safety. PHMSA will impose conditions in the special permit if we conclude they are necessary for safety, environmental protection, or are otherwise in the public interest. If PHMSA determines that a special permit would be inconsistent with pipeline safety or is not justified, the application will be denied.

II. Purpose and Need

The special permit renewal request applies to the remaining **162** ***special permit segments*** (approximately 36.90 miles). This special permit renewal would similarly require that TGP achieve compliance with 49 CFR 192.611 for approximately 10.55 miles of ***special permit segments*** prior to the expiration of the special permit renewal. Thus, TGP would be required to reduce pressure, replace the pipe with stronger pipe, or there must be a reduction in dwellings (homes) near the pipeline for segments totaling approximately 10.55 miles. No new ***special permit segments*** have been added to the permit. The **111** ***Type B special permit segments*** total approximately 26.348 miles and will not be required to be replaced during the duration of the special permit. No new ***special permit segments*** have been added to the permit. The Final Environmental Assessment (FEA) document was originally for **192** ***special permit segments***, **30** of these ***special permit segments*** are now compliant with 49 CFR 192.611 and were not requested in the special permit renewal.

Pursuant to 49 CFR 190.341, Tennessee Gas Pipeline Company, L.L.C. (TGP)[1] requests a special permit seeking relief from 49 CFR 192.611(a) and (d), 192.619(a), and 192.5 for pipeline segments where the class location of the segment had been changed in accordance with 49 CFR 192.5(c), cluster rule, and where additional dwellings for human occupancy have been built within the sliding mile for class location changes outside of the cluster area. TGP found a regulatory compliance issue with past TGP procedure methodology for the determination of class location boundaries using the clustering and

[1] Tennessee Gas Pipeline Company, L.L.C. is owned by Kinder Morgan, Inc.

sliding mile criteria in 49 CFR 192.5(c) and has updated operating procedures for usage of 49 CFR 192.5(c), cluster rule, and the sliding mile for confirmation of maximum allowable operating pressure (MAOP).

Following the purchase of TGP, Kinder Morgan, notified PHMSA of code violation issues it discovered in the TGP procedures for evaluating class locations, where pipe had been previously updated to meet class location changes from Class 1 to 3 locations in accordance with 49 CFR 192.5. TGP had misapplied the usage of the sliding mile and cluster rule portions of 49 CFR 192.5. TGP had properly conducted pipe upgrades to meet the cluster provisions in 49 CFR 192.5, but had not later upgraded the pipe when a single or more dwelling were added in the sliding mile area outside the cluster area.

This special permit is requested by TGP to postpone in some cases and waive in other cases compliance with certain regulations for the determination of class location boundaries using the clustering criteria in 49 CFR 192.5(c). This change in clustering methodology due to misapplication of 49 CFR 192.5(c) in TGP procedures resulted in a number of new class location units, and more specifically class 3 locations, for which pressure testing or pipe replacements are now required. This misapplication impacted 192 ***special permit segments***[2] and 49.00 miles of TGP mainline piping located in the states of Kentucky, Louisiana, Mississippi, New Jersey, New York, Ohio, Pennsylvania, Tennessee, Texas and West Virginia as detailed in Attachment A for ***Type A*** and B ***special permit segments***. These clustered class location units are identified as "***special permit segments***." The special permit would: 1) require the replacement or pressure testing of approximately 11.22 miles of natural gas transmission pipe (***Type A***[3]) and provides a schedule for this replacement or pressure testing work and 2) establish enhanced integrity management procedures to maintain pipe integrity and protect both

[2] In the original 192 segments TGP has 11.22 miles of Type A segment pipe to replace or pressure test and other segments including ***special permit inspection areas*** will implement special permit conditions and integrity management procedures during the entire 5-year special permit period.

[3] ***Type A special permit segments*** include those ***special permit segments*** where there is a cluster, as described in 49 CFR 192.5(c), of more than 10 buildings intended for human occupancy in a "class location unit" and for which the maximum allowable operating pressure (MAOP) has not been confirmed in accordance with 49 CFR 192.611(a).

the public and the environment for the class location units in which the ***special permit segments*** are located for the other 37.78 miles of pipe that are not replaced (***Type B***[4]). All of the ***special permit segments***, even those not replaced or pressure tested would be treated as high consequence areas (HCAs) with the implementation of integrity management (IM) practices. In addition, TGP would comply with Conditions as provided in the terms of the special permit for all the impacted ***special permit segments*** and the designated "***special permit inspection area***" in the special permit. The ***special permit inspection area*** is defined as a one (1) mile continuous segment on both sides of the ***special permit segment*** (***Type A*** and ***Type B***) plus the footage in the ***special permit segment*** and extending 220 yards on each side of the centerline. In the instance that the pipeline does not extend a full mile either upstream from the beginning of the ***special permit segment*** or downstream from the end of the ***special permit segment***, the ***special permit inspection area*** will not extend beyond the pipeline initiation or termination points. The ***special permit inspection area*** will total 433.71 miles of pipe as detailed in Attachment A. In those cases where the special permit would allow for the current pipeline segments to remain in place, the Conditions as prescribed in the special permit would provide an additional level of safety without the impacts of excavation to remove existing pipe and install the replacement pipe. Due to the significant number of new class location segments that will require replacement or pressure testing, a special permit with IM based conditions would allow TGP a more reasonable time interval to schedule the required pipeline outages. The replacement and pressure testing of the 11.22 miles of pipe will be in accordance with the applicable sections of 49 CFR 192.105, 192.611, 192.619, and Subpart J for the current class location.

PHMSA found in reviewing TGP's response that a misapplication of 49 CFR 192.5 had been after installing upgraded pipe in a cluster area (under procedures in use before the Kinder Morgan acquisition) of TGP. Attachment A shows the segment locations with the number of dwellings outside of the cluster area but inside the sliding mile area. PHMSA considered both a Consent Agreement and Safety Order in reviewing the issues of the

[4] ***Type B special permit segments*** include those ***special permit segments*** where there is a cluster, as described in 49 CFR 192.5(c), of 10 or fewer buildings intended for human occupancy in a "class location unit" and for which the MAOP has not been confirmed in accordance with 49 CFR 192.611.

TGP request. Since the operator notified PHMSA of the violation, PHMSA considered a special permit with integrity management concepts in a special permit with conditions an appropriate mechanism for this situation to maintain safety. Also, the special permit conditions would ensure the ***special permit segments*** were maintained while the segments could be upgraded with pipe replacements or pressure tests. With integrity management procedures being effective in other safety situations, PHMSA considers this to be an effective approach for the sliding mile areas with 10 or fewer dwellings or structures for human occupancy, which is the case for over 89 percent (171 of 192 segments) of the TGP 192 ***special permit segments***. Special permit conditions are measures to assess, evaluate, and implement measures to manage and eliminate threats to pipe integrity and public safety in areas of high consequence such as these sliding mile ***special permit segments***.

- *List the regulation(s) for which the operator seeks the permit.*

  The special permit would address the requirements of 49 CFR 192.5, 192.611(a) and (d), and 192.619(a).

- *Describe the need for the requested special permit. How would a special permit benefit the operator? Would a special permit benefit the public? If so, please explain how.*

  Implementation of the special permit conditions would allow TGP to avoid the replacement of 37.78 miles of pipeline. Instead, the special permit would require implementation of the special permit conditions, including enhanced integrity management procedures. The special permit would benefit the public by reducing any disruptions due to construction activities near their homes in the ***special permit segments***.

- *Indicate whether this is an existing or proposed pipeline.*

  This special permit impacts only existing pipeline facilities as outlined in Attachment A.

- *Describe pipeline, the materials transported in the pipeline, and specify the counties and states where the affected segments of the pipeline are or would be located.*

  The TGP pipeline transports natural gas in the pipeline segments included in the special permit that are located in the states of Kentucky, Louisiana, Mississippi, New Jersey, New York, Ohio, Pennsylvania, Tennessee, Texas and West Virginia. The pipeline ***special permit segments*** are generally short in length, not contiguous and are located in multiple States and counties/parishes within those states. Attachment A (Pipeline Segments and Map) outlines the specific locations – state and county – of the ***special permit segments***.

III. Alternatives

- **Alternative 1: Granting the Special Permit Request with Conditions**
  Describe Alternative*:* *Describe what PHMSA would do under this alternative. i.e. grant a permit that allows operator to schedule the replacement or pressure testing of certain pipeline segments and leave certain pipeline segment in place under added integrity measures defined in the Conditions of the special permit and while also treating all of the identified pipeline segments as high consequence areas.*

  TGP proposes a special permit with conditions that includes two types of class location units (***special permit segments***) with clusters that impact approximately 49.00 miles of pipe. These units would be designated as either ***Type A*** or ***Type B special permit segments***.

  The ***Type A special permit segments*** are those with more than 10 dwellings intended for human occupancy and for which the MAOP has not been confirmed in accordance with 49 CFR 192.611. Approximately 11.22 miles of pipe located in these ***special permit segments*** would be replaced or pressure tested. A special permit would provide a schedule for the completion of the required pipe replacements and/or pressure testing for the ***Type A special permit segments***.

  Type B special permit segments that have 10 or fewer dwellings would also be subject to the Conditions of the special permit for its term. All of these ***special***

permit segments would be treated as HCAs under an IM program (49 CFR Part 192, Subpart O) as a requirement of the special permit. Approximately 37.78 miles of pipe are located in ***Type B*** locations.

The special permit would incorporate conditions (enhanced integrity management activities) to maintain pipeline integrity. All of the permit conditions are attributes of a robust IM program (49 CFR Part 192, Subpart O). These Conditions include conducting periodic: close interval surveys, cathodic protection reliability improvements, stress corrosion cracking direct assessment, running inline inspection (ILI) assessments (smart pigs), interference current control surveys, remediating ILI findings through anomaly evaluation and repairs, pipe seam evaluations, pipe properties records review and documentation, and maintaining line-of-sight markers. Many of these integrity activities are currently required in 49 CFR Part 192, Subpart O for an IM program to manage HCAs at specified reassessment intervals. The assessment and reassessment intervals, the level of remediation and the maintenance activities in a special permit would be more stringent to maintain pipe integrity and protect both the public and the environment for the class location units in which the ***special permit segments*** are located.

The enhanced integrity management activities that TGP would implement as special permit conditions for the pipeline segments include:

1. TGP would incorporate the pipeline segments into its written integrity management program (IMP) as a "covered segment" in a "HCA" in accordance with 49 CFR 192.903.
2. TGP would perform a close interval survey (CIS) along the entire length of pipeline segments and remediate any areas of inadequate cathodic protection no later than three (3) years after the issuance of this special permit. TGP will perform periodic CIS of the pipeline segments with a reassessment interval not to exceed seven (7) years.

