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-2021-0019
Requested By:	Tennessee Gas Pipeline Company, LLC
Operator ID#:	19160
Original Date Requested:	December 29, 2020
Effective Dates:	August 4, 2022
Code Section(s):	49 CFR 192.611(a) and (d) and 192.619(a)

I. Background

The National Environmental Policy Act (NEPA), 42 United States Code (U.S.C.) 4321 – 4375, Council on Environmental Quality Regulations, 40 Code of Federal Regulations (CFR) Parts 1500-1508, and U.S. Department of Transportation (DOT) Order 5610.1C, requires the Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS),[1] to 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, grant with additional conditions, 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 as compared to the operation of the pipeline in full compliance with the Federal pipeline safety regulations. PHMSA's environmental review associated with the special permit application is limited to

[1] References to PHMSA in this document means PHMSA OPS.

impacts that would result from granting or denying the special permit. PHMSA developed this assessment to determine what effects, if any, our decision would have on the environment.

Pursuant to 49 United States Code (U.S.C.) 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.

The purpose of this final environmental assessment (FEA) is to comply with National Environmental Policy Act (NEPA) for the Tennessee Gas Pipeline Company, LLC (TGP)[2] application for a special permit to waive compliance from 49 CFR 192.611(a) and (d) and 192.619(a) for one (1) ***special permit segment*** and one (1) ***special permit inspection area*** along 647.49 feet (approximately 0.123 miles) of the natural gas transmission pipeline system in Tennessee. This FEA and finding of no significant impact (FONSI) is prepared by PHMSA to assess the pipeline special permit request, in accordance with 49 CFR 190.341, and is intended to specifically analyze any environmental impact associated with the waiver of 49 CFR 192.611(a) and (d) and 192.619(a). This FEA assesses the pipeline special permit request, in accordance with 49 CFR 190.341, and is intended to specifically analyze any environmental impact associated with the waiver of certain Federal pipeline safety regulations found in 49 CFR 192.611(a) and (d) and 192.619(a).

II. Introduction

Pursuant to 49 U.S.C. 60118(b) and 49 CFR 190.341, TGP submitted a special permit application to PHMSA on December 29, 2020, requesting that PHMSA waive the requirements of 49 CFR 192.611(a) and (d) and 192.619(a) to permit TGP to maintain the maximum allowable operating pressure (MAOP) to the pipeline segment where the class location has changed from Class 1 to Class 3 in Lewis County, Tennessee.

PHMSA is granting a special permit to waive certain regulatory requirements where it is not inconsistent with pipeline safety. A special permit is typically conditioned on the performance

[2] Tennessee Gas Pipeline Company, LLC is owned by Kinder Morgan, Inc.

of additional measures beyond minimum Federal pipeline safety regulations, in accordance with 49 CFR 190.341.

III. Regulatory Background

PHMSA regulations at 49 CFR 192.611(a) require that an operator confirm or revise the MAOP of a pipe segment that is in satisfactory condition when the hoop stress of the segment is no longer commensurate with class location. Under 49 CFR 192.611(a), an operator may be required to reduce the operating pressure of a pipe segment, or alternatively, may have to replace the pipe in order to maintain the MAOP. Below is the relevant text of 49 CFR 192.611(a):

49 CFR 192.611 Change in class location: Confirmation or revision of maximum allowable operating pressure.

(a) If the hoop stress corresponding to the established maximum allowable operating pressure of a segment of pipeline is not commensurate with the present class location, and the segment is in satisfactory physical condition, the maximum allowable operating pressure of that segment of pipeline must be confirmed or revised according to one of the following requirements:

(1) If the segment involved has been previously tested in place for a period of not less than 8 hours:

(i) The maximum allowable operating pressure is 0.8 times the test pressure in Class 2 locations, 0.667 times the test pressure in Class 3 locations, or 0.555 times the test pressure in Class 4 locations. The corresponding hoop stress may not exceed 72 percent of the SMYS of the pipe in Class 2 locations, 60 percent of SMYS in Class 3 locations, or 50 percent of SMYS in Class 4 locations.

(ii) The alternative maximum allowable operating pressure is 0.8 times the test pressure in Class 2 locations and 0.667 times the test pressure in Class 3 locations. For pipelines operating at alternative maximum allowable pressure per §192.620, the corresponding hoop stress may not exceed 80 percent of the SMYS of the pipe in Class 2 locations and 67 percent of SMYS in Class 3 locations.

(2) The maximum allowable operating pressure of the segment involved must be reduced so that the corresponding hoop stress is not more than that allowed by this part for new segments of pipelines in the existing class location.

3) The segment involved must be tested in accordance with the applicable requirements of subpart J of this part, and its maximum allowable operating pressure must then be established according to the following criteria:

(i) The maximum allowable operating pressure after the requalification test is 0.8 times the test pressure for Class 2 locations, 0.667 times the test pressure for Class 3 locations, and 0.555 times the test pressure for Class 4 locations.

(ii) The corresponding hoop stress may not exceed 72 percent of the SMYS of the pipe in Class 2 locations, 60 percent of SMYS in Class 3 locations, or 50 percent of SMYS in Class 4 locations.

(iii) For pipeline operating at an alternative maximum allowable operating pressure per §192.620, the alternative maximum allowable operating pressure after the requalification test is 0.8 times the test pressure for Class 2 locations and 0.667 times the test pressure for Class 3 locations. The corresponding hoop stress may not exceed 80 percent of the SMYS of the pipe in Class 2 locations and 67 percent of SMYS in Class 3 locations.

(d) Confirmation or revision of the maximum allowable operating pressure that is required as a result of a study under §192.609 must be completed within 24 months of the change in class location. Pressure reduction under paragraph (a) (1) or (2) of this section within the 24-month period does not preclude establishing a maximum allowable operating pressure under paragraph (a)(3) of this section at a later date.

49 CFR 192.619 What is the maximum allowable operating pressure for steel or plastic pipelines?

(a)(2)(ii) For steel pipe operated at 100 p.s.i. (689 kPa) gage or more, the test pressure is divided by a factor determined in accordance with **Table 1 – Maximum Allowable Operating Pressure for Steel or Plastic Pipelines**.

Table 1 - Maximum Allowable Operating Pressure for Steel or Plastic Pipelines

Table 1 to Paragraph (a)(2)(ii)

Class location	Factors, [1] segment - Installed before (Nov. 12, 1970)	Installed after (Nov. 11, 1970) and before July 1, 2020	Installed on or after July 1, 2020	Converted under § 192.14
1	1.1	1.1	1.25	1.25
2	1.25	1.25	1.25	1.25
3	1.4	1.5	1.5	1.5
4	1.4	1.5	1.5	1.5

[1] For offshore pipeline segments installed, uprated or converted after July 31, 1977, that are not located on an offshore platform, the factor is 1.25. For pipeline segments installed, uprated or converted after July 31, 1977, that are located on an offshore platform or on a platform in inland navigable waters, including a pipe riser, the factor is 1.5.

