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-2022-0167
Requested By:	East Tennessee Natural Gas Transmission, LLC
Operator ID#:	4070
Original Date Requested:	December 2, 2022
Original Issuance Date:	March 31, 2023
Effective Date:	March 31, 2023
Code Section(s):	49 CFR 192.53(c), 192.121, 192.144, 192.149, 192.150, 192.619(a), 192.624, 192.710, and 192.714 (Effective May 24, 2023)

I. Background

The National Environmental Policy Act (NEPA), 42 United States Code (USC) 4321 – 4375 et seq., Council on Environmental Quality Regulations, 40 Code of Federal Regulations (CFR) Parts 1500-1508, and U.S. Department of Transportation (DOT) Order No. 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 would 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

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

likelihood or consequence of a pipeline failure as compared to the operation of the pipeline in full compliance with the Pipeline Safety Regulations. PHMSA's environmental review associated with the special permit application is limited to impacts that will result from granting or denying the special permit. PHMSA developed this assessment to determine what effects, if any, our decision will have 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.

The purpose of this Final Environmental Assessment (FEA) is to comply with the National Environmental Policy Act (NEPA) for the East Tennessee Natural Gas Transmission, LLC (ETNG)[2] application for a special permit request to waive requirements of 49 CFR 192.53(c), 192.121, 192.144, 192.149, 192.150, 192.619(a), 192.624, 192.710, and 192.714 (effective May 24, 2023) in Roanoke County, Virginia. PHMSA does not have pipeline siting or construction approval authority, but PHMSA's Pipeline Safety Regulations impose certain safety requirements that will apply to the use of the Smartpipe® system[3] that will be inserted into the existing 8.625-inch diameter RURA-EOLN_3320A-100 (Line 3320A-100) 1965 vintage steel natural gas pipeline. 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 certain Federal pipeline safety regulations.

II. Introduction

Pursuant to 49 USC 60118(b) and 49 CFR 190.341, ETNG submitted a special permit petition to PHMSA on December 2, 2022, requesting that PHMSA waive the requirements of 49 CFR 192.53(c), 192.121, 192.144, 192.149, 192.150, 192.619(a), 192.624, 192.710, and 192.714 (effective May 24, 2023) to facilitate the use of Smartpipe® or Smartpipe® pipe for a short segment of ETNG's 8.625-

[2] ETNG is an interstate natural gas transmission pipeline. ETNG operates under operator identification (OPID) number 4070 issued by PHMSA.

[3] Smartpipe® is defined as the composite pipe. Smartpipe® system is the Smartpipe® pipe and components.

inch Line 3320A-100 in Roanoke County, Virginia. The ***special permit segment*** includes 0.64 miles of 8.625-inch diameter pipe located in a Class 3 location.

PHMSA is granting a special permit to waive certain regulatory requirements where it is consistent with pipeline safety. A special permit is typically conditioned on the performance of additional measures beyond minimum PHMSA pipeline safety regulations, in accordance with 49 CFR 190.341. Under the special permit, ETNG will implement robust design, installation, and testing requirements, alternative supplemental risk control measures, and integrity management procedures in the ***special permit segment*** that provide for an equivalent or higher level of safety. PHMSA is granting this special permit based on this document and the "Special Permit Analysis and Findings" (SPAF) document, which can be read in its entirety in Docket No. PHMSA-2022-0167 in the Federal Docket Management System (FDMS) located on the internet at www.regulations.gov.

III. Regulatory Background

This special permit application request seeks a special permit to use the Smartpipe® system in a gas transmission pipeline that operates at the current maximum allowable operating pressure (MAOP) of 813 pounds per square inch gauge (psig). ETNG has requested a special permit to waive the following 49 CFR Part 192 sections:

Section	Section Title	Description of Waived Requirements
192.53(c)	General	Section 192.53 (c) does not recognize Smartpipe® in meeting the requirements of the Subpart.
192.121	Design of Plastic Pipe	The qualification requirements are specific to plastic pipe, and do not apply to flexible non-metallic Reinforced Thermoplastic Pipe (RTP) such as Smartpipe®.
192.144	Qualifying metallic components	There is no listed specification for the swaged steel connectors to use with Smartpipe®.
192.149	Standard fittings	There is no listed specification for Smartpipe® connectors.
192.150	Passage of internal inspection devices	There are presently no ILI tools for composite pipe systems since the internal wall of the composite is thermoplastic instead of steel.
192.619(a)	Maximum allowable operating pressure: Steel or plastic pipelines	This section does not provide a design formula for Smartpipe®.
192.624	Maximum allowable operating pressure reconfirmation: Onshore steel transmission pipelines	The MAOP reconfirmation requirements do not expressly contemplate the installation of composite RTP.

Section	Section Title	Description of Waived Requirements
192.710	Transmission lines: Assessments outside of high consequence areas	The assessment requirements are specific to onshore steel transmission pipelines and do not expressly contemplate assessment of pipelines comprised of composite RTP.
192.714 (effective May 24, 2023)	Transmission lines: Repair criteria for onshore transmission pipelines	The repair requirements are specific to onshore steel transmission pipelines and do not expressly contemplate assessment of pipelines comprised of composite RTP.

The Federal pipeline safety regulations in the above Table can be reviewed at the Electronic Code of Federal Regulations.[4]

IV. Purpose and Need

ETNG requested a special permit, and PHMSA has reviewed the special permit application in order to waive compliance with the requirements of 49 CFR 192.53(c), 192.121, 192.144, 192.149, 192.150, 192.619(a), 192.624, 192.710, and 192.714 (effective May 24, 2023) to facilitate the use of the Smartpipe® system for a 0.64-mile segment of ETNG's 8.625-inch Line 3320A-100 in Roanoke County, Virginia.

This special permit allows ETNG to install and use Smartpipe® to retrofit less than a mile of an 8.625-inch diameter, 1965 vintage steel pipeline, known as the Line 3320A-100. The new 6.0-inch internal diameter (ID), 7.6-inch outer diameter (OD) Smartpipe® pipe will be inserted through a small segment of the existing 8.625-inch diameter steel pipeline, which will improve pipeline integrity and safety by eliminating risks from existing corrosion on the original pipeline and increasing resistance to third-party damage. Use of the Smartpipe® system in this ***special permit segment*** will also significantly reduce the environmental impact and disturbance associated with the excavation, earth disturbance, and other activities associated with removal of the existing 8.625-inch diameter steel pipeline and installation of a new steel pipeline in the right of way (ROW).

This special permit with conditions implemented by ETNG allows the use of Smartpipe® for this project. The special permit will benefit ETNG by allowing the replacement of approximately 0.64 miles of Line 3320A-100 (1965 vintage, 8.625-inch diameter, steel natural gas pipeline) through insertion of new 6.0-inch ID, 7.6-inch OD Smartpipe® pipe planned in one continuous section. This segment is non piggable, and without the granted special permit it would be subject to MAOP

[4] https://www.ecfr.gov/cgi-bin/text-idx?SID=e7d34bf31890c353e65b2428cf6b8d57&mc=true&node=pt49.3.192&rgn=div5.

reconfirmation under 49 CFR 192.624 assessment requirements for Class 3 locations. The special permit will also benefit the public within the vicinity of the pipeline because the insertion process will greatly reduce the earth disturbance and amount of time required to complete the project as compared to the standard direct bury, or open trench type of construction. This will result in less environmental disruptions for communities or environmentally sensitive areas, and result in less emissions of pollutants including methane and emissions that would result from construction equipment during construction and installation compared to traditional steel pipeline construction and replacement methods.