3. TGP would implement a plan to improve cathodic protection reliability and perform inspections for stress corrosion cracking (SCC) during all excavations.
4. TGP would perform Stress Corrosion Direct Assessments to evaluate pipeline segments where the risk of SCC is present.
5. TGP would perform integrity assessments along the pipeline segments using appropriate assessment methods based on threats identified during the risk assessment process including both high resolution magnetic flux leakage (HR-MFL) and either HR-geometry or HR-deformation tools. TGP would reassess the pipeline segments at an interval not to exceed seven (7) years from the last assessment in accordance with 49 CFR 192.939.
6. TGP would not let this special permit be a basis for deferring any of its assessments for HCAs in accordance with 49 CFR Part 192, Subpart O.
7. TGP would address induced alternating current (AC) from parallel electric transmission lines and other interference issues such as direct current (DC) along the pipeline segments that may affect the pipeline.
8. TGP would identify any pipeline segment that may be susceptible to pipe seam issues because of the vintage of the pipe, the manufacturing process of the pipe, or other issues.
9. TGP would install and maintain line-of-sight pipeline markers on the pipeline segments except in agricultural areas or large water crossings such as lakes where line-of-sight signage is not practical.
10. TGP would maintain data integration of all integrity findings and remediation along the pipeline segments.
11. For long term pipeline system flow reversals occurring after the effective date of the Special Permit and exceeding 90 days, TGP would prepare a written plan in accordance with ***Advisory Bulletin (ADB-2014-04)*** prior to implementing the pipeline system flow reversal through the ***special permit segment***.
12. TGP would maintain the following records for each pipeline segment: documentation showing that each ***special permit segment*** has received a 49

CFR 192.505, Subpart J, hydrostatic test for eight (8) continuous hours and at a minimum pressure of 1.25 times MAOP, documentation of mechanical and chemical properties including pipe toughness (mill test reports) showing that the pipe in each ***special permit segment*** meets the wall thickness, yield strength, tensile strength and chemical composition of either the API Standard 5L, 5LX, or 5LS in usage at the time of manufacturing.

- **Alternative 2: Denial of the Request**

  Describe Alternative:
  Denial of the special permit would require the replacement and pressure testing of all the pipeline segments associated with this special permit request, which includes approximately 49.00 miles of mainline pipe. If TGP opted not to replace or pressure test the relevant segments of pipeline, 49 CFR 192.611 requires a reduction in the pipeline MAOP.[5]

- **Summary**
  - A special permit allows TGP to continue to operate the pipeline segments at their current MAOP until either replaced, hydrostatically tested, or operated in accordance with the special permit conditions. The Federal pipeline safety regulations in 49 CFR 192.611(a) require natural gas pipeline operators to confirm or revise the MAOP of a pipeline segment after a change in class location. A special permit would allow TGP to continue to operate each of the 192 ***special permit segments*** at their existing MAOP's despite a change in class location for the special permit specified time interval.
  - A special permit would require TGP to replace or pressure test all segments that have over 10 dwelling in the sliding mile area that are outside the Cluster area to meet 49 CFR 192.611. Segments within the sliding mile and outside the Cluster area will be allowed to implement the special permit conditions and integrity management procedures with the sliding mile and one-mile on either side of the segment. This would be similar to requiring a Class 1

[5] These regulatory options are specified in 49 CFR 192.611 Change in class location: Confirmation or revision of maximum allowable operating pressure.

location to implement integrity management procedures (49 CFR Part 192, Subpart O) for all mileage, whether it is a HCA or not.

- Background on Class Location Special Permits: On June 29, 2004, PHMSA published in the Federal Register (69 FR 38948) the criteria it uses for the consideration of class location change waivers, now being granted through special permits. First, certain threshold requirements must be met for a pipeline section to be further evaluated for a class location change special permit. Second, the age and manufacturing process of the pipe; system design and construction; environmental, operating and maintenance histories; and integrity management program elements are evaluated as significant criteria. These significant criteria are presented in matrix form and can be reviewed in the FDMS, Docket Number PHMSA–RSPA-2004-17401. Third, such special permits will only then be granted when pipe conditions and the operator's integrity management program provides a level of safety equal to a pipe replacement or pressure reduction.

IV. Site Description

- *Describe the environment in the vicinity of the portions of pipeline that would be subject to the special permit.*

The pipeline segments are generally short in length, not contiguous and are located in multiple States and counties/parishes within those states. Attachment A outlines the specific locations – state and county – of the ***special permit segments***. Due to the number of ***special permit segments*** and the multiple locations and topography of each location varies.[6] The pipeline segments identified as part of this special permit that include approximately 49.00 miles of mainline pipe.

[6] The TGP pipeline facilities described in Attachment A, which include the ***special permit segments***, are regulated by the Federal Energy Regulatory Commission (FERC). Prior to approving natural gas pipeline siting, FERC analyzes the environmental impacts of siting, construction, and operation along the pipeline routes.

TGP proposes a special permit that includes two types of class location units (units) with clusters that impact approximately 49.00 miles of pipe. These units would be designated as either ***Type A*** or ***Type B special permit segments***.

The ***Type A special permit segments*** are those with more than 10 dwellings intended for human occupancy and for which the MAOP has not been confirmed in accordance with 49 CFR 192.611. Approximately 11.22 miles of pipe located in these units would be replaced or pressure tested. A special permit would provide a schedule for the completion of the required pipe replacements and/or pressure testing for the ***Type A*** units.

Type B special permit segments that have 10 or fewer dwellings would also be subject to the Conditions of the special permit for its term. All of these ***special permit segments*** would be treated as HCAs under an IM program (49 CFR Part 192, Subpart O) as a requirement of the special permit.

V. Environmental Impacts of Each Alternative

In this section, you must describe the different alternatives for agency action on your special permit request. Describe at least two alternatives.

- **Alternative 1: Granting the Special Permit Request With Conditions**
  Describe Alternative*: Describe what PHMSA would do under this alternative. i.e. grant a permit that allows operator to schedule the replacement or pressure testing of certain pipeline segments and leave certain pipeline segment in place under added integrity measures defined in the Conditions of the special permit and while also treating all of the identified pipeline segments as high consequence areas.*

  The special permit includes two types of class location units (units) with clusters that impact approximately 49.00 miles of pipe. These units would be designated as either ***Type A*** or ***Type B special permit segments***. The ***Type A special permit segments*** are those with more than 10 dwellings intended for human occupancy and for which the MAOP has not been confirmed in accordance with 49 CFR 192.611. Approximately 11.22 miles of pipe located in these units would be replaced or pressure tested. The special permit provides for a schedule for the completion of the required pipe replacements and/or pressure testing for the ***Type***

A special permit segments. ***Type B special permit segments*** that have 10 or fewer dwellings would also be subject to the Conditions of the special permit for its term. All of these ***special permit segments*** would be treated as HCAs under an IM program (49 CFR Part 192, Subpart O) as a requirement of the special permit.

The special permit would incorporate a minimum of 12 enhanced integrity management activities described above. All of the special permit conditions are attributes of a robust IM program. These Conditions include conducting periodic: close interval surveys, cathodic protection reliability improvements, stress corrosion cracking direct assessment, running inline inspection (ILI) assessments (smart pigs), interference current control surveys, remediating ILI findings through anomaly evaluation and repairs, pipe seam evaluations, pipe properties records review and documentation, and maintaining line-of-sight markers. All of these integrity activities are currently required in 49 CFR Part 192 for either normal operational activities or within an IM program at some reassessment intervals. The assessment and reassessment intervals, the level of remediation and the maintenance activities in the special permit are more stringent to maintain pipe integrity and protect both the public and the environment for the class location units in which the pipe segments are located.

- **Safety Risks**: *Describe what, if any, safety risks would result if the regulation were waived as compared to the safety risks in the absence of a special permit.*

  Sections 192.5, 192.611(a) and (d), and 192.619(a) are in the gas pipeline regulations to maintain the safety of the pipeline based upon MAOP, population (Class locations) and population growth along the pipeline. Class locations are based upon the population (dwellings for human occupancy) within a "class location unit" which is defined as an onshore area that extends 220 yards on either side of the centerline of any continuous 1-mile of pipeline. These locations are determined by surveying the pipeline for population growth. The more conservative safety factors are required as dwellings for human occupancy (population growth) increases near the pipeline. Pipeline operators must conduct

surveys and document population growth within 220 yards on either side of the pipeline. A higher population along the pipeline may trigger any of the following for the pipeline segment with the higher population: a reduced MAOP, a new pressure test at a higher pressure, or new pipe with either or both heavier walled or higher grade pipe to protect against integrity risks to occupants along the pipeline segment.

The special permit enhanced integrity management conditions would be designed to identify and mitigate integrity issues that could threaten the pipeline segment and cause failure. The effect of the monitoring and maintenance requirements in the special permit conditions will ensure the integrity of the pipe and protection of the population living near the pipeline segment to a similar degree of a lower MAOP, new pressure test, or a thicker walled or higher-grade pipe without the enhanced IM protections.

If PHMSA were to deny the special permit request, TGP would be required to reduce the pressure in the affected pipeline segments. In this situation, the consequences, and the potential impact radius (PIR) would be less than if the permit is granted because the pipeline would operate at a higher operating pressure under the special permit. In most cases a pressure reduction would be approximately 20 percent of current operating pressures. This reduction would be the difference in a Class 1 versus Class 2 location design safety factor (0.72 versus 0.60). A pressure reduction would reduce gas flow volumes to customers.

The safety risk with respect to this request for a special permit focuses on maintaining the integrity of the pipeline and on the risk it poses to the increased population to mitigate a failure of this pipeline. Granting this special permit does not increase the PIR (the radius of a circle within which the potential failure of a pipeline could have significant impact on people or property) of the pipeline. However, the risk from the increased human population around the pipeline would be mitigated through IM procedures.

PIR is the radius of a circle within which the potential failure of a pipeline could have significant impact on people or property. The current PIR's for these pipeline segments are calculated using Section 3 of ASME B31.8S-2004, "Managing System Integrity of Gas Pipelines, incorporated by reference by 49 CFR 192.903. The formula and resulting calculation are as follows:

> r = radius of the circular area in feet surrounding the point of failure, otherwise known as the PIR
> d = nominal diameter of the pipeline in inches;
> p = pipeline segment's maximum allowable operating pressure (MAOP), psig
> Note: the coefficient for natural gas is 0.69. This number will vary for other gases depending on their heat of combustion.
> $r = 0.69 * d * \sqrt{p}$

TGP proposes to increase integrity management inspections for pipeline segments adjacent to the ***special permit segments***, which would lower the risk in areas beyond the special permit. TGP proposes to conduct IM type procedures (Conditions in the Special Permit) on the ***special permit inspection areas*** (433.71 miles) as defined in the Special Permit. TGP would implement the condition in ***Type B special permit inspection areas*** for the duration of the special permit, and in ***Type A special permit inspection areas*** until the ***special permit segment*** has been replaced with new pipe.

Special permit conditions would include the enhanced IM protections in Section III – Alternative , Items 1 through 12, which would require conducting periodic: close interval surveys, cathodic protection reliability improvements, stress corrosion cracking direct assessment, running inline inspection (ILI) assessments (smart pigs), interference current control surveys, remediating ILI findings through anomaly evaluation and repairs, pipe seam evaluations, pipe properties records review and documentation, and maintaining line-of-sight markers to identify, assess, and mitigate threats to the integrity of the pipeline both for ***special permit segments*** and the larger ***special permit inspection areas***.