(3) The highest actual operating pressure to which the segment was subjected during the 5 years preceding the applicable date in the second column. This pressure restriction applies unless the segment was tested according to the requirements in paragraph (a)(2) of this section after the applicable date in the third column or the segment was uprated according to the requirements in subpart K of this part:

Section 192.619(a) requires Class 3 location pipe to be pressure tested to 1.5 times MAOP.

IV. Purpose and Need

TGP requested a waiver from the requirements of 49 CFR 192.611(a) and (d) and 192.619(a) for one (1) ***special permit segment*** consisting of approximately 0.123 miles (647.49 feet) of natural gas transmission pipeline listed below in **Table 2 – Special Permit Segment**. Without a special permit, the cited regulations require that TGP to complete pipe replacement, hydrotest, and pressure reduction, based on population changes in the vicinity of the ***special permit segment***. TGP must apply the special permit conditions to one (1) ***special permit segment*** to provide an equivalent margin of safety and environmental protection to meet the requirements of 49 CFR 192.611, as outlined in the special permit conditions.

The special permit establishes enhanced integrity management (IM) procedures to maintain pipe integrity and protect both the public and the environment for the class location units in which the ***special permit segment*** is located for the length of pipeline covered by the special permit. In addition, TGP must comply with conditions as provided in the terms of the special permit for all the impacted ***special permit segment*** and the ***special permit inspection area*** in the special permit.

The special permit authorizes future class changes within the ***special permit inspection area*** (***special permit segment extensions***) under the special permit, providing the ***special permit segment extensions*** meet the special permit conditions applicable to the ***special permit segment***. In that case, TGP must also notify PHMSA and update this FEA/FONSI.

V. Site Description

The ***special permit segment*** consists of approximately 0.123 miles of 36-inch diameter Line 500-3 located in Lewis County, Tennessee. The extent of the ***special permit segment*** is provided in **Table 2 - Special Permit Segment**. The ***special permit segment*** was constructed in 1972. The ***special permit inspection area*** extends approximately 28.28 miles of the pipeline and contain one (1) high consequences area (HCA), which are calculated by Method 2 (49 CFR 192.903).

VI. Special Permit Segment and Special Permit Inspection Area

Special Permit Segment:

This special permit applies to the ***special permit segment*** in **Table 2 – Special Permit Segment** and is identified using the TGP valve and survey station (SS) references.

Table 2 – Special Permit Segment

Special Permit Segment Number[3]	Outside Diameter (inches)	Line Name	Length (feet)	Start Survey Station (Valve – Station)	End Survey Station (Valve – Station)	County, State	No. Dwellings	Year Installed	Seam Type	MAOP (psig)
6 (KM 609)	36	500-3	647.49	557-3 – 33394.9	557-3 – 34042.39	Lewis, TN	2	1972	DSAW	938

Note: DSAW is double submerged arc welded pipe weld seam type.

Special Permit Inspection Areas:

The ***special permit inspection area*** is defined as the area that extends 220 yards on each side of the centerline as listed in **Table 3 – Special Permit Inspection Area** and fully defined below:

Table 3 – Special Permit Inspection Areas

Special Permit Inspection Area Number	Special Permit Segment(s) Included	Outside Diameter (inches)	Line Name	Master Segment Name	Start Survey Station (Valve - SS)	End Survey Station (SS)	Length[4] (miles)
1	6 (KM 609)	36	500-3	557-3 TO 559-3	557L-3 - 0	557-3 – 75300.65	28.28

[3] On February 3, 2022, TGP rescinded requested ***special permit segment numbers 1 (KM 604), 2 (KM 605), 3 (KM606), 4 (KM 607), 5 (KM 608),*** and ***7 (KM 610)***. These segments were withdrawn at the request of PHMSA.

[4] If the ***special permit inspection area*** footage does not extent from launcher to receiver then the ***special permit inspection area*** would need to be extended.

The ***special permit inspection area***, which includes the ***special permit segment*** and HCAs, are in Hickman and Lewis Counties, Tennessee. **Attachment B** is a route maps showing the ***special permit segment*** and ***special permit inspection area***. **Attachments C** is a detailed map showing the area near the ***special permit segment***.

High Consequence Area:

The ***special permit inspection area*** contains high consequence areas (HCAs) calculated by Method 2 (49 CFR 192.903) and are caused by ≥ 20 dwellings or an identified site within the calculated potential impact circle of the pipeline. HCAs located in the ***special permit inspection area*** are provided in **Table 4 – High Consequence Area**

Table 4 - High Consequence Area				
Special Permit Inspection Area	Line Name	HCA ID	HCA Begin Survey Station	HCA End Survey Station
6	500-3	2962	557-3 - 27637.50	557-3 - 31885.96

PHMSA is granting this special permit request based on this document and the "Special Permit Analysis and Findings" document, which is incorporated by reference into this document and can be read in its entirety in Docket No. PHMSA-2021-0019 in the Federal Docket Management System (FDMS) located on the internet at www.regulations.gov.

VII. Alternatives

Alternative 1: "No Action" Alternative

If PHMSA were to select the "no action" alternative, PHMSA would deny TGP's special permit request, TGP would be required to fully comply with 49 CFR 192.611(a) and (d) and 192.619(a). In order to maintain the existing MAOP, TGP would be required to replace the approximately 0.123 miles of pipe with a higher-grade pipe in the ***special permit segment***, or alternatively, TGP would be required to reduce pressure on the segment. TGP states that it

would choose to replace the segment to maintain MAOP.[5]

Alternative 2: "Selected" Alternative – Issuance of the Special Permit

PHMSA is granting the proposed special permit for ***special permit segment*** 6 with the below conditions, and TGP is allowed to continue to operate at the current maximum allowable operating pressure (MAOP) of 938 pounds per square inch gauge (psig) on the Line 500-3 Pipeline in the Class 3 location without replacing pipe while complying with the special permit conditions, as described below. Because inline inspection tool data indicated the presence of stress corrosion cracking and potential issues with electric fusion welds in certain areas of the line, TGP withdrew its requests for proposed ***special permit segments* 1-5 and 7,** which were included in the **Proposed Action** described in the DEA**.**[6]

VIII. Overview of Special Permit Conditions

The special permit conditions are designed to prevent leaks and ruptures such that the Special Permit is not inconsistent with pipeline safety. This section provides an overview of the special permit conditions. This section provides an overview of the special permit conditions. This section provides an overview of the special permit conditions. For TGP specific technical requirements and the special permit conditions can be read in its entirety in Docket No. PHMSA-2021-0019 in the Federal Docket Management System located on the internet at www.regulations.gov or on the PHMSA website for special permits issued at https://www.phmsa.dot.gov/pipeline/special-permits-state-waivers/special-permits-issued.