V. Site Description

The ***special permit segment*** is located in Roanoke County, Virginia. It begins at the junction of ETNG's existing Lines 3300-1 and 3320A-100, follows the Line 3320A-100 pipeline ROW for approximately 3,403 feet (0.64 mile), and terminates at ETNG's existing Roanoke Gas Salem Sales Meter Station (M&R 59003) located south of Grandin Road Extension (State Route 686) and west of Lynnson Drive. In addition, ETNG will use an approximate 2,280-foot-long existing access road to gain access to the ROW at the pipeline junction and an approximate 130-foot-long existing access road to gain access to a 1.3-acre laydown area located west of ETNG's existing M&R 59003 and Line 3320A-100 ROW. Both access roads begin and are south of Grandin Road Extension. The ***special permit segment*** area consists primarily of existing and maintained pipeline ROW, mixed forest land, and open/agricultural land. A map of the ***special permit segment*** is provided in **Attachment A**.

VI. Special Permit Segment

On condition that ETNG complies with the special permit conditions, the special permit waives compliance from 49 CFR 192.53(c), 192.121, 192.144, 192.149, 192.150, 192.619(a), 192.624, 192.710, and 192.714 (effective May 24, 2023) for the ***special permit segment***. The ***special permit segment*** is defined as ETNG's Line 3320A-100 from Survey Station 0+00 to 34+03 (approximately 3,403 feet, 0.64 mile) located in Roanoke County, Virginia. The ***special permit segment*** will include use of the Smartpipe® system for insertion into ETNG's 8.625-inch diameter Line 3320A-100 natural gas pipeline.

Smartpipe® is a non-bonded (no adhesive or matrix for high strength fibers) product and is designed in accordance with American Petroleum Institute (API) Specification 15S, Second Edition. More specifically, Smartpipe® or Smartpipe® pipe is a multi-layer composite pipe system with:

- HDPE 4710 core pipe
- Liquid Crystal Polymer (LCP) fiber reinforcement (dry wrap with no matrix) materials helically wrapped on the core pipe to provide hoop strength. The LCP Pulling tapes are laid axially along the pipe for axial strength required for pull-in
- Outer covers comprised of PE/Butyl tapes to protect the high strength reinforcement materials

The design factor of 0.67 and associated service factor for gas 0.67 (total 0.449) are based on API 15S Second Edition. These resultant design factors provide a margin of safety for the ***special permit segment*** based on industry consensus standard.

The Smartpipe® will be assembled within the laydown area in a portable assembly plant, which will be mobilized to a suitable site on the existing pipeline ROW. During the assembly process the Smartpipe® is formed into a "C" shape to accommodate pulling into the existing pipeline and is re-rounded post insertion. The pull through length of a Smartpipe® system into the existing host pipe will be approximately 3,403 feet and is currently planned to be one continuous Smartpipe® section with no intermediate connectors.

ETNG will install the Smartpipe® system in compliance with applicable federal regulations and guidelines including (except as waived by the special permit):

- Non-waived provisions of 49 CFR Part 192 – Transportation of Natural Gas and Other Gas by Pipeline: Minimum Federal Safety Standards; and
- ETNG's Erosion and Sedimentation Control Plan; Spill Prevention, Control and Countermeasure Plan; and Preparedness, Prevention, and Contingency Plan for Construction (E&SCP).

PHMSA is granting this special permit based on the findings set forth in this document with ETNG implementing the special permit, which can be read in its entirety in Docket No. PHMSA-2022-0167 in the FDMS located on the internet at www.regulations.gov.

VII. Alternatives

1) **Alternative 1: "No Action" Alternative**

Denial of the special permit application would require ETNG to comply fully with 49 CFR 192.53(c), 192.121, 192.144, 192.149, 192.150, 192.619(a), 192.624, 192.710, and 192.714 (effective May 24, 2023). In order to continue operating the ***special permit segment*** at the current MAOP, ETNG would be required to use one of the following methods: reduce the MAOP or replace the pipe with 49 CFR Part 192-compliant pipe. The pipeline operator has authority to select which compliance method would best suit it. If pipe replacement is selected, the lift and relay method for steel pipeline construction of the 8.625-inch diameter pipeline would involve the disturbance of the 50-foot-wide temporary workspace adjacent to and along the 0.64-mile ***special permit segment*** including excavation of soil material. As per 49 CFR 192.150, any replacement pipe installed by ETNG would likely need to be constructed to accommodate piggability.

2) **Alternative 2: "Selected" Alternative**

PHMSA is granting the special permit with conditions and ETNG is allowed to use the Smartpipe® system within the ***special permit segment***. In considering this special permit application, PHMSA analyzed the design and that the Smartpipe® system is designed in accordance with API 15S second edition, along with a review of materials, installation, and maintenance of the Smartpipe® system.

VIII. Overview of the Special Permit Conditions

PHMSA is requiring the following summarized special permit conditions (Conditions 1 through 14 and Limitations below). For specific technical requirements, see the special permit conditions provided in Appendix D – Conditions - Special Permit.

1) **Maximum Allowable Operating Pressure and General Conditions**

ETNG must continue to operate the ***special permit segment*** at or below a MAOP of 813 psig. Prior to placing the ***special permit segment*** into service, ETNG must field pressure test the pipe to 1.5 times the MAOP for a minimum of 12 hours.

2) **Procedure Updates**

ETNG must submit final manuals and procedures for design, construction, operations and maintenance, and emergency response for review by PHMSA prior to operation of the ***special permit segment***. ETNG is required to develop and implement an Integrity Management Program relevant to the ***special permit segment*** in accordance with Part 192, Subpart O (except as waived or modified herein), applicable to plastic transmission pipelines. To ensure proper installation, ETNG must inspect a portion of the pull-through pipe for damage. All indications of pipe damage must be evaluated and replaced or repaired pursuant to certain procedural requirements.

3) **General and Design Requirements**

ETNG must not tap, branch, or split the ***special permit segment*** Smartpipe® without the use of the appropriate Smart Pipe Company, Inc. (SPCI) manufactured fittings for the specified application. Any future road crossings using Smartpipe® must have a minimum of 36-inches cover and must be cased or 49 CFR Part 192 compliant steel pipe must be installed.

4) **Material and Testing Requirements**

To maintain pipeline integrity, ETNG must utilize materials that conform with material manufacturing and testing requirements of API 15S, Second Edition outlined in Appendix D, and must notify PHMSA of any changes to these requirements prior to installation. ETNG also must ensure that any polyethylene materials are properly stored as outlined in Appendix D, and that representative portions of the pipe used in the ***special permit segment*** are properly factory pressure tested on site to actual burst test failure pressures that are consistent with the short term burst tests of the product family variant used in the ***special permit segment***. If the actual burst tests do not meet this criterion, then additional design or operation measures must be implemented. ETNG is required to implement procedures addressing all pipeline risk factors and to schedule and perform 4 inspections that must include non-destructive and destructive testing at a minimum 1, 3, 6, and 9-year intervals after installation. ETNG must report the results of these inspections to PHMSA.

5) **Construction Operator Qualifications**

ETNG must follow the Enbridge Gas Transmission (GTM) Operator Qualification (OQ) Plan and ensure that all construction and operations personnel performing OQ covered tasks are qualified.