The special permit conditions will require TGP to conduct hydrostatic pressure tests on any ***Type B special permit segments*** that have not been pressure tested to 1.25 times MAOP or greater to be pressure tested. None of the ***special permit segments*** have MAOPs established using 192.619(c) Grandfather Clause, which operate above 72 percent pipe design factor or without a prior pressure test for a Class 1 location.

Requiring most of the special permit conditions to be applicable to the ***special permit inspection areas***, which extends a mile out from either side of the ***special permit segments***, larger areas of the pipeline will be assessed and remediated for threats to the integrity of the pipeline than a PIR that is used to establish a HCA. Attachment A gives the integrity management PIR for each TGP pipeline segment, which in all cases is less 760 feet or less and is much less than the 1-mile length used to establish the Special Permit Inspection Area.

Performance of the Conditions in the special permit provides an equivalent or greater level of safety for the public and environment; and imposes no additional safety risks as a result of the waived regulation. As already noted, all of the pipeline segments included under the special permit would be treated as HCAs with the additional risk analysis and remedial activities associated with this designation. The special permit also includes a number of conditions that address potential safety risks. Among these are incorporation of these segments into the Kinder Morgan Integrity Management Program, additional close interval corrosion surveys, implementation of a cathodic protection reliability improvement plan, a more comprehensive stress corrosion cracking direct assessment program, an in-line inspection (ILI) program with intervals not to exceed seven years, anomaly evaluation and repair meeting more stringent criteria, additional testing and remediation of interference currents caused by induced alternating current sources, pipe seam evaluations, criteria for the identification of pipe properties, installation of line-of-sight markers and the integration of all inspection and remediation data. This comprehensive list of

additional risk related Conditions incorporated in the special permit is intended to provide for a significant added level of safety for the existing pipeline segments.

- *Would operation under a special permit change the risk of rupture or failure?*

  Operation under the special permit would not be expected to have an impact on the risk of failure or rupture as the operating conditions of the pipeline segments have not changed. Segments in the special permit would have inspections at intervals similar to IM program intervals, which would maintain the integrity of the pipe segments over the life of the special permit.

- *If a failure occurred, would consequences and spill or release volumes be different if PHMSA granted the permit? Increase risk, decrease risk, no change?*

  The consequences of any spill or release would not be impacted as a result of the special permit and the potential for such an event is expected to be less likely with the added safety programs noted above.

- *Would the Potential Impact Radius (PIR) of a rupture change under the special permit? Would more people be affected by a failure if we granted the permit?*

  The PIR as calculated in accordance with 49 CFR 192.903 would not change under the special permit since maximum operating pressure and pipe diameter will not change, thus there would be no additional impact on the public.

  - *Would operation under the special permit have an effect on pipeline longevity or reliability? Would there be any life cycle or maintenance issues?*

    Operation under the Special Permit Conditions that provide an additional level of safety is expected to have a positive impact on pipeline longevity and reliability. TGP does not anticipate any deleterious life cycle or maintenance issues related to operation of the pipeline with the special permit and conditions based upon IM type procedures.

Implementation of the conditions in the special permit provides an equivalent level of safety for the public and environment; and imposes no additional safety risks as a result of the waived regulation.

As already noted, all of the pipeline segments included under the special permit would be replaced with new pipe (***Type A***) or treated as HCAs with the additional risk analysis and remedial activities associated with this designation (***Type B***). The special permit also includes a number of Special Permit Conditions that would address potential safety risks. Among these are incorporation of these segments into the Kinder Morgan Integrity Management Program, additional close interval corrosion surveys, implementation of a cathodic protection reliability improvement plan, a more comprehensive stress corrosion cracking direct assessment program, an in-line inspection (ILI) program with intervals not to exceed seven years, anomaly evaluation and repair meeting more stringent criteria, additional testing and remediation of interference currents caused by induced alternating current sources, pipe seam evaluations, criteria for the identification of pipe properties, installation of line-of-sight markers and the integration of all inspection and remediation data. This comprehensive list of additional risk related conditions incorporated in the special permit is intended to provide for a significant added level of safety for the existing pipeline segments.

- **Environmental Impacts:** *Explain how operation under the special permit would impact the environment as compared to the status quo in the absence of a special permit, either positively, negatively, or not at all.*

  Approval of the special permit would have a positive impact for those units that do not require pressure testing or replacement, since TGP's activities would have negligible, if any, environmental impact. TGP would avoid disturbing the right of way of property owners except for the additional inspections that may be required to satisfy the conditions of the special permit such those related to the Integrity Management Program for HCAs, additional SCCDA verification digs, and potential anomaly evaluations/repairs.

While the special permit would avoid the full replacement of affected pipe, the special permit conditions require monitoring and maintenance that could lead to excavations and repair or replacement of some pipe. TGP will evaluate the potential environmental consequences and affected resources of land disturbances and water body crossings caused by construction activities (including adding, modifying, replacing or removing any facility) for the related environmental permits associated with any TGP activity. This evaluation is outlined in Kinder Morgan's Operating and Maintenance Procedure (O&M) 1205: Land Disturbance, Construction, and Environmental Permits, and referenced forms and procedures, which requires obtaining the required permits prior to conducting any construction activity. These procedures ensure that all activities resulting in land disturbances or construction of new or modified facilities comply with the requirement to obtain all applicable environmental permits and other applicable environmental authorizations. These procedures contain information required to identify activities subject to Federal, State, and Local environmental authorizations related to the work and to obtain those authorizations. The procedures require a review by TGP Environmental Services staff prior to the start of work, incorporation of environmental requirements into the project implementation, and ensuring outstanding (environmental) requirements are incorporated into facility operation.

If the activities do not qualify under the requirements of the Federal Energy Regulatory Commission (FERC) "General Rules and Regulations" Section 2.55(a) or 2.55(b) facilities or the blanket certificate, TGP will pursue authorization in accordance with Section 7 of the Natural Gas Act.

- *Explain whether and how operation under the special permit would impact each of the environmental resources set out in the Site Description portion of this document: land use planning, surface waters (including wetlands), drinking water, soils and vegetation, wildlife habitats (including fisheries), cultural resources, socioeconomics, Native Americans, etc. ? Focus on environmental aspects that are impacted. Are there any geologic hazards? Would any of these impacts be significant?*

As already noted, this special permit involves pipeline facilities at various locations. Each of the environmental resources potentially impacted that are listed would be addressed in accordance with the applicable Kinder Morgan procedures and FERC requirements. Although the environmental impacts are not expected to be significant it must be kept in mind that for those units requiring pressure testing or pipe replacements (***Type A***) there will be excavation related activities, along with water sourcing and water disposal issues at a minimum. These impacts will occur whether or not the Special Permit is granted. For the ***Type B special permit segments***, approval of the special permit request would avoid disturbance to the environment, public roadways, businesses and homes since pipe replacement would not be required at this time. PHMSA may require pipe replacement at a later date if integrity issues are found with the pipe or if the segment grows to over 10 dwellings for human occupancy in the sliding mile length that is outside the upgraded Cluster area.

- *Discuss direct, indirect and cumulative impacts.*

  The majority of the pipeline segments addressed by this special permit have been buried and undisturbed for many years. The current pipeline cover has therefore returned to its original state in most cases. Any activity related to pressure testing or pipe replacement will be temporary in nature and the pipeline right of way would be restored in accordance with required environmental regulations. Direct, indirect, or cumulative impacts associated with activities related to the special permit would not be significant.

- *Briefly summarize environmental aspects that will not be impacted. Explain why these resources won't be impacted.*

  As already noted, those pipeline segments that do not require pressure testing or pipe replacements will be operated in nearly the same manner as they are currently. The special permit would allow approximately 37.78 miles of ***Type B***[7]

[7] Type B special permit segments total 37.78 miles of pipe of which 3.84 miles will require pressure testing.

special permit segments to remain in their current state and not require excavation or disruption of landowner activities. Unless localized excavations are needed, right of way activities (such as additional pipeline markers) may increase in frequency due to the special permit conditions, but it is anticipated that there would be a very minimal added environmental impact related to those activities. All ILI Tool inspections to determine any pipeline integrity issues due to corrosion or third party damage would be propelled down the pipeline by gas flow volumes pushing ILI tools through the pipeline segment. Other IM inspections would be performed along the pipeline segment right of way.

- **Special Permit Conditions**: *[Describe the additional safety measures you propose to implement in lieu of compliance with the regulations. You may reference information already provided in your special permit request, as relevant.]*

  The Conditions related to this special permit are described in detail in the special permit.

- *[Explain whether and how each of these safety measures addresses the safety risks and environmental impacts, if any, of granting the permit.]*

  Each of the special permit conditions have been included and designed to address the anticipated safety risks and environmental impacts of the TGP pipeline segments covered by the special permit.

- *[Explain whether, even with the safety measures you propose, there would be any safety risks or environmental impacts beyond those that would exist in the absence of a special permit.]*

  There are currently no known safety risks or environmental impacts that are not addressed by the special permit conditions. The pipeline segments included in the special permit are currently operating safely and are expected to continue to perform in that same manner.

- *[Would implementation of the safety measures themselves have any environmental impacts? If so, would they be significant? Discuss direct, indirect and cumulative impacts.]*

The additional safety measures provided by the special permit conditions are not expected to have any significant environmental impacts other than the potential issues already noted that are related to the required pressure tests and/or pipe replacements. Please see Section III, Site Description, which outlines the environmental review process followed by TGP prior to any excavation being implemented. TGP follows a rigorous procedural process as dictated by federal, state and local entities to assure compliance with all environmental regulations and requirements as outlined in this prior section.

PHMSA has reviewed the Part 192 requirements for replacing the pipeline and the conditions of the special permit including integrity management practices and considers both to have similar environmental and right-of-way impacts. These impacts will be mitigated by following the FERC procedures outlined in Section V.

- **Alternative 2: Denying the Special Permit Request and Requiring Full Compliance with 49 CFR Part 192.**

  Describe Alternative*:* Applicant would be required to comply with 49 CFR 192.5, 192.611(a) and (d), and 192.619(a)**.** TGP would be required to replace existing pipe with heavier walled pipe.

  Denial of the permit and full adherence to the Code would afford the protections described above that are associated with either: a lower MAOP, new pressure test, or heavier walled or higher-grade pipe. Denial of the special permit would mean for most of these pipeline segments that the enhanced integrity management portions of a special permit conditions would probably not be implemented.

  Denial of the special permit would require excavation to remove existing pipe, acquiring environmental permits where necessary, and pressure testing of the replacement pipeline segments. This action would create an impact to vegetation, soils and possibly waterways due to the excavation, use of public roadways, and the impacted right of way during construction.