1) **Current Status of Pipe in the Ground**

   To ensure that key characteristics of the pipe currently installed in the ***special permit segment*** are known, records that confirm pipe specifications, successful pressure tests, and girth weld non-destructive tests are required. Should records be unavailable or unacceptable, additional activities as detailed in the special permit must be completed. If these additional

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

[6] The letters wherein TGP withdrew proposed ***special permit segments* 1-5** and **7** from its ***special permit segments*** available on this docket, PHMSA-2021-0019 on www.regulations.gov. PHMSA's response to the withdrawal is also available on the docket.

activities are not completed or should pipe be discovered that does not meet specific requirements of eligibility, the ***special permit segment*** must be replaced.

2) **Operating Conditions**

The ***special permit inspection area*** must continue to be operated at or below the existing MAOP until a restoration or uprating plan has been approved, if allowed by the special permit. To ensure compliance with special permit conditions, TGP's Operations and Maintenance Manual (O&M), Integrity Management Program (IMP), and Damage Prevention (DP) program must be modified to implement the special permit conditions. In addition, PHMSA must approve any long-term flow reversals that would impact ***special permit segment(s)***.

3) **Threat Management**

Threats are factors that can lead to the failure of a pipeline. Activities are required to identify, assess, remediate, and monitor threats to the pipeline.

a) **General activities.** TGP must perform annual data integration and identification of threats to which the ***special permit inspection area*** is susceptible. These activities must include integrity assessments with specific inline inspection tools (ILI), strict anomaly repair criteria, and appropriate environmental assessment and permitting. Additional integrity assessment methodologies may be used if allowed by the special permit. Integrity assessments must then be conducted periodically at an interval determined in the special permit for each threat identified.

b) **External corrosion control requirements.** The special permit requires additional activities to monitor and mitigate external corrosion. These activities include installation and annual monitoring of cathodic protection (CP) test stations, periodic close interval surveys (CIS), and clearing or remediating shorted casings that may impede CP effectiveness. These activities ensure the appropriate level of CP is reaching the pipeline in areas where coating loss or damage has occurred in order to prevent or mitigate external corrosion. In addition, TGP would be required to develop and implement a plan that identifies and remediates interference from alternating or direct current (AC/DC)

sources (such as high-voltage powerlines) that could adversely impact the effectiveness of CP.

c) **Internal corrosion control requirements.** The special permit includes gas quality specifications to mitigate internal corrosion because internal corrosion is highly dependent on the quality of the gas transported within the pipeline and.

d) **Stress corrosion cracking requirements.** To ensure that stress corrosion cracking (SCC) is discovered and remediated, any time a pipe segment is exposed during an excavation TGP must examine coating to determine type and condition. If the coating is in poor condition, TGP must conduct additional SCC analysis. If SCC is confirmed, TGP must implement additional special permit defined remediation and mitigation.

e) **Pipe seam requirements.** TGP must perform an engineering integrity analysis to determine susceptibility to seam threats. TGP must re-pressure test any ***special permit segment*** with an identified seam to ensure the issue is not systemic in nature.

f) **External pipe stress requirements.** Upon identification of any source of external stress on the pipeline (such as soil movement), TGP must develop procedures to evaluate and periodically monitor these stresses.

g) **Third-party specific requirements.** To assist in identifying the pipeline location and minimizing the chance of accidental pipeline strikes, TGP must install and maintain line-of-site markers for the pipeline. TGP must perform mitigation activities for any location where a depth-of-cover survey shows insufficient soil cover.

4) **<u>Consequence Mitigation</u>**

To ensure quick response and decreased adverse outcome in the event of a failure, each side (upstream and downstream) of the ***special permit segment*** must have and maintain operable automatic shutdown valves (ASV) or remote-controlled valves (RCV). TGP must monitor valves through a control room with a supervisory control and data acquisition (SCADA) system. In addition to the mainline valves, should a crossover or lateral connect between the valve locations, additional isolation valves may be required.

5) **Post Leak or Failure**

If the ***special permit inspection area*** experiences an in-service or pressure test leak/failure, TGP must conduct a root cause analysis to determine the cause. If the cause is determined to be systemic in nature, TGP must implement a remediation plan or the ***special permit segment*** must be replaced, as determined by the special permit specific conditions.

6) **Class Location Study and Potential Extension of Special Permit Segment**

TGP must conduct a class location study at an interval specified in the special permit. This allows TGP to quickly identify extended locations that must comply with the ***special permit segment*** requirements. TGP may extend a ***special permit segment*** with proper notification, update of the FEA, and implementation of all requirements in the special permit.

7) **PHMSA Oversite and Management**

PHMSA maintains oversight and management of each special permit. This includes annual meetings with executive level officers on special permit implementation status, written certification of the special permit, special permit required notification of planned activities, notification of root cause analysis results, and notification prior to certain excavation activities so that PHMSA may observe.

8) **Gas Leakage Surveys and Remediation**

The ***special permit segment*** and ***special permit inspection area*** have requirements in the special permit to conduct leakage surveys more frequently than is presently required in 49 CFR 192.706. Gas leakage surveys using instrumented gas leakage detection equipment must be conducted along the ***special permit segment*** and at all valves, flanges, pipeline tie-ins with valves and flanges, ILI launcher, and ILI receiver facilities in the ***special permit inspection area*** at least twice each calendar year, not to exceed 7½ months. The type of leak detection equipment used, survey findings, and remediation of all instrumented gas leakage surveys must be documented by TGP. The special permit will require a three-step grading process with a time interval for remediation based upon the type of leak.

9) **Documentation**

TGP must maintain documentation that supports compliance with special permit conditions for the life of the pipeline.

IX. Affected Resources and Environmental Consequences

TGP is granted a special permit that waives compliance with 49 CFR 192.611(a) and (d) and 192.619(a) for one (1) ***special permit segment*** totaling approximately 0.123 miles located within one (1) ***special permit inspection area*** totaling approximately 28.28 miles. TGP must comply with the special permit conditions within the ***special permit segment***.

Implementation of the special permit conditions, including enhanced IM procedures, provides an additional level of safety without the impacts of excavation to remove existing pipe, install the replacement pipe, and conduct pressure testing of the existing pipe. Thus, TGP will avoid disturbing approximately 0.123 miles of the pipeline right of way (ROW), with the exception of additional inspections that may be required to satisfy the conditions of the special permit such as those related to the IM protocols that may require verification digs and potential anomaly evaluations/repairs.

Implementing additional preventative and mitigative measures enables a pipeline to improve its knowledge and understanding of the pipeline's integrity, accelerate the identification and repair of actionable anomalies, and better manage and mitigate threats to the public and environment. Therefore, implementing enhanced inspection and assessment practices within the ***special permit inspection area***, in lieu of replacing and pressure testing the small sections of pipe experiencing the class location changes, extends pipeline safety benefits to a much greater area, and avoids environmental disturbances.