6) **Excavation, Pipe Cover, and Damage Prevention**

ETNG must develop and implement an inspection training and qualification plan and must send the plan to the Director, PHMSA Central Region, 30 days prior to the start of construction. ETNG must inspect the leading 50 feet of pull-through pipe for damage. ETNG must develop and implement O&M Procedures and/or Construction Specifications to remove and replace any Smartpipe® with damage at any place that exceeds the criteria for wall damage.

7) **Corrosion Control**

ETNG must perform external corrosion monitoring on each buried metallic fitting and apply cathodic protection (CP) on any buried Smartpipe® components and joints within the ***special permit segment*** in accordance with 49 CFR Part 192.

8) **Pressure and Temperature Control and Monitoring**

To ensure pipeline safety, ETNG is required to monitor the pressure of the ***special permit segment*** with a SCADA system and replace an existing manual valve with an automatic shutoff valve, remote-control valve, or equivalent technology. ETNG is also required to monitor the temperature of gas in the line and shut down operation of the ***special permit segment*** if the temperature exceeds a set threshold. ETNG is also required to implement construction procedures for installation and a controlled venting and/or monitoring system that would address inner barrier migration of the product into the annular space between the outer diameter of the Smartpipe® and the inner diameter of the steel pipe through which it is installed.

9) **Valve – Monitoring and Remote Control for Rupture**

ETNG must automate mainline valves for closure or demonstrate capability to manually close mainline valves. A ***special permit segment*** must have upstream and downstream remote-controlled valves (RCVs) so that the distance between the valves is no greater than 20 miles. ETNG must automate mainline valves to close within 12 months of the grant of this special permit.

10) **Construction and Operations**

ETNG must maintain a stock of tools and fittings for maintenance and emergency repairs. ETNG must perform leak testing and re-evaluation surveys at set intervals following operation of the ***special permit segment***. Should any portion of the ***special permit segment*** become a Class 4 location or a High Consequence Area (HCA) or a moderate consequence area (MCA), ETNG must provide notice to PHMSA and conduct a review to determine whether any additional safety measures must be implemented to be consistent with the requirements at Part 192.

11) **Communication and Records**

ETNG is required to provide material and pipe installation records to PHMSA. ETNG must also increase its communication with PHMSA by communicating, among other items, any identified threat to the integrity of the ***special permit segment*** or whether repairs or modifications are made to the Smartpipe®.

12) **Gas Quality**

ETNG must develop and implement a program to monitor and mitigate the presence of deleterious gas stream constituents.

13) **Annual Reporting**

ETNG must file annual reports that contain information including, the number of new residences, other structures intended for human occupancy, and public gathering areas within 220 yards of the pipeline centerline along the ***special permit segment***, any new integrity threats identified during the previous year, and any reportable incident, leaks and all repairs on the ***special permit segment***.

14) **Certification**

A senior executive officer at ETNG must certify certain submissions to PHMSA, including that all procedures and specifications for the ***special permit segment*** have been updated to include all additional construction, and O&M requirements required by the special permit conditions.

IX. LIMITATIONS

This special permit is subject to the limitations set forth in 49 CFR 190.341, as well as the following limitations:

1) PHMSA has the sole authority to make all determinations on whether ETNG has complied with the specified conditions of this special permit. Failure to comply with any condition of this special permit may result in revocation of the permit.

2) Any work plans and associated schedules for the ***special permit segment*** are automatically incorporated into this special permit and are enforceable in the same manner.

3) Failure by ETNG to submit the required certifications within the time frames specified may result in revocation of the special permit.

4) If ETNG sells, merges, transfers, or otherwise disposes of all or part of the assets known as the Line 3320A-100 in the ***special permit segment***, ETNG must provide PHMSA with written notice of the change within 30 days of the consummation date. In the event of such transfer, PHMSA reserves the right to revoke, suspend, or modify the special permit if the transfer constitutes a material change in conditions or circumstances underlying the permit.

5) As provided in 49 CFR 190.341, PHMSA may issue an enforcement action for failure to comply with this special permit. The terms and conditions of any corrective action order, compliance order or other order applicable to a pipeline facility covered by this special permit will take precedence over the terms of this special permit.

6) PHMSA grants this special permit for a term of 5 - 10 years from the date of issuance. If ETNG elects to seek renewal of this special permit, ETNG must submit its renewal request at least 180 days prior to expiration of the 5 or10-year period to the PHMSA Associate Administrator for Pipeline Safety with copies to the Director, PHMSA Central Region, and the Director, PHMSA Engineering and Research Division. PHMSA may seek additional information from ETNG prior to granting any request for special permit renewal. Additional information on previous waivers approved by PHMSA for Smartpipe® system installation is captured in the "Application for a Special Permit Smartpipe® Installation" document.

X. Affected Resources and Comparative Environmental and Safety Consequences

A. The environmental resources and issues listed here are analyzed to evaluate the potential for environmental impact, in accordance with NEPA.

Safety: Under the "Selected" Alternative, ETNG will be able to continue operating the ***special permit segment*** at the current MAOP**.** The Smartpipe® system is designed in accordance with API 15S second edition, which provides a margin of safety that will continue throughout the specified service life, and any subsequent re-permitting of the ***special permit segment***.

Once Smartpipe® is installed, the ***special permit segment*** will be (1) immune to internal and external corrosion; (2) installed with acoustic sensing technology tied into SCADA system, Smartpipe® section is at less risk of third party damage utilizing alarm systems, and also provides an early shut-down capability in case of an intrusion; (3) monitored by continuous real time leak detection equipment; and (4) protected by an additional automatic shutoff valve, remote-controlled valve, or equivalent technology. By having the ability to remotely shut off gas in the event of an emergency, and reducing risks associated with corrosion and third-party damage, the "Selected" Alternative is consistent with pipeline safety.

Finally, the special permit imposes conditions that will require ETNG to develop and implement an integrity management program applicable to Smartpipe® that covers the ***special permit segment***. This program will require risk assessment and installation of direct assessment sections, while the Operations and Maintenance (O&M) program will include regular patrolling and participation in the one call system. These requirements are designed to increase the overall safety of the ***special permit segment***. Because the ***special permit segment*** is not currently located in an HCA, these measures would not be required under the No Action Alternative.

Aesthetics: The ***special permit segment*** is located within ETNG's existing and maintained Line 3320A-100 pipeline ROW. The landscape surrounding the ***special permit segment*** consists of mixed forest land and open/agricultural land. No scenic byways, viewsheds, or vista points were identified in the immediate vicinity of the ***special permit segment*** (FHA, 2021).

Under the No Action Alternative, the visual character of the ***special permit segment*** would be temporarily affected during construction. The "Selected" Alternative will involve minimal and discreet ground disturbance at an entry bell hole site adjacent to the existing M&R 59003, approximately six (6) pothole sites along ETNG's existing ROW, and one (1) bell hole at the junction of ETNG's existing Lines 3300-1 and 3320A-100. The No Action Alternative would involve the lift and relay method along the entire 3,403-foot ***special permit segment*** and include ROW and temporary workspace clearing and grading, removal of the existing pipeline, trench excavation, and installation

of the new pipeline. Under both alternatives, all areas disturbed within the ***special permit segment*** will be restored and areas outside of the permanent ROW will be returned to pre-construction conditions per ETNG's Erosion & Sediment Control Plan (E&SCP). Therefore, we conclude that effects on the visual character along the ***special permit segment*** will not cause significant long-term impacts, although the No Action Alternative would cause more short-term impacts than the "Selected" Alternative.