TGP will evaluate the potential environmental consequences and affected resources of land disturbances and water body crossings caused by construction activities (including adding, modifying, replacing or removing any facility) for the related environmental permits associated with any TGP activity. This evaluation is outlined in Kinder Morgan's Operating and Maintenance Procedure (O&M) 1205: Land Disturbance, Construction, and Environmental Permits, and referenced forms and procedures, which requires obtaining the required permits prior to conducting any construction activity. These procedures ensure that all activities resulting in land disturbances or construction of new or modified facilities comply with the requirement to obtain all applicable environmental permits and other applicable environmental authorizations. These procedures contain information required to identify activities subject to Federal, State, and Local environmental authorizations related to the work and to obtain those authorizations. The procedures require a review by TGP Environmental Services staff prior to the start of work, incorporation of environmental requirements into the project implementation, and ensuring outstanding (environmental) requirements are incorporated into facility operation.

If the activities do not qualify under the requirements of 2.55(a) or 2.55(b) facilities or the blanket certificate, TGP will pursue authorization in accordance with Section 7 of the Natural Gas Act.

VI. Public Comments

PHMSA published the special permit request in the Federal Register (87 FR 32227) for a 30-day public comment period from May 27, 2022, through June 27, 2022. PHMSA sought comments on any potential environmental impacts that could result from the selection of either alternative, including the special permit conditions. The special permit application from TGP, and draft special permit conditions were available in Docket No. PHMSA-2016-0004 at: www.regulations.gov for public review.

PHMSA received four (4) public comment concerning this special permit request through June 27, 2022. PHMSA received comments from the Pipeline Safety Trust (PST) and private citizens which asked PHMSA to examine several topics:

(1) **PST Comment**: PST commented that the initial notice for special permit renewal was posted on the public docket, but the supporting documents were not posted until much later. PST stated this delay caused for a shortened comment period and commented that the public should have ample time to review all documents for the allotted 30-day comment period.

- **PHMSA Response**: When PHMSA became aware of the issue with the docket, it immediately worked to ensure the remaining documents were posted. PHMSA then extended the comment period for an additional 30-days.

(2) **PST Comment**: PST noted that the application document is related to ***162 special permit segments*** and the FEA and FONSI references ***175 special permit segments***.

- **PHMSA Response**: This special permit is to be re-issued for ***162 special permit segments*** that are currently not compliant with 49 CFR 192.611 for a Class 1 to Class 3 location change. The FEA and FONSI was not re-issued as it is still considered valid for the renewed ***special permit segments***.

(3) **PST Comment**: TGP was issued in July of 2021 a Corrective Action Order (CPF No. 2-2021-010-CAO) as a result of a failure on a 24-inch TGP pipeline located in West Bloomfield, New York. This is on the same line as multiple ***special permit segments***. PST requested that PHMSA consider that an open enforcement action should put this application into the requires substantial justification and PST believes the "application comes up short."

- **PHMSA Response**: As a condition of the special permit, PHMSA is requiring Kinder Morgan to replace or lower the MAOP of the 24-inch diameter 200-1 ***special permit segment*** in Ontario County, New York to be in compliance with 49 CFR 192.611.

- (4) **PST Comment**: PST commented that Kinder Morgan, Inc.[8] was issued a Notice of Proposed Safety Order (CPF No. 5-2021-056-NOPSO) in October of 2021, which identified extensive concerns regarding Kinder Morgan's integrity management program and identified several thousand unremediated anomalies in multiple States through their hazardous liquids pipeline system. PST comments that the operator's enforcement history presents a concern regarding whether the operator can be relied upon to comply with the conditions imposed under a new special permit.

- **PHMSA Response**: PHMSA has reviewed this enforcement action and is granting the special permit request based upon the findings detailed in the SPAF posted to the special permit Docket Number: PHMSA-2016-0004. PHMSA has designed a robust set of conditions that TGP must abide by in lieu of compliance with the Federal pipeline safety regulations in the ***special permit segments***. The special permit conditions require assessment and remediation of integrity threats to the pipeline. To ensure TGP properly implements the special permit conditions, TGP is required to give PHMSA an annual review of their compliance with the special permit. If TGP fails to comply with any material term or condition of the special permit, PHMSA may revoke, suspend, or modify the special permit per 49 CFR 190.341(j). PHMSA also has the authority to utilize its various enforcement tools if violations of the permit are discovered.

(5) **PST Comment**: PST states that TGP claims the permit will provide environmental and safety benefits by eliminating methane emissions that would occur from blowdowns in anticipation of hydrotesting and/or replacement. PST comments that non-emergency blowdowns should not be considered a sufficient reason to avoid strength testing and replacement of pipe segments where necessary to comply with the Federal pipeline safety regulations.

- **PHMSA Response**: PHMSA uses strict criteria when determining whether a class location special permit will provide an equivalent level of safety to people and the environment as the Federal pipeline safety regulations. While avoiding the release of

[8] Kinder Morgan, Inc. is the operator of the TGP pipelines.

unburned methane is beneficial, the special permit criteria focus is on the safety of communities that are in proximity to the ***special permit segments***. Please see the Federal Register Notice, "Pipeline Safety: Development of Class Location Change Waiver Criteria," (69 FR 38948, June 29, 2004) for a detailed description of the criteria that PHMSA evaluates when determining if granting a special permit is consistent with pipeline safety. Furthermore, PHMSA imposes special permit conditions that require minimization of gas loss during blowdowns and leakage surveys along the pipeline.

(7) **PST Comment**: PST commented that TGP's application does not contain adequate justification for the need of the special permit.

- **PHMSA Response**: Section 190.341(c)(4) requires operators to provide, "an explanation of the unique circumstances that the applicant believes make the applicability of that regulation or standard (or portion thereof) unnecessary or inappropriate for its facility" with their special permit application. The Federal Register Notice, "Pipeline Safety: Development of Class Location Change Waiver Criteria," (69 FR 38948, June 29, 2004), describes the specific circumstances in which PHMSA will consider special permit applications for class location changes. The Federal Register Notice includes the criteria that PHMSA evaluates to determine the suitability of granting a permit, in addition to consideration of the justification for the waiver. PHMSA finds that implementation of enhanced integrity management with enhanced monitoring and maintenance requirements are consistent with pipeline safety to protect the population living near the pipeline segment to a similar degree as replacing with heavier walled or higher-grade pipe without the enhanced integrity management activities (see **Attachment A – Segment Integrity Information**).

(8) **PST Comment**: PST commented that there appear to be many ***special permit segments*** that have never been pressure tested and have MAOPs determined by the grandfather clause relying on pre-1970 operating pressures. If the operator must pressure test all grandfathered segments, why go through the permit process rather

than simply comply with the testing requirements of 192.611(3) to establish the appropriate MAOP?

- **PHMSA Response**: Prior to the reissuance of this special permit, PHMSA has reviewed all ***special permit segments*** pressure test records. For any ***special permit segment*** that does not have a TVC pressure test record at a pressure of 1.25 times the MAOP for an eight (8) hour duration will be required to be pressure tested as detailed in the special permit conditions. Regardless of how the initial MAOP was determined, the operator may choose to apply the special permit conditions or comply with 49 CFR 192.611. A special permit will allow a Class location change from Class 1 to Class 3 without a pressure reduction with a special permit compliant pressure test. Section 192.611 would require the pressure test and a pressure reduction.

(9) **Public Comment 1**: Recommends no permit be issued. It is time to shut down the fossil fuel industry and save the planet. The fossil fuel industry must be Nationalized, their profits and shareholder profits seized and used to clean up the environment.

- **PHMSA Response**: PHMSA has reviewed this public comment recommending a permit not being issued. The commenter did not give an explanation on why the permit should not be issued from a safety standpoint. PHMSA appreciates the commenter's concern with the environment.

(10) **Public Comment 2**: Recommends we not permit this pipeline. Fossil fuels need to stay underground where they belong.

- **PHMSA Response**: PHMSA has reviewed this public comment recommending a permit not being issued. The commenter did not give an explanation on why the permit should not be issued from a safety standpoint.

(11) **Public Comment 3**: Build more pipelines. They are the safest method to transport petroleum products.

- **PHMSA Response**: PHMSA has reviewed this public comment recommending a permit be issued. PHMSA special permit conditions were developed to maintain pipeline safety and ensure safe transportation of natural gas.

VII. Reporting

In this section, you must describe the different reporting activities to other agencies and reporting basis (such as quarterly or annually) of right-of-way activities that require permits for this proposed special permit.

- TGP will submit an annual report to the FERC pursuant to Section 2.55(b) concerning replacement activities performed in the prior calendar year that were exempt from the advance notification requirements as specified in Section 2.55(b)(2). The following items are provided to FERC:
  - (i) A brief description of the pipeline facilities to be replaced (including pipeline size and length, compression horsepower, design capacity, and cost of construction);
  - (ii) Current U.S. Geological Survey 7.5-minute series topographic maps showing the location of the facilities to be replaced; and
  - (iii) A description of the procedures to be used for erosion control, revegetation and maintenance, and stream and wetland crossings.
- TGP will submit an annual report of Blanket Certificate Activities performed pursuant to Sections 157.208, and 385.2011 of the FERC regulations. The following information will be provided pursuant to the applicable blanket certificate regulation:
  - Section 157.208 (Construction, acquisition, operation, replacement, and miscellaneous rearrangement of facilities):
    - (1) A description of the facilities installed pursuant to this section, including a description of the length and size of pipelines, compressor horsepower, metering facilities, taps, valves, and any other facilities constructed;
    - (2) The specific purpose, location, and beginning and completion date of construction of the facilities installed, the date service commenced, and, if

applicable, a statement indicating the extent to which the facilities were jointly constructed;

- (3) The actual installed cost of each facility item listed pursuant to paragraph (e)(1), separately stating the cost of materials and labor as well as other costs allocable to the facilities;
- (4)(i) A description of the contacts made, reports produced, and results of consultations which took place to ensure compliance with the Endangered Species Act, the National Historic Preservation Act and the Coastal Zone Management Act;
  - (ii) Documentation, including images, that restoration of work areas is progressing appropriately;
  - (iii) A discussion of problems or unusual construction issues, including those identified by affected landowners, and corrective actions taken or planned; and
- (5) For acquisitions of facilities:
  - (i) A statement referencing the date of issuance, docket number and title of the proceeding for any certificate issued by the Commission authorizing the facilities acquired; and
  - (ii) The amounts recorded in the accounts of the vendor (seller or lessor) that apply to the facilities acquired and the accumulated provisions for depreciation, depletion, and amortization.

VIII. Finding of No Significant Impact (FONSI)

PHMSA has carefully analyzed the safety and environmental risks associated with the above alternatives.

PHMSA believes there are minimal differences in environmental benefits from Alternative 1 (Granting the Special Permit Request with Conditions) or Alternative 2 (Denial) in eliminating methane emissions. Some methane emissions will occur from blowdowns in anticipation of hydrotesting or pipe replacement for either alternative.

TGP must use operating practices to minimize gas volumes in the pipe prior to segment blowdown for either Alternative 1 or 2.

PHMSA will require ***Type A special permit segments***[9] to be replaced with new upgraded pipe in accordance with 49 CFR 192.611(a) and 192.619(a) requirements for a Class 3 location or pressure tested so that the MAOP is commensurate with the present class location. ***Type B special permit segments*** [10] will be required to implement IM procedures and the conditions in the special permit.