An analysis of environmental resources and potential environmental consequences in the vicinity of the ***special permit segment*** is provided in the following sections. This FEA incorporates the SPAF, which is available under this docket on www.regulations.gov. The SPAF does not describe any integrity issue that would affect the approval of the special permit or the development of the special permit conditions.

A. Affected Resources and Environmental Consequences of the Proposed Alternative and the No Action Alternative

Aesthetics: The visual character of the ***special permit segment*** and the ***special permit inspection area*** will not be changed by the approval of this special permit request. The objective of the special permit is to avoid construction or ground disturbances in the pipeline ROW that would be necessitated if the special permit was not granted. Therefore, the issuance of the requested special permit will result sporadic and temporary aesthetic impacts due to increased monitoring, maintenance, and repair activities along the affected ***special permit segment*** or ***special permit inspection area***.

Denial of the special permit request would require the replacement or pressure testing of the pipeline segment associated with this special permit request. Pipe replacement would require removal of the existing pipe and installation of a new pipe. This would result in the use of heavy equipment and ground disturbance. Furthermore, pressure testing would also require disturbances along the pipeline ROW.

Agricultural Resources: The area surrounding the ***special permit segment*** contain cultivated crops. The issuance of the special permit will reduce short term impact to agricultural resources in the ***special permit segment***. Increased monitoring and maintenance requirements imposed by the special permit conditions could increase these activities causing temporary and isolated impacts to the ***special permit inspection area*** throughout the duration of the special permit. The aim of the special permit is to avoid the higher impact construction activities associated with pipeline replacement in the right-of-way along the ***special permit segment***.

Air Quality: The Proposed Action would have resulted in fewer blowdown emissions in comparison to the Selected Action, but the special permit application was modified by the withdrawal of proposed ***special permit segments* 1-5** and **7** due to certain integrity concerns. The Selected Action avoids the blowdown that would have been required for the replacement or hydrotest of ***special permit segment* 6.** If the permit were denied, pipe replacement of the ***special permit segment*** would be required, which would necessitate blowing down the pipeline to release unburned natural gas, which is a powerful greenhouse gas. If the special permit is granted, it could have minimal impacts on air quality in the ***special permit segment*** due to

combustion emissions resulting from surveillance, assessment, and maintenance activities required by the permit. The no action alternative would have a more substantial, though still minimal effects onair quality, with additional emissions that are temporary caused by equipment use during excavation, pipe removal, pipe replacement, and pipe installation.

Biological Resources: ***Special permit segment 6*** consists of grasslands land cover with mixed forests located directly adjacent to the right-of-way. There are four (4) Federally listed threatened and endangered species listed as having the potential to occur within the ***special permit segment***. No critical habitat was identified within the ***special permit segment***.

Any potential impacts to wildlife will be temporary in nature and may include disturbance from increased human presence, vehicle access, vegetation clearing, and use of mechanized equipment within the project area. Some avian species may occasionally fly over or forage within the project location or stop over during migration.

Table 5.
Federally Listed Threatened and Endangered Species with the Potential to Occur along the *Special Permit Segment* and Preliminary Effect Determination for the "Selected" Alternative, Lewis County, Tennessee

Common Name	Scientific Name	Federal	Habitat Description	Occurrence	Effect
Birds					
Eastern Black Rail	*Laterallus jamaicensis*	T	In Texas Black Rails are usually found in saltgrass marshes (AgriLife Ext 2020).	Not likely to occur.	No effect
Least Tern	*Sterna antillarum*	E	This project only needs to be considered if the project is wind related within the migratory route (USFWS 2020).	Not likely to occur.	No effect
Piping Plover	*Charadrius melodus*	T	This project only needs to be considered if the project is wind related within the migratory route (USFWS 2020).	Not likely to occur.	No effect
Red-cockaded Woodpecker	*Picoides borealis*	E	This species of bird roost and nest exclusively in live pine trees. They require pines at least 60 years old but prefer 80 to 100-year old pines infected with red heart fungus (USFWS 2020).	Not likely to occur.	No effect
Red Knot	*Calidris canutus rufa*	T	This project only needs to be considered if the project is wind related within the migratory route (USFWS 2020).	Not likely to occur.	No effect
Clams					

Table 5. Federally Listed Threatened and Endangered Species with the Potential to Occur along the *Special Permit Segment* and Preliminary Effect Determination for the "Selected" Alternative, Lewis County, Tennessee					
Common Name	Scientific Name	Federal	Habitat Description	Occurrence	Effect
Pink Mucket	*Lamsilis abrupta*	E	This mussel is found in mud and sand and in shallow riffles and shoals swept free of silt in major rivers and tributaries. This mussel buries itself in sand or gravel, with only the edge of its shell and its feeding siphons exposed (USFWS 2020).	Not likely to occur.	No effect
Rabbitfoot	*Quadrula cylindrical cylindrical*	T	This species generally inhabits small- to medium-sized stream and some larger rivers. It occurs shallow water areas along the bank and in shoals with reduced water velocity. Individuals have also been found in deep water runs (9-12 ft.). Primary substrate includes gravel and sand (USFWS 2020).	Not likely to occur.	No effect
Snuffbox Mussel	*Epioblasma triquetra*	E	This mussel is primarily a large creek to moderately-sized river species. It generally is found in gravel substrates with interstitial sand, with moderate current, at depths less than 1 meter deep in moderate to swift current velocities. This species requires flowing, well oxygenated waters to thrive (USFWS 2020).	Not likely to occur.	No effect
Crustaceans					
Kentucky Cave Shrimp	*Palaemonias ganteri*	E	This species only lives in underground streams. They typically inhabit large, base-level cave streams characterized by slow flow, abundant organic material, coarse to fine grain sand, and coarse silt sediments (USFWS 2020).	Not likely to occur.	No effect
Flowering Plants					
Short's Bladderpod	*Physaria globose*	E	Steep, rocky wooded slopes and talus areas occur along cliff tops and bases and cliff ledges. Found adjacent to rivers or streams and on south to west facing slopes (USFWS 2020).	Not likely to occur.	No effect

Table 5. Federally Listed Threatened and Endangered Species with the Potential to Occur along the *Special Permit Segment* and Preliminary Effect Determination for the "Selected" Alternative, Lewis County, Tennessee					
Common Name	Scientific Name	Federal	Habitat Description	Occurrence	Effect
Tennessee Yellow-eyed Grass	*Xyris tennesseensis*	E	This species is found in open or thin canopy woods in gravelly seep-slopes or gravelly bars and banks of small streams, springs and ditches. This species is restricted to basic or circumneutral soils that thinly cover calcareous substrates with year-round seepage or mineral-rich water flow NatureServe 2020).	Not likely to occur.	No effect
Texas Prairie Dawn-flower	*Hymenoxys texana*	E	This species occurs at the base of small mounds in grasslands in poorly drained, sparsely vegetated areas. It is also found in almost barren areas on slightly salty soils (TPWD 2020c).	Not likely to occur.	No effect
Mammals					
Gray Bat	*Myotis grisescens*	E	With rare exceptions, gray bats live in caves year-round. During the winter, gray bats hibernate in deep, vertical caves. In the summer, they roost in caves which are scattered along rivers. These caves are in limestone karst areas of the southeastern United States.	Not likely to occur.	No effect
Indiana Bat	*Myotis sodalis*	E	The Indiana bat hibernates in caves during the winter. Summer habitat includes small to medium river and stream corridors with well developed riparian woods; woodlots within 1 to 3 miles of small to medium rivers and streams; and upland forests. Caves and mines as hibernacula (USFWS 2020).	Not likely to occur.	No effect