Agricultural Resources: Approximately 1,365 feet of the ***special permit segment*** ROW is adjacent to open/agricultural land (Jamison's Orchid Farm Market). The "Selected" Alternative and No Action Alternative will be located within and/or adjacent to ETNG's existing and maintained pipeline ROW and on land that is not currently utilized for agriculture or farming practices.

In this section of the ***special permit segment*** ROW, the "Selected" Alternative will involve temporary, minimal, and discreet ground disturbance at an entry bell hole site adjacent to the existing M&R 59003 and one (1) bell hole at the junction of ENTG's existing lines, and six (6) pothole sites along ETNG's existing ROW that is adjacent to the farm. The No Action Alternative would involve the lift and relay method that would result in greater localized impacts due to the continuous length of construction workspace and activity needed to replace the existing pipeline. After construction is complete, all disturbed areas would be restored to pre-construction conditions per ETNG's E&SCP. As a result, we believe that long-term impacts on agricultural resources along the ***special permit segment*** will not occur under either alternative, although the No Action Alternative would cause more short-term impacts on agriculture resources than the "Selected" Alternative.

Air Quality: ETNG will use standard procedures associated with all construction alternatives (Smartpipe® or traditional repair methods) that will involve the blowdown of the line. All planned pipeline work implements a recompression system to reduce the volume of gas in the pipe prior to venting to the atmosphere. Construction activities associated with the "Selected" Alternative will result in temporary increases in emissions of some pollutants due to the use of non-stationary equipment powered by diesel fuel or gasoline engines; the temporary generation of fugitive dust at discreet ground disturbance sites including entry bell holes, pothole sites and exit bell holes; and indirect emissions attributable to activities associated with construction activities of the ***special permit segment*** (e.g., workers commuting to and from work sites during construction, etc.). The No Action

Alternative would involve the lift and relay method and use of non-stationary equipment along the entire 3,403-foot-long ***special permit segment***.

Construction-related emission estimates are based on a typical construction equipment list, hours of operation, and miles traveled by the construction equipment and supporting vehicles for the ***special permit segment***. Installation of the Smartpipe® system will require approximately less than one (1) month to complete whereas the No Action Alternative or lift and relay of the existing pipeline would require approximately two (2) months. The additional time of construction for the lift and relay method would require more equipment, hours of operation, and vehicle miles traveled which would result in more emissions of pollutants, including green-house-gases (GHG).

Because the "Selected" Alternative will require less construction equipment and less time to install, we believe the air quality in the ***special permit segment*** area will be less affected under the "Selected" Alternative. In addition, an electric powered remote-control valve will be installed to isolate the line, and no other aboveground facilities, such as compressor stations or meter station upgrades, will be required for the "Selected" Alternative. Therefore, no operational impacts on air quality are anticipated.

Biological Resources

Wildlife: Wildlife is generally dependent on available habitat, which is typically directly linked to existing vegetation cover types. The ***special permit segment*** is located within ETNG's existing and maintained pipeline ROW. The area within the ***special permit segment*** area consists primarily of mixed forest land and open/agricultural land.

Wildlife that occur in mixed forest land habitats include black bear (Ursus americanus americanus), common eastern chipmunk (Tamias striatus striatus), gray squirrel (Sciurus carolinensis carolinensis), fox squirrel (Sciurus niger vulpinus), eastern gray fox (Urocyon cinereoargenteneus cinereoargenteneus), white-tailed deer (Odocoileus virginianus), American woodcock (Scolopax minor), barred owl (Strix varia), black-and-white warbler (Mniotilta varia), blue jay (Cyanocitta cristata), Carolina chickadee (Poecile carolinensis), downy woodpecker (Dryobates pubescens), eastern box turtle (Terrapene carolina carolina), and northern copperhead (Agkistrodon contortrix mokasen) (Virginia DWR, 2021a; Virginia BBA, 2021). Wildlife that occur in scrub-shrub and open land habitats include coyote (Canis latrans), red fox (Vulpes fulva), meadow vole (Microtus

pennsylvanicus pennsylvanicus), eastern cottontail (Sylvilagus floridanus mallurus), Cooper's hawk (Accipiter cooperii), song sparrow (Melospiza melodia), American kestrel (Falco sparverius), and eastern bluebird (Sialia sialis) (Virginia DWR, 2021a; Virginia BBA, 2021).

The "Selected" Alternative and No Action Alternative will be located within and/or adjacent to ETNG's existing and maintained ROW. The "Selected" Alternative and the Smartpipe® system will result in less overall disturbance to land and wildlife habitat within the ***special permit segment***. After construction is complete, all disturbed areas will be restored to pre-construction conditions per ETNG's E&SCP. Therefore, impacts on wildlife species and habitat will not result in long-term or significant effects given the abundance of available habitat adjacent to the ***special permit segment*** and ETNG's established restoration practices. However, the "Selected" Alternative may result in less short-term impacts to wildlife than the No Action Alternative.

Fisheries: Neither the "Selected" Alternative or No Action alternative will affect waterbodies that support fisheries resources. Therefore, no fisheries resources will be affected.

Special Status Species: The Endangered Species Act (ESA) of 1973 (16 U.S.C. Section A-1535-1543, P.L. 93-205) protects federally listed threatened and endangered (T&E) species. The ESA states that T&E plant and animal species are of aesthetic, ecological, educational, historic, and scientific value to the United States and protection of these species and their habitats is required. The ESA protects fish, wildlife, plants, and invertebrates that are federally listed as T&E. A federally listed endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A federally listed threatened species is likely to become endangered in the foreseeable future throughout all or a significant portion of its range. The ESA also affords protection to "critical habitat", which is habitat containing natural and biological features essential to a species' conservation. Based on a review of U.S. Fish and Wildlife Service, Virginia Department of Wildlife Resources, and Virginia Administrative Code, T&E species that could potentially occur in the ***special permit segment*** area are shown in Table 5-1 below.

Table 5-1 - Potentially Occurring Federal and State Listed Species in Roanoke County, Virginia

Species	Federal Status a/	State Status b/	Proposed Habitat	Habitat Present in Special Permit Segment
Mammals				