PHMSA will grant TGP a special permit with conditions as outlined in Alternative 1 and Reporting sections above. TGP will implement additional special permit conditions to maintain safety and will follow the FERC regulations for evaluating the potential environmental consequences and affected resources of land disturbances and water body crossings caused by construction activities (including adding, modifying, replacing or removing any facility) for the related environmental permits associated with any TGP activity.

PHMSA has imposed conditions on this special permit designed to protect the public, property, and the environment from the risk of a pipeline leak or failure. These conditions are designed to ensure that the likelihood of a leak or failure is not greater than it would be in the absence of the special permit. Therefore, we believe there are no significant environmental impacts associated with the issuance of a special permit to TGP.

The special permit with conditions granted to TGP, SPAF, and **Attachment A – Segment Integrity Information** for Docket No. PHMSA-2016-0004 can be found on the FDMS located on the internet at www.regulations.gov or on the PHMSA website for

[9] ***Type A special permit segments*** include those ***special permit segments*** where there is a cluster, as described in 49 CFR 192.5(c), of more than 10 buildings intended for human occupancy in a "class location unit" and for which the MAOP has not been confirmed in accordance with 49 CFR 192.611(a) or where the pipe installed has been identified to have a seam type or manufacturer type that is problematic for maintaining pipeline integrity.

[10] ***Type B special permit segments*** include those ***special permit segments*** where there is a cluster, as described in 49 CFR 192.5(c), of 10 or fewer buildings intended for human occupancy in a "class location unit" and for which the MAOP has not been confirmed in accordance with 49 CFR 192.611.

special permits issued at https://www.phmsa.dot.gov/pipeline/special-permits-state-waivers/special-permits-issued.

IX. List of Preparers

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X. Agencies and Persons Consulted

No other agencies were consulted, but PHMSA considered environmental information, special permit conditions, and documents submitted by TGP.

Attachments:

Attachment A – Listing of TGP Special Permit Segments

Attachment B – Guidance of Repairs to Interstate Natural Gas Pipelines Pursuant to FERC Regulations (July 2005)

Location Map: A map showing the geographic location of the Special Permit Segments can be reviewed at: regulations.gov at Docket: PHMSA-2016-0004.

Completed by PHMSA in Washington, DC on: March 17, 2023

keep the public informed about their integrity management efforts. This plan shall provide information to be communicated to each stakeholder about the integrity plan and the results achieved. Paragraph 10 provides further information about communications plans.

2.4.4 Management of Change Plan. Pipeline systems and the environment in which they operate are seldom static. A systematic process shall be used to ensure that, prior to implementation, changes to the pipeline system design, operation, or maintenance are evaluated for their potential risk impacts, and to ensure that changes to the environment in which the pipeline operates are evaluated. After these changes are made, they shall be incorporated, as appropriate, into future risk assessments to ensure that the risk assessment process addresses the systems as currently configured, operated, and maintained. The results of the plan's mitigative activities should be used as a feedback for systems and facilities design and operation. Paragraph 11 discusses the important aspects of managing changes as they relate to integrity management.

2.4.5 Quality Control Plan. Paragraph 12 discusses the evaluation of the integrity management program for quality control purposes. That paragraph outlines the necessary documentation for the integrity management program. The paragraph also discusses auditing of the program, including the processes, inspections, mitigation activities, and prevention activities.

3 CONSEQUENCES

3.1 General

Risk is the mathematical product of the likelihood (probability) and the consequences of events that result from a failure. Risk may be decreased by reducing either the likelihood or the consequences of a failure, or both. This paragraph specifically addresses the consequence portion of the risk equation. The operator shall consider consequences of a potential failure when prioritizing inspections and mitigation activities.

The B31.8 Code manages risk to pipeline integrity by adjusting design and safety factors, and inspection and maintenance frequencies, as the potential consequences of a failure increase. This has been done on an empirical basis without quantifying the consequences of a failure.

Paragraph 3.2 describes how to determine the area that is affected by a pipeline failure (potential impact area) in order to evaluate the potential consequences of such an event. The area impacted is a function of the pipeline diameter and pressure.

3.2 Potential Impact Area

The refined radius of impact for natural gas is calculated using the formula

$$r = 0.69 \cdot d\sqrt{p} \quad (1)$$

where

d = outside diameter of the pipeline, in.
p = pipeline segment's maximum allowable operating pressure (MAOP), psig
r = radius of the impact circle, ft

EXAMPLE: A 30 in. diameter pipe with a maximum allowable operating pressure of 1,000 psig has a potential impact radius of approximately 660 ft.

$$\begin{aligned} r &= 0.69 \cdot d\sqrt{p} \\ &= 0.69\ (30\ \text{in.})(1{,}000\ \text{lb/in.}^2)^{1/2} \\ &= 654.6\ \text{ft} \approx 660\ \text{ft} \end{aligned}$$

Use of this equation shows that failure of a smaller diameter, lower pressure pipeline will affect a smaller area than a larger diameter, higher pressure pipeline. (See GRI-00/0189.)

NOTE: 0.69 is the factor for natural gas. Other gases or rich natural gas shall use different factors.

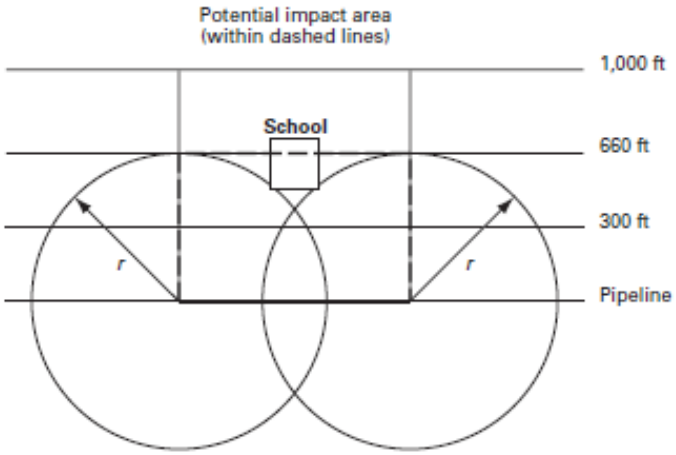
Equation (1) is derived from

$$r = \sqrt{\frac{115{,}920}{8} \cdot \mu \cdot \chi_g \cdot \lambda \cdot C_d \cdot H_C \cdot \frac{Q}{a_o} \cdot \frac{pd^2}{I_{th}}}$$

where

C_d = discharge coefficient
H_C = heat of combustion
I_{th} = threshold heat flux
Q = flow factor $= \gamma\left(\frac{2}{\gamma+1}\right)^{\frac{\gamma+1}{2(\gamma-1)}}$
R = gas constant
T = gas temperature
a_o = sonic velocity of gas $= \sqrt{\frac{\gamma RT}{m}}$
d = line diameter
m = gas molecular weight
p = live pressure
r = refined radius of impact
γ = specific heat ratio of gas
λ = release rate decay factor
μ = combustion efficiency factor
χ_g = emissivity factor

In a performance-based program, the operator may consider alternate models that calculate impact areas and consider additional factors, such as depth of burial, that may reduce impact areas. The operator shall count the number of houses and individual units in buildings within the potential impact area. The potential impact area extends from the center of the first affected circle to the center of the last affected circle (see Fig. 3). This housing unit count can then be used to help determine the relative consequences of a rupture of the pipeline segment.



GENERAL NOTE: This diagram represents the results for a 30 in. pipe with an MAOP of 1,000 psig.

Fig. 3 Potential Impact Area

The ranking of these areas is an important element of risk assessment. Determining the likelihood of failure is the other important element of risk assessment (see paras. 4 and 5).

3.3 Consequence Factors to Consider

When evaluating the consequences of a failure within the impact zone, the operator shall consider at least the following:

(*a*) population density

(*b*) proximity of the population to the pipeline (including consideration of manmade or natural barriers that may provide some level of protection)

(*c*) proximity of populations with limited or impaired mobility (e.g., hospitals, schools, child-care centers, retirement communities, prisons, recreation areas), particularly in unprotected outside areas

(*d*) property damage

(*e*) environmental damage

(*f*) effects of unignited gas releases

(*g*) security of gas supply (e.g., impacts resulting from interruption of service)

(*h*) public convenience and necessity

(*i*) potential for secondary failures

Note that the consequences may vary based on the richness of the gas transported and as a result of how the gas decompresses. The richer the gas, the more important defects and material properties are in modeling the characteristics of the failure.

4 GATHERING, REVIEWING, AND INTEGRATING DATA

4.1 General

This paragraph provides a systematic process for pipeline operators to collect and effectively utilize the data elements necessary for risk assessment. Comprehensive pipeline and facility knowledge is an essential component of a performance-based integrity management program. In addition, information on operational history, the environment around the pipeline, mitigation techniques employed, and process/procedure reviews is also necessary. Data are a key element in the decision-making process required for program implementation. When the operator lacks sufficient data or where data quality is below requirements, the operator shall follow the prescriptive-based processes as shown in Nonmandatory Appendix A.

Pipeline operator procedures, operation and maintenance plans, incident information, and other pipeline operator documents specify and require collection of data that are suitable for integrity/risk assessment. Integration of the data elements is essential in order to obtain complete and accurate information needed for an integrity management program.

4.2 Data Requirements

The operator shall have a comprehensive plan for collecting all data sets. The operator must first collect the data required to perform a risk assessment (see para.