Table 5. **Federally Listed Threatened and Endangered Species with the Potential to Occur along the *Special Permit Segment* and Preliminary Effect Determination for the "Selected" Alternative, Lewis County, Tennessee**					
Common Name	Scientific Name	Federal	Habitat Description	Occurrence	Effect
Northern Long-eared Bat	*Myotis septentrionalis*	T	Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). Males and non-reproductive females may also roost in cooler places, like caves and mines. Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices (USFWS 2020).	Potential to occur along the forest edges.	No effect
West Indian Manatee	*Trichechus manatus*	T	Manatees live in marine, brackish, and freshwater systems in coastal and riverine areas throughout their range. Preferred habitats include areas near the shore featuring underwater vegetation like seagrass and eelgrass (USFWS 2020).	Not likely to occur.	No effect
Reptiles					
Louisiana Pinesnake	*Pituophis ruthveni*	T	This species is generally associated with sandy, well-drained soils; open pine forests, especially longleaf-pine savannah; moderate to sparse midstory; and a well-developed herbaceous understory dominated by grasses (USFWS 2020).	Not likely to occur.	No effect
T: Threatened (State and Federal) E: Endangered (State and Federal)					

Increased maintenance, monitoring, and repair activities in order to achieve compliance with this special permit in the ***special permit segment*** and ***special permit inspection area*** will be conducted within the boundaries of the previously disturbed pipeline right-of-way. TGP will request no effect concurrence from the United States Fish and Wildlife Service Twin Cities Ecological Services Field Office for any proposed future work by TGP to be undertaken within its existing, previously disturbed right-of-way to ensure compliance with Section 9 of the Endangered Species Act (ESA). Replacement of line pipe in the ***special permit segment*** would

result in increased disturbance to wildlife habitat, though that disturbance will also be temporary and limited in nature.

Climate Change: The scope and duration of any activities associated with the ***special permit segment***, including maintenance and repair activities will have minimal impact on climate change. A benefit of the "Selected" Alternative is that it will avoid methane venting, construction, or ground disturbances in the pipeline ROW. The "No Action" Alternative would not grant a special permit, requiring the pipe replacement and/or hydrotesting would be required, which would necessitate the use of heavy equipment during construction and blowing down the pipeline releasing natural gas, a known greenhouse gas. The Proposed Action in the DEA would have waived the requirements to replace and/or hydrotest the line for seven (7) total segments. This Alternative would have avoided a greater quantity of blowdown emissions, but EGP withdrew requests for ***special permit segments* 1-5** and **7** for integrity reasons, including SCC and electric flash welded (EFW) seams. A pipeline failure or leak could result in much larger quantity of released methane or carbon dioxide and result in other harmful impacts to human safety and the environment. Pipeline operators can and should mitigate blowdowns through pressure reductions and capture and storage of natural gas during pipeline work. However, PHMSA does not currently have authority to mandate these mitigation measures.

The "Selected" alternative will result in emissions that result from increased maintenance, monitoring, and repair requirements for the duration of the special permit. These emissions will be expected to be significantly less than the replacement associated with the "No Action" alternative.

The scope and duration of any activities associated with the special permit will have an insignificant impact on climate change.

Cultural Resources: There are no cultural, archaeological, or paleontological resources that will be impacted by this special permit request because the right of way was disturbed during initial construction of the pipeline. A cultural resource survey completed in 2020 determined no National Register of Historical Places (NRHP) listed building is located within one (1) mile of the ***special permit segment***.

Environmental Justice: The special permit alternative associated with this special permit will not have an adverse impact on the local population. The ***special permit segment*** is not situated in or disproportionately impacts any predominantly minority, low income, or non-English language populations as demonstrated in **Table 6 – Demographic Information for Special Permit Segment – Using EPA EJScreen**. In any event, the activities of the special permit are intended to maintain safety along the ***special permit segment*** and increase the level of the safety along the 28.28-mile ***special permit inspection area***.

The special permit is intended to maintain or increase safety with the implementation of safety conditions in the ***special permit segment***. Many special permit conditions also apply to the ***special permit inspection area*** and will not have a disparate impact on any minority, low income, or limited English proficiency populations. This special permit will also reduce climate change impacts, which are understood to disproportionately affect low-income and minority communities. Therefore, consistent with DOT Order 5610.2C ("Department of Transportation Actions to Address Environmental Justice in Minority Populations and Low-Income Populations") and Executive Orders 12898 ("Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations"), 13985 ("Advancing Racial Equity and Support for Underserved Communities Through the Federal Government"), 13990 ("Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis"), 14008 ("Tackling the Climate Crisis at Home and Abroad"), 12898 and DOT Order 5610.2(a), and Department of Transportation Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, PHMSA does not anticipate that the special permit will result in disproportionately high and adverse effects on minority or low-income populations.

Table 6 - Demographic Information for Special Permit Segment – Using EPA EJScreen

Special Permit Segment	State	County / Parish	Total Population (Along Special Permit Segment)	Minority*/People of Color** Population	Low Income Population (%)	Linguistically Isolated (%)
6	Tennessee	Lewis	11	0	47	0

Minority*: The term minority is used in the currently active DOT Environmental Justice Order 5610.2(a), available at: https://www.fhwa.dot.gov/environment/environmental_justice/ej_at_dot/orders/order_56102a/index.cfm

Table 6 - Demographic Information for Special Permit Segment – Using EPA EJScreen
People of Color**: The term people of color is used in EPA's Environmental Justice Screening and mapping tool (EJSCREEN). An overview of demographic indicators through EJSCREEN is available at: https://www.epa.gov/ejscreen/overview-demographic-indicators-ejscreen

Geology, Soils, and Mineral Resources: ***Special permit segment 6*** is located within the St. Louis Limestone Geologic Formation which is characterized by fine-grained, brownish-gray limestone, dolomitic and cherty and Warsaw Limestone Geologic Formation, which is characterized by coarse-grained, gray, cross bedded limestone. The dominant soil type is ironcity gravelly silt loam, 5 to 12 percent slopes. Soils in this group are well drained are classified as not prime farmland.