Table 5-1 - Potentially Occurring Federal and State Listed Species in Roanoke County, Virginia				
Species	**Federal Status a/**	**State Status b/**	**Proposed Habitat**	**Habitat Present in Special Permit Segment**
Northern Long-Eared Bat (*Myotis septentrionalis*)	T	T	Spends winter hibernating in caves and mines of various size with constant temperatures, high humidity, and no air currents. Within hibernacula, hibernate most often in small crevices or cracks, often with only the nose and ears visible. During the summer, roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees).	No suitable habitat within the ***special permit segment***. Additionally, no tree clearing or trimming activities are proposed.
Indiana bat (*Myotis sodalist*)	E	E	Long lived in the forests and caves of the Northeast and Southeast but primarily in the Midwest. Hibernate in limestone caves from mid-autumn to early spring. Bats may move from a location deeper in the cave to a site nearer the entrance as the cold season progresses to move away from areas that go below freezing. Tend to return to the same hibernacula each year.	No suitable habitat within the ***special permit segment***. Additionally, no tree clearing or trimming activities are proposed.
Fish				
Roanoke logperch (*Percina rex*)	E	E	Inhabits larger streams in the upper Roanoke, Smith, Pigg, Otter, Nottoway River systems, and Goose Creek in Virginia and in the Dan, Mayo, Smith River systems and Big Beaver Island Creek in North Carolina. Prefers large sized warm clear streams and riffles, runs and pools with sand, gravel or boulder.	No suitable habitat within the ***special permit segment***.
Clams				
James spinymussel (*Pleurobema collina*)	E	E	Fresh water mussel is found in the James River drainage and the and Dan/Mayo River systems within the Roanoke River drainage in Virginia, North Carolina, and West Virginia.	No suitable habitat within the ***special permit segment***.
Plants				
Small whorled pogonia (*Isotria medeoloides*)	T	E c/	Occurs on upland sites in mixed-deciduous or mixed deciduous/coniferous forests that are generally in second- or third-growth successional stages in areas of sparse to moderate ground cover and relatively open understory canopy.	No suitable habitat within the ***special permit segment***.
Smooth coneflower (*Echinacea laevigata*)	E	T c/	Prefers open woods, cedar barrens, roadsides, dry limestone bluffs, utility line rights-of-way, and other sunny to partly sunny situations, usually on magnesium- and calcium-rich soils associated with underlying mafic rock.	Utility line right-of-way present within the ***special permit segment***. Based on a review of the USFWS Range Information Map for this species, habitat does not occur in the ***special permit segment***.

E – Endangered; T – Threatened

a/ U.S. Fish and Wildlife Service (USFWS). Listed species believed to or known to occur in Roanoke, Virginia. Available online: https://ecos.fws.gov/ecp/report/species-listings-by-current-range-county?fips=51161 Accessed November 9, 2021.

b/ Virginia Department of Wildlife Resources (DWR). Special Status Faunal Species in Virginia. Available online: https://dwr.virginia.gov/wp-content/uploads/media/virginia-threatened-endangered-species.pdf Accessed November 9, 2021.

c/ Virginia Administrative Code. 2VAC5-320-10. Listing of endangered and threatened plant and insect species. Available online: https://law.lis.virginia.gov/pdf/admincode/2/5/320/10/ Accessed November 9, 2021.

No tree clearing is anticipated under the "Selected" Alternative approach. Construction activities will be within the existing maintained ROW and cleared temporary workspace under either alternative.

Based on ETNG's commitment to implement its mitigation and restoration measures per its E&SCP, avoidance of sensitive habitat by utilizing its existing and maintained pipeline ROW, we conclude that sensitive wildlife and plant species will not be affected under either alternative.

Vegetative Communities: The area within the ***special permit segment*** consists primarily of mixed forest land and open/agricultural land. The ***special permit segment*** is within the Ridge and Valley Province, which consists of 63 percent forest cover, 37 percent of open/agricultural land, and less than 0.1 percent of freshwater wetlands (Virginia DCR, 2021a). Vegetation in this province includes Chestnut Oak (*Quercus montana*), Northern Red Oak (*Q. rubra*), Scarlet Oak (*Q. coccinea*), Black Oak (*Q. velutina*), white oak (*Q. alba*), Eastern White Pine (*Pinus strobus*), red maple (*Acer rubrum*), sugar maple (*A. saccharum*), Mountain Laurel (*Kalmia latifolia*), Black Huckleberry (*Gaylussacia baccata*), Blueberries (*Vaccinium spp*.), and Flowering Dogwood (*Cornus florida*) (Virginia DCR, 2021a). Open land includes land that is actively maintained in herbaceous vegetation and is mainly associated with existing ROW, open pasture, developed land, roadways, and residential lands. Vegetation may include Orchard grass (*Dactylis glomerata*), poverty grass (*Danthonia spicata*), common hairgrass (*Deschampsia flexuosa*), red fescue (*Festuca rubra*), Japanese stiltgrass (*Microstegium vimineum*), birdsfoot trefoil (*Lotus corniculatus*), and deertongue (*Dichanthelium clandestinum*).

The "Selected" Alternative and No Action Alternative will be located within and/or adjacent to ETNG's existing and maintained ROW. Use of the "Selected" Alternative and the Smartpipe® system will result in less overall disturbance to vegetation within the ***special permit segment***. Use of the Smartpipe® system will affect vegetation at the start and end of the pipeline segment, and two (2) bell hole locations, whereas the lift and relay method would affect the existing vegetation along the entire length of the pipeline segment. For both scenarios, after construction is complete, all disturbed areas will be restored to pre-construction conditions. Because the "Selected" Alternative will affect less vegetation than the No Action Alternative and areas disturbed during construction will be restored per ETNG's E&SCP, we believe that impacts on vegetation under the "Selected" Alternative will be reduced to less than significant levels along the ***special permit segment***.

Climate Change: Neither the "Selected" Alternative nor the No Action Alternative will significantly contribute to global climate change. ETNG will use standard procedures associated with all construction alternatives (Smartpipe® or traditional repair methods) that will involve the blowdown of

the line. All planned pipeline work implements a recompression system to reduce the volume of gas in the pipe prior to venting to the atmosphere. Construction activities associated with the "Selected" Alternative will result in temporary increases in emissions of some pollutants due to the use of non-stationary equipment, the temporary generation of fugitive dust at discreet ground disturbance sites along the ***special permit segment***, and indirect emissions attributable to activities associated with construction activities. The No Action Alternative would involve the lift and relay method and use of non-stationary equipment along the entire approximate 3,403-foot-long ***special permit segment***. Installation of the Smartpipe® system will require approximately less than one (1) month to complete whereas the No Action Alternative or lift and relay of the existing pipeline would require approximately two (2) months.

When looking at GHG and other emissions, there are two aspects to consider. First, the emissions that would occur during construction of the facilities must be considered. The Smartpipe® system, that will be inserted into the existing 8.625-inch diameter Line 3320A-100, greatly minimizes both the disturbed area and the amount of necessary equipment needed for construction as compared to the No Action Alternative. The use of the lift and relay method to replace the existing pipeline would require an equipment spread with additional pieces of heavy equipment for approximately two (2) months to complete the work.

Second, the Smartpipe® system has an approximate natural gas permeation rate of 2.47 standard cubic feet (scf)/day or 901 scf per year for the ***special permit segment***. The Smartpipe® system will be installed within the existing pipeline and will include a controlled venting and/or monitoring system. ETNG will monitor, capture, and repurpose the permeated gas. Furthermore, the Smartpipe® system will be installed inside of the existing 8.625-inch steel pipeline, making it less susceptible to third-party damage. Lastly, the Smartpipe® system will be installed with fiber optic sensors for continuous real time leak detection and monitoring through SCADA.

Based on this information, we believe that the "Selected" Alternative will have less impact on global climate change than the No Action Alternative.

Cultural Resources: A preliminary assessment of cultural resources, including historic standing structures, historic districts, and archaeological sites, was conducted for the ***special permit segment.*** Research was conducted through the Virginia Cultural Resource Information System (VCRIS), which contains databases maintained by the Virginia Department of Historic Resources, Division of Review

and Compliance (SHPO) as well as information regarding properties listed or eligible for listing on the National Register of Historic Places (NRHP). There are no resources listed or eligible for listing on the NRHP within the ***special permit segment***, nor are there any resources listed or eligible for listing on the NRHP within 1-mile of the ***special permit segment***.