Attachment A – Special Permit Segments and Special Permit Inspection Areas

Type A Special Permit Segments and Inspection Areas													
Special Permit Segment Number	Outside Diameter (inches)	Line Name	Segment Length (feet)	Start Survey Station (Valve - SS)	End Survey Station (Valve - SS)	Inspection Area Start SS (Valve – SS)	Inspection Area End SS (Valve – SS)	Inspection Area Length (Miles)	County or Parish, State	No. Dwellings	Year Installed	Seam Type	MAOP (psig)
1 (KM 69)	24	100-1	526.27	102-1A - 68947	102-1A - 69473	102-1A - 63667	102-1A - 74753	2.10	Madison, KY	3	1971	FW	750
3 (KM 71)	24	100-1	168.34	102-1A - 77036	102-1A - 77204	102-1A - 71756	102-1A - 82484	2.03	Madison, KY	1	1971	FW	750
4 (KM 72)	26	100-2	606.6	108-2 - 33270	108-2 - 33876	108-2 - 27990	108-2 - 39156	2.11	Bath, KY	5	1948	FW	750
6 (KM 74)	26	100-2	1,515.3	108-2 - 40523	108-2 - 42039	108-2 - 35243	108-2 - 47319	2.29	Bath, KY	3	1948	FW	750
7 (KM 75)	26	100-2	344.2	108-2 - 44555	108-2 - 44899	108-2 - 39275	109-2 - 597	2.07	Bath, KY	6	1948	FW	750
8 (KM 76)	26	100-2	252.39	109-2 - 1131	109-2 - 1384	108-2 - 45434	109-2 - 6664	2.05	Rowan, KY	0	1948	FW	750
13 (KM 82)	26	100-3	1,054.07	108-3 - 52941	108-3 - 53995	108-3 - 47661	109-3 - 4870	2.20	Rowan, KY	6	1949	FW	750
14 (KM 83)	26	100-3	338.7	108-3 - 54035	108-3 - 54402	108-3 - 48755	109-3 - 5277	2.06	Rowan, KY	4	1949	FW	750
15 (KM 84)	26	100-3	912.96	109-3 - 472	109-3 - 1385	108-3 - 49597	109-3 - 6665	2.17	Rowan, KY	3	1949	FW	750
17 (KM 86)	26	100-3	655.37	112-3 - 47754	112-3 - 48425	112-3 - 42474	112-3A - 53705	2.12	Boyd, KY	0	1950	FW	790
18 (KM 87)	26	100-3	494.4	112-3A - 48525	112-3A - 49019	112-3 - 43245	112-3A - 54299	2.09	Boyd, KY	1	1950	FW	790
23 (KM 101)	24	100-1	598.4	36-1 - 47642	36-1 - 48240	36-1 - 42362	36-1 - 53520	2.11	Sabine, LA	3	1944	FW	750
24 (KM 102)	24	100-1	1,118.3	39-1 - 57784	39-1 - 58902	39-1 - 52504	39-1 - 64182	2.21	Natchitoches, LA	6	1944	FW	750
29 (KM 109)	26	100-2	920.8	47-2D - 10183	47-2D - 11104	47-2D - 4903	47-2D - 16384	2.17	Ouachita, LA	1	1947	FW	750
46 (KM 134)	26	100-2	112.4	53-2B - 95230	53-2B - 95230	53-2B - 89950	53-2B - 100623	2.02	Washington, MS	1	1948	FW	750
47 (KM 135)	26	100-2	2,073.94	53-2B - 95383	53-2B - 97457	53-2B - 90103	53-2B - 102737	2.39	Washington, MS	2	1948	FW	750
50 (KM 139)	30	500-1	1,471.05	530-1 - 71188	530-1 - 72659	530-1 - 65908	530-1 - 77939	2.28	Hancock, MS	2	1959	FW	936
51 (KM 140)	30	500-1	482.4	535-1 - 38349	535-1 - 38831	535-1 - 33069	535-1 - 44111	2.09	Forrest, MS	2	1959	FW	936
52 (KM 141)	30	500-1	1,370.49	535-1 - 38884	535-1 - 40254	535-1 - 33604	535-1 - 45534	2.26	Forrest, MS	2	1959	FW	936
60 (KM 152)	36	500-2	1,488.68	530-2 - 71038	530-2 - 72527	530-2 - 65758	530-2 - 77807	2.28	Hancock, MS	2	1965	FW	936
61 (KM 153)	36	500-2	1,909.29	535-2 – 38304	535-2 – 40214	535-2 – 33024	535-2 – 45494	2.36	Forrest, MS	2	1966	LF-ERW	936
75 (KM 178)	24	200-1	654.33	236-1 - 13357	236-1 - 14012	236-1 - 8077	236-1 - 19292	2.12	Ontario, NY	2	1951	FW	760
82 (KM 187)	26	200-1	2,658.16	213-1 - 35693	213-1 - 38351	213-1 - 30413	213-1 - 43631	2.50	Carroll, OH	5	1950	FW	790
83 (KM 188)	26	200-1	2,044.66	215-1 - 37377	215-1 - 39422	215-1 - 32097	215-1 - 44702	2.39	Columbiana, OH	8	1950	FW	790
84 (KM 189)	26	200-1	1,270.1	215-1 - 44383	215-1 - 45653	215-1 - 39103	215-1 - 50933	2.24	Columbiana, OH	2	1950	FW	790
85 (KM 190)	26	200-1	1,382.31	215-1 - 46382	215-1 - 47765	215-1 - 41102	215-1 - 53045	2.26	Columbiana, OH	1	1950	FW	790

Type A Special Permit Segments and Inspection Areas													
Special Permit Segment Number	Outside Diameter (inches)	Line Name	Segment Length (feet)	Start Survey Station (Valve - SS)	End Survey Station (Valve - SS)	Inspection Area Start SS (Valve – SS)	Inspection Area End SS (Valve – SS)	Inspection Area Length (Miles)	County or Parish, State	No. Dwellings	Year Installed	Seam Type	MAOP (psig)
86 (KM 191)	26	200-2	1,513.05	205-2 - 8795	205-2 - 10308	205-2 - 3515	205-2 - 15588	2.29	Athens, OH	3	1952	FW	790
88 (KM 193)	26	200-2	2,680.73	213-2 - 35739	213-2 - 38419	213-2 - 30459	213-2 - 43699	2.51	Carroll, OH	5	1952	FW	790
89 (KM 194)	26	200-2	1,296.36	216-2 - 15651	216-2 - 16947	216-2 - 10371	216-2 - 22227	2.25	Columbiana, OH	5	1954	FW	790
109 (KM 223)	26	100-2	554.05	82-2C - 49652	82-2C - 50206	82-2C - 44372	82-2C - 55486	2.10	Dickson, TN	1	1948	FW	750
110 (KM 224)	26	100-2	177.44	82-2C - 59530	82-2C - 59708	82-2C - 54250	83-2 - 2036	2.03	Dickson, TN	1	1948	FW	750
120 (KM 238)	30	500-1	9.9	562-1 - 1259	562-1 - 1269	560-1 - 97810	562-1 - 6549	2.00	Cheatham, TN	1	1959	FW	936
128 (KM 250)	36	500-2	1,318.68	560-2 – 37151	560-2 – 38470	560-2 – 31871	560-2 – 43750	2.25	Cheatham, TN	4	1968	LF-ERW	936
129 (KM 251)	36	500-2	381.21	560-2 – 43790	560-2 – 44171	560-2 – 38510	560-2 – 49451	2.07	Cheatham, TN	5	1968	LF-ERW	936
130 (KM 252)	36	500-2	420.56	560-2 – 99604	560-2 – 100024	560-2 – 94324	562-2 – 3915	2.08	Cheatham, TN	1	1968	LF-ERW	936
151 (KM 290)	24	100-1	1,677.99	19-1 - 21876	19-1 - 24570	19-1 - 16596	19-1 - 29850	2.32	Waller, TX	5	1944	FW	750
152 (KM 291)	24	100-1	753.7	20-1 - 36048	20-1 - 36801	20-1 - 30768	20-1 - 41976	2.14	Harris, TX	2	1944	FW	750
153 (KM 292)	24	100-1	675	36-1 - 13320	36-1 - 13995	36-1 - 8040	36-1 - 19275	2.13	Sabine, TX	1	1944	FW	750
160 (KM 300)	30	100-3	1,531.99	19-3 -20924	19-3 - 23684	19-3 - 15644	19-3 - 28964	2.29	Waller, TX	4	1952	EFW	750
161 (KM 301)	30	100-3	1,727.52	19-3 - 41139	19-3 - 42867	19-3 - 35859	19-3 - 48147	2.33	Waller, TX	3	1952	EFW	750
162 (KM 302)	30	100-3	1,024.5	19-3 - 48100	19-3 - 49125	19-3 - 42820	20-3 - 5225	2.19	Harris, TX	7	1952	EFW	750
169 (KM 312)	24	409A-100 DONNA LINE	1,237.01	409A-101.1 - 5411	409A-101.1 - 6648	409A-101.1 - 131	409A-101.1 - 11928	2.23	Hidalgo, TX	76	1950	FW	933
171 (KM 316)	24	409A-100 DONNA LINE	1,523.74	409A-102 - 10119	409A-102 - 11643	409A-102 - 4839	409A-102 - 16923	2.29	Hidalgo, TX	4	1950	FW	933
172 (KM 317)	24	409A-100 DONNA LINE	1,787.31	409A-102 - 35417	409A-102 - 37204	409A-102 - 30137	409A-102 - 42484	2.34	Hidalgo, TX	9	1950	FW	933
177 (KM 323)	24	100-2	2,657.51	115-2 - 18573	115-2 - 21231	115-2 - 13293	115-2 - 26511	2.50	Wayne, WV	3	1948	FW	973
178 (KM 326)	24	100-2	1,833.55	119-2 - 3970	119-2 - 5881	118-3 - 65930	119-2 - 11161	2.35	Putnam, WV	3	1948	FW	938
181 (KM 329)	26	100-3	438.1	117-3 - 37414	117-3 - 37852	117-3 - 32134	117-3 - 43132	2.08	Cabell, WV	2	1966	FW	910
185 (KM 335)	24	100-1	1,181.7	19-1 - 47777	19-1 - 48959	19-1 - 42497	20-1 - 5235	2.22	Harris, TX	8	1944	FW	750
186 (KM 336)	24	100-1	1,351.66	20-1 - 0034	20-1 - 1386	19-1 - 43757	20-1 - 6666	2.26	Harris, TX	8	1966	FW	750
187 (KM 340)	24	100-2	1,233.7	121-2 - 54382	121-2 - 55616	121-2 - 49102	121-2 - 60896	2.23	Kanawha, WV	1	1948	FW	910
191 (KM 348)	36	500-2	311.51	541-2 - 72	541-2 - 383	540-2 - 81127	541-2 - 5663	2.06	Lauderdale, MS	3	1963	FW	936

Note: **FW** is a flash welded pipe longitudinal seam. **EFW** is electric flash welded pipe longitudinal seam.
LF-ERW is low frequency electric welded longitudinal seam pipe.