There has been no historical earthquake within 61 miles of the ***special permit segment***, however because of the distance from the pipeline, the local intensity (MMI scale) at the pipeline would have been diminished and may not have met the initial threshold of interest. The initial threshold is only a starting point of interest and is well below any level of concern. Earthquake activity impact analysis for TGP's pipelines is based upon magnitude, location, intensity extents, and analytical information provided by the USGS quantifying ground shaking and strength at our pipelines. The Modified Mercalli Intensity (MMI scale) provides an understanding of the intensity decrease with distance. For TGP, conditions of initial interest would not be expected until an earthquake magnitude reaches M4.5 (referenced and explained in chart below) and greater with the epicenter directly at the pipeline or when the local ground shaking at the pipeline resulting from a remotely located event reaches an assigned MMI value of at least VI.[7]

If granted the special permit will minimize the ground disturbance and existing conditions will remain undisturbed. As such, geologic, soil, and mineral resources will not be impacted.

Indian Trust Assets: According to the U.S. Department of Interior, Bureau of Indian Affairs (2016), there are no Federally recognized Indian tribes or tribal reservations in the counties with the ***special permit segment***. The scope and duration of any compliance work resulting from the

[7] The Modified Mercalli Intensity (MMI) value assigned to a specific site after an earthquake has a more meaningful measure of severity to nonscientist than the magnitude because intensity refers to the effects actually experienced at that place. The MMI is provided by the USGS (United Stated Geological Service) after earthquake. See chart below for more information.

special permit will have little to no effect or impact on the socioeconomics in the surrounding area.

Land Use: Minimal ground disturbance or modifications to TGP system along the ***special permit segment*** and ***special permit inspection area*** will occur as part of the special permit from increased maintenance activities. The special permit will not impact land use or planning and does not require permits from local governments.

Noise: The scope and duration of any maintenance or repair activities required for compliance with the special permit along the ***special permit segment*** and ***special permit inspection area*** will cause minimal localized and temporary increases in noise levels in the vicinity of the pipeline. These noise impacts could occur throughout the duration of the special permit, which could be many years. Denial of the special permit or the "no action" alternative would likely result in more significant and concentrated, though temporary increases in noise during the replacement of the existing pipe. However, potential noise impacts will occur only in the vicinity of the ***special permit segment*** that may be replaced, rather than the proposed ***special permit inspection area***.

Recreation: The request could have minimal impacts on recreational resources in the ***special permit segment*** and ***special permit inspection area*** due to compliance with increased maintenance, monitoring, and repair activities required for compliance with the special permits. The impacts will be temporary and sporadic throughout the applicability of the proposed special permit.

Denial of the special permit or the "no action" alternative would result in temporary increases in disturbances to recreational activities during the replacement of the existing pipe.

Safety: 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 installation of new pipe with either or both of heavier walled or higher grade pipe with new, modern coating to protect against integrity risks to occupants along the pipeline segment.

The special permit enhanced IM conditions are designed to identify and mitigate integrity threats that could threaten the ***special permit 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 that would not have the enhanced IM protections.

Under the "Selected" Alternative of granting a special permit, PHMSA will require increase IM inspections for the ***special permit inspection area*** adjacent to the ***special permit segment***, which will lower the risk in areas beyond the ***special permit segment***. TGP must implement the conditions in ***special permit inspection area*** for the duration of the special permit.

PHMSA analyzed the integrity conditions and history of the TGP natural gas transmission pipeline system, and PHMSA determined that the pipeline is in satisfactory condition for the issuance of the ***special permit*** for ***special permit segment*** 6. Details about the pipeline's integrity and compliance history are provided in the SPAF s document, which is available in the docket.

Performance 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, the pipeline ***special permit segment*** included under the special permit will 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 the ***special permit segment*** into the TGP IM Program, close interval corrosion surveys, implementation of a cathodic protection reliability improvement plan, an in-line inspection 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.

(a) Will operation under a special permit change the risk of rupture or failure?

Operation under the special permit will not be expected to have an impact on the risk of failure or rupture as the operating conditions of the ***special permit segment*** have not changed. The special permit will require inspections at intervals similar to IM program intervals, which will maintain the integrity of the ***special permit segment*** over the life of the special permit.

(b) If a failure occurred, will consequences and spill or release volumes be different if PHMSA granted the permit? Will granting this permit increase, decrease, or have no change on the risk of failure?

The consequences of any spill or release will 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.

If PHMSA denied the special permit request and TGP opted to lower the pressure, the potential impact radius (PIR) would be smaller in the event of a pipeline failure. However, TGP's contractual obligations would not allow for a lowering of pressure and therefore, TGP would need to replace the existing pipeline.

(c) Will the Potential Impact Radius (PIR) of a rupture change under the Special Permit? Please calculate and provide the PIR data, if applicable. Will more people be affected by a failure if PHMSA granted the permit?

As compared to current operation, the PIR as calculated in accordance with 49 CFR 192.903 will not change under the special permit since the maximum allowable operating pressure and pipe diameter will not change, thus there will be no additional impact on the public. The PIR for the ***special permit segment*** is calculated below.

$$PIR = 0.69 * (MAOP * NOMINAL\ DIAMETER^2)^{0.5}$$

For ***special permit segment 6,*** calculated $PIR = 0.69 * (938 * 36^2)^{0.5} = 760$ feet

(d) Will operation under the Special Permit have any effect on pipeline longevity or reliability? Will there be any life cycle or maintenance issues?

Operation under the special permit conditions will provide a positive impact on pipeline longevity and reliability. PHMSA does not anticipate any deleterious life cycle or maintenance issues related to operation of the pipeline special permit segment by implementation the special permit by TGP.

Socioeconomics: This special permit will not be situated in, or disproportionately impact, any predominantly low-income populations. The scope and duration of any activities associated with the ***special permit segment*** will have no impact on the socioeconomics in the vicinity of the Lewis County, Tennessee.

Approximately 19.5% of individuals in Lewis County, Tennessee, are living below the poverty level, and 12% of individuals are living below 125% of the poverty level. The project is not situated in, or disproportionately impacts, any predominantly low-income populations.

If granted, a special permit will be designed to maintain pipeline safety for the ***special permit segment*** and increase pipeline safety for the ***special permit inspection area.***

Topography: The topography of the area surrounding the proposed ***special permit segment*** is flat open and forested land. The aim of the special permit is to avoid construction and other ground disturbing activities in the right-of-way.

No construction-related activities will occur if the special permit is granted; therefore, the topography in the area will not be affected.

Transportation: The ***special permit segment*** will be accessed by existing roads and right-of-way crossings. No construction-related activities will occur as part of the special permit request; therefore, traffic will not increase, and construction of additional roads will not be required. Concerns about temporary increases in traffic that could result from pipeline segment replacement are outweighed by longer term risk to infrastructure, the public and the environment.