Due to the lack of aboveground facilities, and ground disturbance being confined to an existing pipeline ROW, the potential for impacts to historic properties under either the "Selected" Alternative or the No Action Alternative, as defined by Section 106 of the National Historic Preservation Act, is relatively minimal.

Environmental Justice: An assessment was conducted on the ***special permit segment*** area[5] for identifying whether minority and low-income communities are present, and if these types of communities are present, evaluate whether high and adverse human health or environmental effects would disproportionately affect the identified communities. The environmental justice data used in this evaluation was obtained from the U.S. Environmental Protection Agency's (EPA's) EJSCREEN (EPA, 2020). See Attachment A.

As presented below in Table 8-1, the total population of the ***special permit segment*** area is 1,273 people within 0.5-mile of either side of the existing pipeline. This area represents 1.4 percent of Roanoke County's total population. The percentages of minority and low-income communities in the ***special permit segment*** area presented in Table 8-1 are well below the EPA's thresholds which define these communities (EPA, 2019). In addition, no linguistically isolated populations exist in the ***special permit segment*** area. The data represented in Table 8-1 for the ***special permit segment*** area indicate that neither the "Selected" Alternative or the No Action Alternative will disproportionately impact any predominantly minority, low-income, or non-English language communities since these alternatives will not occur in or near these communities.

The "Selected" Alternative and use of the Smartpipe® system will, however, result in less overall disturbance because it significantly reduces or eliminates potential environmental impacts since this technology is non-intrusive, it requires minimal excavations, thus avoiding the need for long trenches that may result in public and environmental disruption. Further, the ***special permit segment*** area consists primarily of existing and maintained pipeline ROW, mixed forest land, and open/agricultural

[5] The assessment area includes a one half (0.5) mile buffer on either side of the existing pipeline segment for 0.64 mile.

land and, as a result, construction impacts to the local population will be temporary and minimal. We believe no long-term population impacts will result from use of the Smartpipe® system.

Likewise, after installation, the Smartpipe® system is also designed to improve pipeline safety and integrity as compared to standard pipe replacement. By design, the Smartpipe® system is immune to internal or external corrosion damage and is more resistant to third-party damage than other systems. In addition, the special permit conditions will impose certain conditions that are designed to ensure pipeline safety, including the requirement that ETNG develop and implement an Integrity Management Program, which will include regular patrolling and increased risk assessments. Given the increased requirements and the design of the Smartpipe® system, the "Selected" Alternative will present lower risks of potential harm to the communities living within the vicinity of the ***special permit segment*** as compared to the No Action Alternative.

Moreover, the extensive special permit conditions are designed to ensure the safety of people, property, or environmental resources in the vicinity of the pipeline. As a result, we believe high and adverse human health or environmental effects to the communities within the ***special permit segment*** area or on any nearby communities is not expected under the "Selected" Alternative.

Table 8-1 – Environmental Justice Summary for *Special Permit Segment*

Special Permit Segment	**State / County**	**Total Population (Along *Special Permit Segment*)**	**Minority Population**	**Low Income Population**	**Linguistically Isolated**
RURA-EOLN 3320A-100	VA Roanoke	1,273	10%	17%	0%

Sources:
EPA's EJSCREEN Technical Document, September 2019, available at: https://www.epa.gov/ejscreen.

DOT's Environmental Justice Order 5610.2(c), May 2021, available at: https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2021-06/DOT%20Order%205610.2C.pdf.

Geology, Soils, and Mineral Resources

Soils: The ***special permit segment*** crosses four soil types. These soils and their major limitations are shown in Table 9-1 below (USDA_NRCS, 2021).

Table 9-1 - Soil Series and Major Soil Limitations Crossed by the Topside Meter Station Rebuild Project							
Soil Unit Name	Hydric a/	Prime Farmland or Farmland of Statewide Importance	Compaction Prone b/	Soil Erosion		Depth to Bedrock or Confining Layer (inches)	Stony or Rocky Soils e/
				Water Erosion Hazard c/	Wind Erodibility d/		
Chiswell-Litz complex, 25 to 50 percent slopes	No	No	No	0.24	6	20-40	No
Chiswell-Litz-Urban land complex, 15 to 35 percent slopes	No	No	No	0.24	6	20-40	No
Hayesville channery fine sandy loam, 25 to 50 percent slopes, very stony	No	No	No	0.17	3	>80	Yes
Hayesville-Urban land complex, 2 to 15 percent slopes	No	No	No	0.17	3	>80	No

a/ Hydric determination was based on the predominant soil in each soil map unit.

b/ Soils with a surface texture of sandy clay loam or finer and a drainage class of somewhat poorly drained to very poorly drained.

c/ Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water (Web Soil Survey, 2021).

d/ A wind erodibility group (WEG) consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible (Web Soil Survey, 2021).

e/ Stony, gravelly, or cobble soils.

USDA-NRCS. 2021. Web Soil Survey. Available at: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx Accessed November 10, 2021

Soil impacts that could occur during pipeline construction include mixing of layers within the soil profile, introduction of rock fragments to the soil profile, compaction, rutting, erosion, and alteration of drainage characteristics through mixing. Soil erosion is the displacement of soils by water and/or wind. Soils have the potential to erode from rainfall, non-turbulent surface runoff, channelized flow, and wind transport. Temporary exposure of bare, non-vegetated soil during construction could pose a risk of soil erosion. Two of the soil types within the ***special permit segment*** have moderate erodibility due to wind.

Soils with textural classifications of cobbly, stony, bouldery, shaly, channery, very gravelly, or extremely gravelly in any layer; or that have a surface layer that contains greater than 5 percent by weight rock fragments larger than 3 inches, may be characterized as stony or rocky soils. Typically, stony/rocky soils do not hold water well and exhibit a low revegetation potential due to low water content and higher seed mortality. In addition, in areas with shallow bedrock there is increased

potential to introduce rocks into the topsoil during construction activities. One soil type within the ***special permit segment*** is classified as very stony.

Construction within the ***special permit segment*** will result in the temporary loss of vegetation and require that the disturbed areas be re-seeded to restore successful vegetative growth. Use of the lift and relay method under the No Action Alternative would require a longer construction timeline and use of more heavy equipment. Following construction, ETNG will remove all construction debris, restore to original contours and drainages, prepare a seedbed (where necessary), and revegetate the disturbed workspace. Implementation of proper topsoil segregation in temporary workspace areas will help ensure post-construction revegetation success, thereby minimizing the potential for long-term erosion due to lack of vegetative cover. Restoration and revegetation will be accomplished in accordance with ETNG's E&SCP.

Based on the soils present in the ***special permit segment***, the installation method of the Smartpipe® system as described above, and implementation of ETNG's E&SCP, impacts on soils will be minimal. Any impact to soil under the "Selected" Alternative will be less than the impact under the No Action Alternative.

Physiological Location: The Mountain region of Virginia includes three provinces: the Blue Ridge, the Ridge and Valley, and the Appalachian Plateau Physiographic Provinces (Virginia DCR, 2021b). The ***special permit segment*** is located in the Ridge and Valley Province, which is characterized by long, even-crested, parallel ridges rising above intervening valleys of various size. This province consists of folded sedimentary bedrock that comprise linear mountain ridges and valleys that trend to the northeast. The underlying bedrock geology includes sandstone, shale, and carbonate bedrock. Karst features such as sinkholes, swallets, caves, and springs can be found in the carbonate formations in this province.