Type B Special Permit Segments and Inspection Areas													
Special Permit Segment Number	Outside Diameter (inches)	Line Name	Length (feet)	Start Survey Station (Valve - SS)	End Survey Station (Valve - SS)	Inspection Area Start SS (Valve – SS)	Inspection Area End SS (Valve – SS)	Inspection Area Length (Miles)	County or Parish, State	No. Dwellings	Year Installed	Seam Type	MAOP (psig)
2 (KM 70)	24	100-1	12.7	102-1A – 71157	102-1A – 71170	102-1A – 65877	102-1A – 76450	2.00	Madison, KY	1	1971	SAW	750
10 (KM 78)	30	100-3	824.32	102-3 – 53270	102-3 – 54095	102-3 – 47990	103-3 – 5236	2.16	Madison, KY	4	1950	DSAW	750
11 (KM 79)	30	100-3	536.3	103-3 – 1904	103-3 – 2440	102-3 – 50762	103-3 – 7720	2.10	Madison, KY	1	1950	DSAW	750
12 (KM 80)	30	100-3	806.72	103-3 – 8570	103-3 – 9377	103-3 – 3290	103-3 – 14657	2.15	Madison, KY	1	1950	DSAW	750
19 (KM 88)	30	100-4	521.39	103-4 – 15933	103-4 – 16455	103-4 – 10653	103-4 – 21735	2.10	Madison, KY	1	1951	DSAW	750
20 (KM 89)	30	100-4	607.56	103-4 – 17254	103-4 – 17861	103-4 – 11974	103-4 – 23141	2.12	Madison, KY	2	1951	DSAW	750
21 (KM 90)	36	800-2	1,690.82	874-2 – 69802	874-2 – 71493	874-2 – 64522	874-2 – 76773	2.32	Madison, KY	3	1969	DSAW	936
27 (KM 106)	30	100-2	272.2	36-2 – 47634	36-2 – 47906	36-2 – 42354	36-2 – 53186	2.05	Sabine, LA	2	1949	DSAW	750
28 (KM 108)	31	100-2	1,121.16	39-2 – 57758	39-2 – 58879	39-2 – 52478	39-2 – 64159	2.21	Natchitoches, LA	6	1948	DSAW	604
31 (KM 111)	30	100-3	740.5	36-3 – 47480	36-3 – 48221	36-3 – 42200	36-3 – 53501	2.14	Sabine, LA	2	1951	DSAW	750
32 (KM 113)	30	100-3	1,772.33	39-3 – 57098	39-3 – 58870	39-3 – 51818	39-3 – 64150	2.34	Natchitoches, LA	6	1951	DSAW	750
33 (KM 115)	30	100-3	907.8	47-3D – 10212	47-3D – 11120	47-3D – 4932	47-3D – 16400	2.17	Ouachita, LA	1	1949	DSAW	750
34 (KM 116)	30	100-4	1,414.14	47-4D – 9988	47-4D – 11056	47-4D – 4708	47-4D – 16337	2.27	Ouachita, LA	1	1951	DSAW	750
36 (KM 118)	24	500-1	872.7	511-1 – 10843	511-1 – 11716	511-1 – 5572	511-1 – 16996	2.17	Vermillion, LA	8	1956	DSAW	973
37 (KM 119)	24	500-1	3,005.66	511-1 – 15728	511-1 – 18734	511-1 – 10448	511-1 – 24014	2.57	Vermillion, LA	10	1956	DSAW	973
38 (KM 120)	24	500-1	858.45	512-1 – 45271	512-1 – 46129	512-1 – 39991	512-1 – 51409	2.16	Iberia, LA	4	1956	DSAW	973
41 (KM 124)	30	800-1	102.57	834-1 – 77999	834-1 - 78101	834-1 – 72719	834-1 – 83381	2.02	Franklin, LA	0	1954	DSAW	936
42 (KM 125)	30	800-1	1,259.31	834-1 - 78142	834-1 - 79401	834-1 – 72862	834-1 – 84682	2.24	Franklin, LA	1	1954	DSAW	936
43 (KM 126)	30	800-1	75.63	835-1 – 694	835-1 – 797	834-1 – 80806	835-1 – 6050	2.01	Franklin, LA	1	1954	DSAW	936
44 (KM 131)	24	100-1	731.04	53-1B1 – 95339	53-1B1 – 96070	53-1B1 – 90059	53-1B1 – 101350	2.14	Washington, MS	1	1944	SMLS	750
45 (KM 132)	24	100-1	964.23	53-1B1 – 101333	53-1B1 – 102270	53-1B1 – 96053	53-1B1 – 107550	2.18	Washington, MS	1	1944	SMLS	750
48 (KM 136)	30	100-3	1,198.98	69-3 – 3436	69-3 – 4635	68-3 – 59355	69-3 – 9915	2.23	Benton, MS	2	1949	DSAW	750
49 (KM 137)	30	100-4	1,234.46	69-4 – 3494	69-4 – 4728	68-4 – 59426	69-4 – 10008	2.23	Benton, MS	2	1952	DSAW	750
53 (KM 142)	30	500-1	1,474.9	540-1 – 77758	540-1 – 79233	540-1 – 72478	540-1 – 84513	2.28	Lauderdale, MS	5	1959	SAW	936
55 (KM 144)	30	500-1	257.2	541-1 - 00042	541-1 – 00313	540-1 – 81096	541-1 – 5593	2.05	Lauderdale, MS	4	1959	DSAW	936
58 (KM 148)	30	500-1	959.21	546-1 – 26190	546-1 – 27149	546-1 – 20910	546-1 – 32429	2.18	Lowndes, MS	1	1959	DSAW	936
59 (KM 150)	30	500-1	1,581.69	546-1 – 34988	546-1 – 36570	546-1 – 29708	546-1 – 41850	2.30	Lowndes, MS	3	1959	DSAW	936
62 (KM 154)	36	500-2	1,439.84	540-2 – 77710	540-2 – 79150	540-2 – 72430	540-2 – 84430	2.27	Lauderdale, MS	6	1966	DSAW	936

Type B Special Permit Segments and Inspection Areas													
Special Permit Segment Number	Outside Diameter (inches)	Line Name	Length (feet)	Start Survey Station (Valve - SS)	End Survey Station (Valve - SS)	Inspection Area Start SS (Valve – SS)	Inspection Area End SS (Valve – SS)	Inspection Area Length (Miles)	County or Parish, State	No. Dwellings	Year Installed	Seam Type	MAOP (psig)
64 (KM 157)	36	500-2	1,585.26	546-2 – 34989	546-2 – 36574	546-2 – 29709	546-2 – 41854	2.30	Lowndes, MS	3	1964	DSAW	936
65 (KM 158)	36	500-3	1,347.37	530-3 – 70819	530-3 – 72167	530-3 – 65539	530-3 – 77447	2.26	Hancock, MS	2	1972	DSAW	936
66 (KM 159)	24	300-1	2,953.04	324-1A - 55004	324-1A – 57957	324-1A – 49724	324-1A - 63237	2.56	Sussex, NJ	10	1955	SMLS	1,170
67 (KM 160)	24	300-1	638.57	324-1A - 63558	324-1A – 64196	324-1A – 58278	324-1A - 69476	2.12	Sussex, NJ	1	1955	SMLS	1,170
68 (KM 162)	24	300-1	471.55	325-1 – 16365	325-1 – 16837	325-1 – 11085	325-1A - 22117	2.09	Sussex, NJ	5	1955	SMLS	1,170
69 (KM 163)	24	300-1	1,121.11	325-1 – 17148	325-1 – 18277	325-1 – 11868	325-1A - 23557	2.21	Sussex, NJ	8	1955	SMLS	1,170
70 (KM 164)	24	300-1	811.71	325-1A – 38824	325-1A – 39635	325-1A – 33544	326-1 – 3519	2.15	Sussex, NJ	2	1955	SMLS	1,170
71 (KM 166)	24	300-1	373.7	326-1 – 8209	326-1 – 8582	326-1 – 2929	326-1 – 13862	2.07	Sussex, NJ	2	1955	SMLS	1,170
72 (KM 167)	24	300-1	1,729.51	326-1 – 11749	326-1 – 13479	326-1 – 6469	326-1 – 18759	2.33	Sussex, NJ	2	1955	SMLS	1,170
77 (KM 180)	24	200-1	1,478.51	243-1 – 20348	243-1 – 21827	243-1 – 15068	243-1 – 27107	2.28	Madison, KY	3	1951	DSAW	760
79 (KM 182)	24	200-1	1,153.88	251-1 – 18683	251-1 – 19837	251-1 – 13403	251-1 – 25117	2.22	Albany, NY	1	1951	DSAW	760
80 (KM 183)	24	200-1	1,059.96	251-1 – 34314	251-1 – 35374	251-1 – 29034	252-1 – 2901	2.20	Albany, NY	1	1951	DSAW	760
90 (KM 195)	26	200-3	1,081.17	213-3 – 26889	213-3 – 27970	213-3 – 21609	213-3 – 33250	2.20	Carroll, OH	4	1956	DSAW	790
92 (KM 197)	26	200-3	974.2	213-3 – 35492	213-3 – 364478	213-3 – 30212	213-3 – 41746	2.18	Carroll, OH	5	1956	DSAW	790
94 (KM 200)	36	200-4	2,648.75	213-4 – 35689	213-4 – 38338	213-4 – 30409	213-4 – 43618	2.50	Carroll, OH	5	1963	DSAW	790
95 (KM 201)	36	200-4	1,950.62	215-4 – 37485	215-4 – 39436	215-4 – 32205	215-4 – 44716	2.37	Columbiana, OH	8	1963	DSAW	790
96 (KM 202)	36	200-4	1,248.52	215-4 – 44504	215-4 – 45753	215-4 – 39224	215-4 – 51033	2.24	Columbiana, OH	2	1963	DSAW	790
97 (KM 203)	36	200-4	1,358.28	215-4 – 46492	215-4 – 47844	215-4 – 41212	215-4 – 53124	2.26	Columbiana, OH	1	1963	DSAW	790
98 (KM 205)	26	200-1	1,935.75	217-1 – 38468	217-1 – 40404	217-1 – 33188	217-1 – 45684	2.37	Lawrence, PA	5	1950	DSAW	790
99 (KM 206)	24	300-1	839.87	219-2D – 22733	219-2D – 23573	219-2D – 17453	219-2D – 28853	2.16	Mercer, PA	2	1953	DSAW	877
100 (KM 207)	24	300-1	491.7	219-2D – 28609	219-2D – 29100	219-2D – 23329	219-2D – 34380	2.09	Mercer, PA	1	1953	DSAW	877
101 (KM 208)	30	300-2	875.56	219-3 – 22847	219-3 – 23723	219-3 – 17567	219-3 – 29003	2.17	Mercer, PA	2	1965	DSAW	877
102 (KM 209)	30	300-2	573.79	219-3 – 28627	219-3 – 29201	219-3 – 23347	219-3 – 34507	2.11	Mercer, PA	1	1965	DSAW	877
103 (KM 213)	24	100-1	533.33	82-1C – 18316	82-1C – 18849	82-1C – 13036	82-1C – 24129	2.10	Dickson, TN	2	1944	SMLS	750
104 (KM 215)	24	100-1	2,782.53	83-1A – 78304	83-1A – 81086	83-1A – 73024	83-1A – 86366	2.53	Cheatham, TN	10	1944	SMLS	750
105 (KM 216)	24	100-1	1,490.6	83-1A – 97294	83-1A – 98785	83-1A – 92014	83-1A - 104065	2.28	Cheatham, TN	7	1944	SMLS	750
106 (KM 217)	24	100-1	28.61	83-1A – 105135	83-1A – 105164	83-1A – 99855	83-1A - 110444	2.01	Cheatham, TN	1	1944	SMLS	750
107 (KM 220)	24	100-1	668.38	84-1 – 49147	84-1 – 49815	84-1 – 438667	85-1 – 5224	2.13	Robertson, TN	5	1944	SMLS	750