Water Resources: The ***special permit segment 6*** is located in the Cane Creek watershed and does not cross any surface waterbody features. ***Special permit segment 6*** does not cross any wetland areas and is not located within a FEMA mapped 100-year floodplain.

Excavation during pipeline replacement and repair activities can cause increased runoff and siltation of nearby water resources. Siltation can decrease oxygen levels and visibility, affecting the feeding and reproduction of benthic macroinvertebrates, fish, reptiles, amphibians, and water fowl. These impacts vary greatly due to duration and quantity of runoff. If PHMSA would have selected the Proposed Action, it would have waived requirements to replace or hydrotest proposed ***special permit segments* 1-5** and **7.** Selection of the Proposed Action would have further reduced potential increased runoff and siltation in comparison to the No Action Alternative and the Selected Action. TGP withdrew its requests for those segments based on integrity concerns related to SCC and EFW seams in certain areas of the pipeline. Although unlikely, a pipeline failure could cause more significant human health and environmental impacts. Nonetheless, issuance of the special permit for ***special permit segment* 6** could reduce impacts to water bodies caused by runoff from excavation.

Minor impacts associated with repair requirements for ***special permit segment* 6** could occur for as long as the special permit remains in effect. In the event that the special permit is denied, more significant, yet temporary runoff or siltation impacts could affect water bodies in the vicinity of the ***special permit segment***. In each case, TGP is required to follow Federal, State, and local law to minimize impacts to these resources.

B. Comparative Environmental Impacts of Alternatives

As PHMSA recognized in its June 29, 2004, Criteria for Class Location Change Waivers, implementing additional preventative and mitigative measures enables a pipeline operator to improve its knowledge and understanding of the pipeline's integrity, accelerate the identification and repair of actionable anomalies, and better manage and mitigate threats to the public and environment. Implementing enhanced inspection and assessment practices throughout the ***special permit segment*** and ***special permit inspection area***, in lieu of replacing a small segment of pipe experiencing the class location change, extends pipeline safety benefits to a much greater area along the pipeline. In addition, avoiding pipe excavation and replacement will minimize

costs to the operator, will avoid delivery interruptions and supply shortages, and avert environmental disturbance. All of these benefits will be realized under TGP's requested special permit.

If the special permit is not granted, 49 CFR 192.611(a) would require pipe replacement. However, the monitoring conditions associated with the special permit would not be applicable if the special permit was denied because those conditions are not mandated by applicable regulations. Accordingly, both alternatives are anticipated to lead to a similar safety result.

The mode of pipeline failure would be the same whether the pipe operates under a special permit or is replaced.

The natural environment would be temporarily disturbed if the pipe is replaced; a special permit will have no impact on the environment. Although relatively minor, greater environmental and noise impacts could result from replacement of the pipeline segment that has undergone a class-location change due to population increase. PHMSA concludes that the relatively minor and temporary environmental impacts associated with full regulatory compliance, rather than waiver, are appropriate and could potentially avoid future impact of a higher degree.

X. Consultation and Coordination

TGP and PHMSA personnel involved in preparation of this document include:

Personnel from TGP

Jaime Hernandez - Director of Codes and Standards

Charlie Childs – Manager, IC Pipeline Integrity

Justin Durham - Manager, Engineering

Gary Taylor- Manager, Pipeline Compliance Systems

Johnson Samuel – Project Management Specialist Compliance systems

Cass Shannon - Specialist SR 1, Project Permitting – Minor Projects

PHMSA

Amelia Samaras, PHMSA, US DOT

Steve Nanney, PHMSA, US DOT

XI. Response to Public Comments Placed on Docket PHMSA-2021-0019

PHMSA published the special permit request in the Federal Register (86 FR 31571) for a 30-day public comment period from June 14 through July 14, 2021. The special permit application from TGP, draft environmental assessment and proposed finding of no significant impact, and draft special permit conditions were available in Docket No. PHMSA-2021-0019 at: www.regulations.gov. PHMSA did not receive any comments with regards to the special permit application.

XII. Finding of No Significant Impact

In consideration of the analysis and special permit conditions explained above, pipeline condition, and safety history, PHMSA finds that no significant negative impact will result from the issuance and full implementation of the above-described special permit to waive the requirements of 49 CFR 192.611(a) and (d) and 192.619(a) for one (1) ***special permit segment***, which consists of approximately 0.123 miles of 36-inch diameter Line 500-3 located in Lewis County, Tennessee. This special permit will require TGP to implement additional conditions to the operations, maintenance, and IM of the ***special permit segment*** and ***special permit inspection area***.

XIII. Bibliography

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Earthquake Magnitude Scale

Richter Magnitudes	Description	Earthquake Effects	Frequency of Occurrence
Less than 2.0	Micro	Micro-earthquakes, not felt.	About 8,000 per day
2.0 - 2.9	Minor	Generally not felt, but recorded.	About 1,000 per day
3.0 - 3.9	Minor	Often felt, but rarely causes damage.	49,000 per year (est.)
4.0 - 4.9	Light	Noticeable shaking of indoor items, rattling noises. Significant damage unlikely.	6,200 per year (est.)
5.0 - 5.9	Moderate	Can cause major damage to poorly constructed buildings over small regions. At most slight damage to well-designed buildings.	800 per year
6.0 - 6.9	Strong	Can be destructive in areas up to about 160 kilometers (100 mi) across in populated areas.	120 per year
7.0 - 7.9	Major	Can cause serious damage over larger areas.	18 per year
8.0 - 8.9	Great	Can cause serious damage in areas several hundred miles across.	1 per year
9.0 - 9.9	Great	Devastating in areas several thousand miles across.	1 per 20 years
10.0+	Epic	Never recorded	Extremely rare (Unknown)

(Based on U.S. Geological Survey documents.)[2]