Seismic Activity: Seismic hazards defined in building codes are typically based on peak ground acceleration. The U.S. Geological Survey (USGS) produces Seismic Hazard Maps for the United States with peak horizontal acceleration values represented as a factor of "g." The factor "g" is equal to the acceleration of a falling object due to gravity. A review of the USGS 2015 Long-Term Model Seismic Hazard Maps (USGS, 2015a; 2015b) for the ***special permit segment*** area indicates the following:

- The area has a 10-percent probability of a 3-4-percent "g" exceedance in 50 years.
- The area has a 2-percent probability of a 10- to 12-percent "g" exceedance in 50 years.

A search was conducted of the USGS earthquake database (USGS, 2021c) for seismic events (earthquakes with a magnitude 4.5 or greater) in the vicinity (within 25 miles) of the ***special permit segment*** area, where the timeline used for this search was for all recorded seismic events. No seismic events are recorded. Building codes used for the ***special permit segment*** include uniform seismic standards and are linked to the seismic risk for the area of construction. The relative seismic hazard for the ***special permit segment*** area is low. Therefore, we believe earthquakes and seismic hazards are unlikely to occur in the ***special permit segment*** area.

Landslides: Landslides occur when rock, sediments, soils, and debris move down steep slopes. Such gravity-induced flow is usually precipitated by heavy rains, erosion by rivers, earthquakes, or human activities (e.g., man-made structures or piles of rock or ore). Areas of unstable soils that may be susceptible to landslides may be characterized by soils that shrink or swell with changes in moisture content and are located in areas with steep relief.

USGS mapping of landslide incidence for the United States indicates the ***special permit segment*** and surrounding area has not had a recorded landslide in the inventory. The ***special permit segment*** is located 0.9 mile north of a recorded landslide that occurred on May 27, 2018 along Sugar Loaf Mountain Road Mudslide where floods and downpour caused a mudslide on one person's property (USGS, 2021d). In general, the ***special permit segment*** crosses flat to low-lying slopes with low potential for landslide activity. Therefore, we believe landslides are not expected to pose a threat to the ***special permit segment***.

Subsidence/Karst: Subsidence is the localized lowering of land surface occurring when belowground voids or cavities cause surficial collapse. This process occurs as a result of extracting solids or liquids from beneath the Earth's surface (including from salt domes), and is affected by numerous factors including mining methods, extraction depth, deposit thickness, and topography (Lee and Able Jr., 1983). The ***special permit segment*** is underlain by carbonate bedrock at or near the surface (USGS, 2021e).

ETNG routinely inspects its pipeline ROW and pipeline integrity, which will identify whether any karst features or subsidence develops under the ***special permit segment***. If observations indicating

subsidence are found, ETNG will take the appropriate corrective measures to maintain the integrity of the pipeline. These measures include determining the allowable stresses on unsupported pipe spans, importing fill for pipe support, and evaluating whether recurrence is likely.

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 Roanoke County, Virginia. The "Selected" Alternative and the No Action Alternative will involve ground disturbance within and adjacent to ETNG existing and maintained pipeline ROW and result in no change in existing conditions of the ROW; as such, there will be no impact to Indian Trust Assets or federally recognized Tribal Reservations. Existing conditions will remain undisturbed.

Land Use: The existing land use surrounding the ***special permit segment*** consists of mixed forest land and open/agricultural land. Residential development has occurred to the east along Lynnson Drive, Longridge Drive/Circle, Elbert Drive, and Carolyn Circle and to the west along Winnbrook Drive. Approximately 1,365 feet of the ***special permit segment*** ROW is east of Jamison's Orchid Farm Market located south of Grandin Road Extension (State Route 686).

The land use within the ***special permit segment*** will not change as result of either construction method: Smartpipe® system installation or lift and relay method. Impacts resulting from construction will be short-term and primarily limited to ETNG's existing ROW. ETNG will implement the measures in its E&SCP to control erosion and minimize impacts due to sedimentation. All temporary workspaces will be restored to pre-construction conditions. Therefore, impacts on land use will be minimal.

Planned Residential and Commercial/Industrial Areas: Planned development projects are those that are permitted but not yet constructed or have permit applications that have been filed but not yet approved. ETNG is not aware of planned residential or commercial developments within the ***special permit segment***. Use of the Smartpipe® system or the lift and relay method will be located within and adjacent to ETNG's existing and maintained ROW. Therefore, neither alternative will affect planned residential or commercial/industrial developments, to the extent that any exists.

Existing Residences and Buildings: The ***special permit segment*** area can be generally classified as very rural and sparsely populated with residences located to the east along Longridge Drive/Circle, Elbert Drive, and Carolyn Circle and to the west along Winnbrook Drive. The closest structure

intended for occupancy is approximately 43 feet from the ***special permit segment*** along Lynnson Drive. Construction within 50 feet or less of an occupied residence is not anticipated; however, if this scenario would be required, ETNG would implement additional construction mitigation measures including:

- Construction activities would generally occur during daytime hours wherever feasible;
- Mature trees and landscaping should not be removed from within the construction work area unless necessary for the safe operation of construction equipment;
- Immediately after backfilling, all lawn areas and landscaping within the construction work area should be restored consistent with the requirements of ETNG's E&SCP;
- The edge of the construction work area adjacent to the residence would be fenced for 100 feet on either side of the residence to ensure that construction equipment and materials, including the spoil pile, remain within the construction work area; and
- Fencing will be maintained, at a minimum, throughout active construction and installation of the Smartpipe® system.

ETNG will notify landowners affected by construction activities prior to construction. No homes or business will be displaced due to construction activities. All temporary workspaces will be restored to pre-construction conditions. Therefore, impacts on residences will be minimal under both alternatives. Based on construction, impacts to nearby residences and building may be increased under the No Action Alternative, which would require more extensive construction.

Public or Conservation Land: A review of the Commonwealth's state-wide conservation lands database was conducted to identify land owned or managed by the State of Virginia within 0.25 mile of the ***special permit segment*** area. No Virginia Conservation or Recreations Lands or Virginia Conservation Easements were identified within 0.25 mile of the ***special permit segment*** area based on review of this database (DCR, 2021c/2021d). Additionally, no National Forest Lands or trails were identified within 0.25 mile of the ***special permit segment*** area through review of additional online databases and/or map viewers (Bureau of Land Management, 2021; USDA, 2021; USFS, 2021).

Noise: Noise levels associated with construction of the Smartpipe® system will be lower than use of the lift and relay method because work will occur at discreet ground disturbance sites including an

entry bell hole site adjacent to the existing M&R 59003, six (6) pothole sites along ETNG's existing a ROW, and one(1) exit bell holes at the junction of ETNG's existing Lines 3300-1 and 3320A-100. The lift and relay method would involve the use of non-stationary equipment along the entire 3,400-foot-long ***special permit segment***, more heavy equipment would be required, and the duration of work would increase by one (1) month.

ETNG's existing natural gas transmission pipeline system is buried underground, and there are no existing aboveground facilities or valves directly associated with the special permit contributing noise. Therefore, after the "Selected" Alternative is implemented, noise levels associated with operation of the Smartpipe® system will not change current noise levels associated with operation of the ***special permit segment***.