Type B Special Permit Segments and Inspection Areas													
Special Permit Segment Number	Outside Diameter (inches)	Line Name	Length (feet)	Start Survey Station (Valve - SS)	End Survey Station (Valve - SS)	Inspection Area Start SS (Valve – SS)	Inspection Area End SS (Valve – SS)	Inspection Area Length (Miles)	County or Parish, State	No. Dwellings	Year Installed	Seam Type	MAOP (psig)
108 (KM 221)	24	100-1	1,953.93	85-1 – 150	85-1 – 2103	84-1 – 44741	85-1 – 7383	2.37	Robertson, TN	10	1944	SMLS	750
111 (KM 226)	30	500-1	566.83	557-1 – 27037	557-1 – 27604	557-1 – 21757	557-1 – 32884	2.11	Lewis, TN	2	1959	SAW	936
112 (KM 227)	30	500-1	686.45	557-1 – 32179	557-1 – 32866	557-1 – 26899	557-1 – 38146	2.13	Lewis, TN	1	1959	SAW	936
113 (KM 228)	30	500-1	1,376.94	557-1 – 33305	557-1 – 34682	557-1 – 28025	557-1 – 39962	2.26	Lewis, TN	3	1959	SAW	936
114 (KM 232)	30	500-1	732.13	560-1 – 37152	560-1 – 37885	560-1 – 31872	560-1 – 43165	2.14	Cheatham, TN	1	1959	DSAW	936
115 (KM 233)	30	500-1	1006	560-1 – 42304	560-1 – 43310	560-1 – 37024	560-1 – 48590	2.19	Cheatham, TN	10	1959	DSAW	936
116 (KM 234)	30	500-1	757.26	560-1 – 43428	560-1 – 44185	560-1 – 38148	560-1 – 49465	2.14	Cheatham, TN	7	1959	DSAW	936
117 (KM 235)	30	500-1	1,332.21	560-1 - 98120	560-1 – 99452	560-1 – 92840	562-1 – 2902	2.25	Cheatham, TN	1	1959	DSAW	936
118 (KM 236)	30	500-1	633.98	560-1 – 99846	560-1 – 100480	560-1 – 94566	562-1 – 3930	2.12	Cheatham, TN	2	1959	DSAW	936
119 (KM 237)	30	500-1	994.45	562-1 – 66	562-1 – 1061	560-1 – 96617	562-1 – 6341	2.19	Cheatham, TN	5	1959	SAW	936
121 (KM 239)	30	500-1	1,339.84	562-1 – 6239	562-1 – 7579	562-1 – 959	562-1 – 12859	2.25	Cheatham, TN	1	1959	SAW	936
122 (KM 240)	30	500-1	2,474.52	563-1 – 29453	563-1 – 31925	563-1 – 24173	563-1 – 37205	2.47	Robertson, TN	6	1959	DSAW	936
123 (KM 241)	30	500-1	4,358.19	563-1 – 42160	563-1 – 46519	563-1 – 36880	563-1 – 51799	2.83	Robertson, TN	10	1959	DSAW	936
124 (KM 242)	30	500-1	1,929.95	564-1 – 14368	564-1 – 16298	564-1 – 9088	564-1 – 21578	2.37	Robertson, TN	4	1959	DSAW	936
125 (KM 243)	30	500-1	3,262.84	564-1 – 20668	564-1 – 23931	564-1 – 15388	564-1 – 29211	2.62	Robertson, TN	10	1959	DSAW	936
126 (KM 244)	36	500-2	469.38	557-2 – 27013	557-2 – 27483	557-2 – 21733	557-2 – 32763	2.09	Lewis, TN	2	1964	DSAW	936
127 (KM 245)	36	500-2	738.42	557-2 – 32134	557-2 – 32872	557-2 – 26854	557-2 – 38152	2.14	Lewis, TN	1	1964	DSAW	936
131 (KM 253)	36	500-2	502.7	562-2 – 551	562-2 – 1054	560-2 – 96661	562-2 – 6334	2.10	Cheatham, TN	6	1963	DSAW	936
132 (KM 254)	36	500-2	16.9	562-2 – 1253	562-2 – 1270	560-2 – 97362	562-2 – 6550	2.00	Cheatham, TN	1	1963	DSAW	936
133 (KM 255)	36	500-2	2,062.21	562-2 – 5535	562-2 – 7598	562-2 – 255	562-2 – 12878	2.39	Cheatham, TN	2	1963	DSAW	936
134 (KM 256)	36	500-2	1,001.81	563-2 – 29422	563-2 – 30424	563-2 – 24142	563-2 – 35704	2.19	Robertson, TN	4	1965	DSAW	936
135 (KM 257)	36	500-2	1,426.43	563-2 – 30503	563-2 – 31930	563-2 – 25223	563-2 – 37210	2.27	Robertson, TN	5	1965	DSAW	936
136 (KM 258)	36	500-2	303.7	563-2 – 42134	563-2 – 42438	563-2 – 36854	563-2 – 47718	2.06	Robertson, TN	2	1965	DSAW	936
137 (KM 259)	36	500-2	3,257.08	563-2 – 42518	563-2 – 46423	563-2 – 37238	563-2 – 51703	2.62	Robertson, TN	6	1965	DSAW	936
138 (KM 260)	36	500-2	1,899.22	564-2 – 14427	564-2 – 16326	564-2 – 9147	564-2 – 21606	2.36	Robertson, TN	4	1965	DSAW	936
139 (KM 261)	36	500-2	219.1	564-2 – 20671	564-2 – 20890	564-2 – 15391	564-2 – 26170	2.04	Robertson, TN	4	1965	DSAW	936
140 (KM 262)	36	500-2	2,970.93	564-2 – 20965	564-2 – 23936	564-2 – 15685	564-2 – 29216	2.56	Robertson, TN	6	1965	DSAW	936
141 (KM 271)	30	800-1	384.62	861-1 – 44265	861-1 – 44649	861-1 – 38985	861-1 – 49929	2.07	Cheatham, TN	1	1954	EW	936

Type B Special Permit Segments and Inspection Areas													
Special Permit Segment Number	Outside Diameter (inches)	Line Name	Length (feet)	Start Survey Station (Valve - SS)	End Survey Station (Valve - SS)	Inspection Area Start SS (Valve – SS)	Inspection Area End SS (Valve – SS)	Inspection Area Length (Miles)	County or Parish, State	No. Dwellings	Year Installed	Seam Type	MAOP (psig)
142 (KM 272)	30	800-1	581.5	861-1 – 99945	861-1 – 100526	861-1 – 94665	863-1 – 3910	2.11	Cheatham, TN	2	1954	EW	936
143 (KM 273)	30	800-1	1,104.3	863-1 – 94	863-1 – 1199	861-1 – 96711	863-1 – 6479	2.21	Cheatham, TN	6	1954	EW	936
144 (KM 275)	30	800-1	1,366.34	863-1 – 6197	863-1 – 7564	863-1 – 917	863-1 – 12844	2.26	Cheatham, TN	1	1954	EW	936
145 (KM 276)	30	800-1	968.97	864-1 – 29457	864-1 – 30426	864-1 – 24177	864-1 – 35706	2.18	Robertson, TN	4	1954	EW	936
146 (KM 277)	30	800-1	1,797.26	864-1 – 30649	864-1 – 32446	864-1 – 25369	864-1 – 37726	2.34	Robertson, TN	5	1954	EW	936
147 (KM 278)	30	800-1	4253	864-1 – 42177	864-1 – 46430	864-1 – 36897	864-1 – 51710	2.81	Robertson, TN	10	1954	EW	936
148 (KM 279)	30	800-1	1,978.36	865-1 – 14349	865-1 – 16327	865-1 – 9069	865-1 – 21607	2.37	Robertson, TN	4	1954	EW	936
149 (KM 280)	30	800-1	3,133.48	865-1 – 20783	865-1 – 23888	865-1 – 15503	865-1 – 29168	2.59	Robertson, TN	6	1954	EW	936
154 (KM 293)	24	100-1	1,539.3	36-1 – 18211	36-1 – 19750	36-1 – 12931	36-1 – 25030	2.29	Sabine, TX	8	1964	DSAW	750
155 (KM 294)	24	100-1	573.4	36-1 – 20133	36-1 – 20706	36-1 – 14853	36-1 – 25986	2.11	Sabine, TX	3	1964	DSAW	750
156 (KM 295)	30	100-2	1,574.15	19-2 – 20806	19-2 – 23619	19-2 – 15526	19-2 – 28898	2.30	Waller, TX	4	1948	DSAW	750
157 (KM 297)	30	100-2	1,220.9	19-2 – 47755	19-2 – 48976	19-2 – 42475	20-2 – 5205	2.23	Harris, TX	8	1948	DSAW	750
158 (KM 298)	30	100-2	1,962.45	20-2 – 0048	20-2 – 2010	19-2 – 43818	20-2 – 7290	2.37	Harris, TX	9	1948	DSAW	750
159 (KM 299)	30	100-2	2,597.7	36-2 – 17089	36-2 – 19687	36-2 – 11809	36-2 – 24967	2.49	Sabine, TX	7	1949	SAW	750
163 (KM 303)	30	100-3	217	20-3 – 61	20-3 – 278	19-3 – 43960	20-3 – 5558	2.04	Harris, TX	8	1952	DSAW	750
164 (KM 304)	30	100-3	1,733.65	20-3 – 398	20-3 – 2162	19-3 – 44297	20-3 – 7442	2.33	Harris, TX	8	1952	DSAW	750
165 (KM 306)	30	100-3	1,101.34	20-3 – 36121	20-3 – 37211	20-3 – 30841	20-3 – 42491	2.21	Harris, TX	2	1952	DSAW	750
166 (KM 307)	30	100-3	1,502.4	36-3 – 18156	36-3 – 19658	36-3 – 12876	36-3 – 24938	2.28	Sabine, TX	8	1964	DSAW	750
173 (KM 318)	20	100-1	1,349.06	118-1 – 50528	118-1 – 51883	118-1 – 45216	118-1 - 57075	2.26	Kanawha, WV	2	1984	DSAW	910
174 (KM 319)	20	100-1	1,228.73	118-1 – 54017	118-1 – 55245	118-1 – 48737	118-1 – 60525	2.23	Kanawha, WV	3	1984	DSAW	910
175 (KM 320)	20	100-1	584.46	118-1 – 70516	118-1 – 70534	118-1 – 64688	118-1 – 75964	2.11	Kanawha, WV	1	1984	DSAW	910
176 (KM 322)	20	100-1	2,249.91	121-1 – 19064	121-1 – 21305	121-1 – 13822	121-1 – 26546	2.43	Kanawha, WV	3	1984	DSAW	936
182 (KM 330)	30	100-3	1,415.75	118-3 – 25714	118-3 – 27130	118-3 – 20434	118-3 – 32410	2.27	Putnam, WV	2	1972	DSAW	910
183 (KM 331)	30	100-3	891.2	118-3 – 31972	118-3 – 32863	118-3 – 26692	118-3 – 38143	2.17	Putnam, WV	2	1972	DSAW	910
188 (KM 341)	30	100-4	497.5	83-4B – 114836	83-4B – 115333	83-4B – 109556	84-4 – 3287	2.09	Cheatham, TN	7	1952	DSAW	750
189 (KM 342)	30	100-4	1,342.49	103-4 – 7517	103-4 – 8889	103-4 – 2237	103-4 – 14169	2.25	Madison, KY	1	1951	DSAW	750
190 (KM 343)	30	100-4	242.74	103-4 – 9445	103-4 – 9687	103-4 – 4165	103-4 – 14967	2.05	Madison, KY	1	1951	DSAW	750

Note: **DSAW** is double submerged arc welded pipe longitudinal seam.
EW is a submerged arc welded pipe longitudinal seam.
SAW is single submerged arc welded pipe longitudinal seam.
SMLS is seamless longitudinal seam.

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