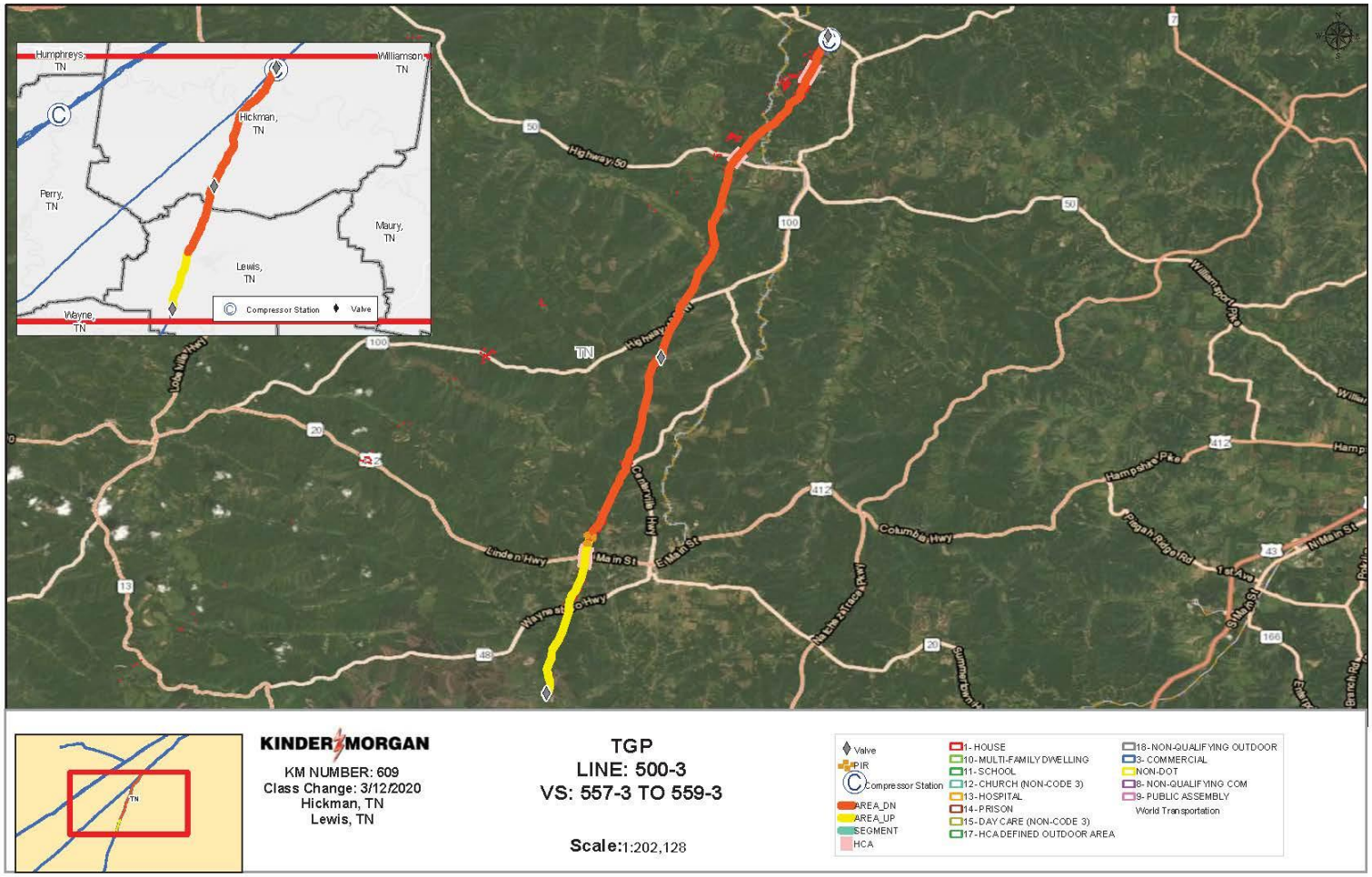
Modified Mercalli Intensity Scale

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest,especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

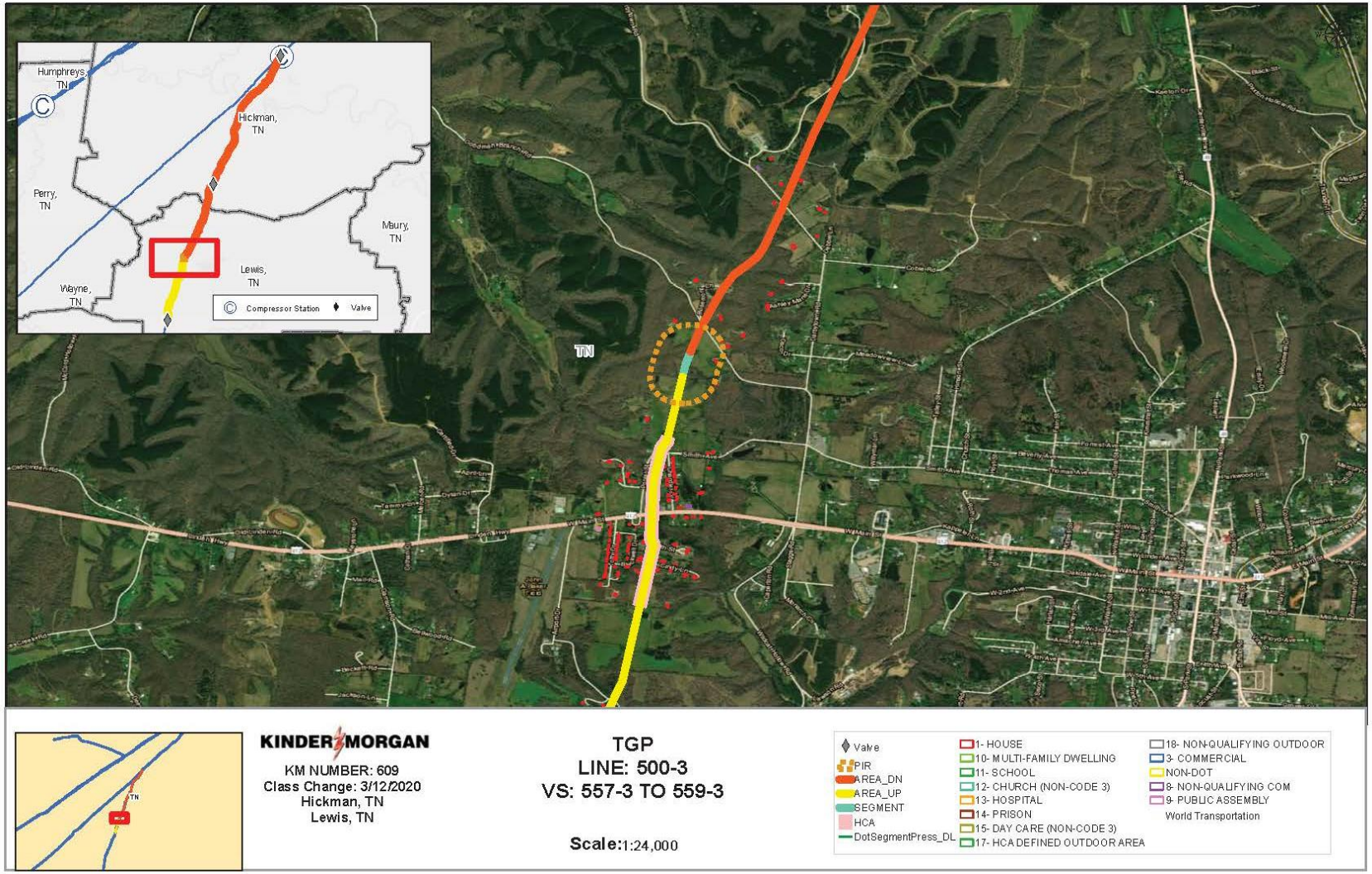
(Public domain.)

Completed by PHMSA in Washington, DC on: August 4, 2022

Attachment B– TGP Special Permit Segment and Inspection Area



Attachment C – TGP Special Permit Segment



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