Recreation: Natural, Recreational, or Scenic Areas: Publicly available information on websites of the National Park Service (NPS) "Find a Park" tool, National Register of Historic Places National Archives, and protected NPS affiliated sites were reviewed. These reviews determined that no National Parks, National Natural Landmarks, National Park Service Wilderness Areas, National Wild and Scenic Rivers, or National Scenic Byways are crossed or located within 0.25 mile of the ***special permit segment*** area (NPS, 2021a, 2021b, 2021c, 2021d; National Wild & Scenic Rivers, 2021; USDA, 2021; FHA, 2021).

Socioeconomics: The socioeconomic data used in the Table 14-1 below was obtained from the most recent U.S. Department of Commerce, Bureau of the Census, ACS 5-Year Estimates Subject Table for Roanoke County. As seen in Table 14-1, Roanoke County has a range of economic levels with the majority of households (53 percent) in the $50,000 to $149,999 range. Of that, approximately 19 percent of the households' average over $100,000. Median income estimates across Roanoke County are estimated at approximately $69,000.

Table 14-1 – Income in Past 12 Months (In 2019 Inflation-Adjusted Dollars)

Roanoke County/ Economic Range	Estimate	Margin of Error
Total Households	38,222	±465
Less than $10,000	3.7%	±0.8
$10,000 to $14,999	3.6%	±0.8
$15,000 to $24,999	7.1%	±0.9
$25,000 to $34,999	8.7%	±1.2

Table 14-1 – Income in Past 12 Months (In 2019 Inflation-Adjusted Dollars)		
Roanoke County/ Economic Range	**Estimate**	**Margin of Error**
$35,000 to $49,999	11.1%	±1.0
$50,000 to $74,999	20.0%	±1.8
$75,000 to $99,999	14.1%	±1.1
$100,000 to $149,999	18.8%	±1.4
$150,000 to $199,999	6.6%	±0.9
$200,000 or more	6.1%	±0.9
Median income (dollars)	68,948	±2,007
Mean income (dollars)	87,906	±2,528
Source: https://data.census.gov/cedsci/table?q=&text=S1901&g=0500000US51161&tid=ACSST5Y2019.S1901&hidePreview=trueesults		

Topography: The topography within the ***special permit segment*** area ranges from approximately 1,300 to 1,500 feet above sea level. As discussed above, there will be limited ground disturbance associated with the use of the Smartpipe® system as compared to replacing the entire pipeline using the lift and relay method under the No Action Alternative. Under both the "Selected" Alternative and No Action Alternative, following construction, ETNG will remove all construction debris, restore to original contours and drainages, prepare a seedbed (where necessary), and revegetate the disturbed workspace. Restoration and revegetation will be accomplished in accordance with ETNG's E&SCP.

Transportation: Access to the ***special permit segment*** will not change under either alternative. The ***special permit segment*** will be accessed from Grandin Road Extension (State Route 686). ETNG will use an approximate 2,280-foot-long existing access road to gain access to the ROW at the pipeline junction and an approximate 130-foot-long existing access road to gain access to a laydown area located west of ETNG's existing M&R 59003 and Line 3320A-100 ROW. The lift and relay method would involve the transportation of more heavy equipment, and the duration of work would increase by one (1) month.

Water Resources: The ***special permit segment*** will not affect wetlands, waterbodies or springs under either the "Selected" Alternative or the No Action Alternative.

Groundwater Resources: As previously discussed, the ***special permit segment*** is located in the Ridge and Valley Province, which is characterized by long, even-crested, parallel ridges rising above

intervening valleys of various size. The province is also referred to as the Folded Appalachians because folded strata dominate the topography. The Valley and Ridge Province reaches a maximum width of approximately 80 miles in central Pennsylvania and is bounded by the higher land surfaces of the Blue Ridge and the Piedmont Provinces on the southeast and the Appalachian Plateaus Province on the northwest. It is predominantly underlain by carbonate-rock aquifers and undifferentiated sedimentary-rock aquifers that consist mostly of sandstone and yield moderate volumes of water. Coal-bearing beds are prominent in parts of the province in Pennsylvania and in a local area in southwestern Virginia. The rocks of the Valley and Ridge Province are mainly sandstone, shale, and carbonate rocks. A thick cover of regolith has developed on the rocks, particularly in the valleys. Within this province is the Great Valley which is floored with easily eroded rock, such as shale, slate, or carbonate rocks. The valley generally ranges from 10 to 20 miles wide but is much narrower in and near Roanoke County, Virginia (Trapp and Horn, 1997).

Water in the Valley and Ridge aquifers moves mostly along fractures and bedding planes in all rock types, and in solution openings in the carbonate rocks. Thick wedges of colluvium that locally cover the lower flanks of the ridges can temporarily store large quantities of water that later move into bedrock aquifers in the valleys. The carbonate rocks that are mostly in the valleys receive recharge from precipitation that falls directly on the valley floors as well as from runoff from the adjacent ridges. There are three common types of springs occurring in the Valley and Ridge Province and they include: the contact springs, tubular springs, and impermeable-rock springs which all result from groundwater movement driven by the force of gravity. Only the tubular springs yield large quantities of water and some of the springs discharge water that is distinctly warmer than the average air temperature. Well yield varies with carbonate rock type; the best- to worst-yielding carbonate lithologies are, in order, sandy dolomite, coarse-grained dolomite, limestone, and fine-grained dolomite (Trapp and Horn, 1997).

The chemical quality of water in the freshwater parts of the aquifers of the Valley and Ridge Province is variable but generally is satisfactory for municipal use and other purposes. Most of the water in the upper aquifer is not greatly mineralized and is suitable, or can be treated and made suitable, for most uses. Saline water is commonly in the aquifers at depths of only a few hundred feet below the land surface with only a thin transition zone between the freshwater and saltwater (Trapp and Horn, 1997).

Karst topography including sinkholes, caves, and underground streams characterize the region and are an extremely important source of water supply. Springs in the region are especially important as discharges from large springs commonly exceed hundreds or thousands of gallons per day (GPD). Total freshwater withdrawals from the bedrock aquifers of the Valley and Ridge Province were approximately 371 million GPD during 1985. Withdrawals from carbonate-rock aquifers were estimated to be 249 million GPD. Slightly more than one-half of this water was used for domestic and commercial supplies. Withdrawals from undifferentiated sedimentary-rock aquifers, primarily sandstone aquifers in the Valley and Ridge Province were estimated to be 122 million GPD. Approximately two-thirds of this water was used for domestic and commercial supplies. Due to the complexities of karst geology formations, delineation and development of source water protection areas is challenging, as underground limestone conduits act as hidden streams capable of rapid pollution transport (Trapp and Horn, 1997).

A review of EPA's designated sole-source aquifer maps for Region 3 indicated no designated sole-source aquifers are in the vicinity of the ***special permit segment*** area (EPA, 2021c). In addition, no known hazardous waste sites, including National Priority List sites, were found in the area that could be impacted or provide a groundwater contamination concern for construction and operation of the facilities in the ***special permit segment*** area (EPA, 2021d).

Water Supply Wells: Although information regarding water supply wells is available through various online services, the presence of municipal/public water supply wells within 150 feet of the ***special permit segment*** area is not publicly available (VADEQ, 2021; EPA, 2021e, 2021f; VADEQ, 2020). Data on existing water sources are available in Virginia's Draft 2020 State Water Resources Plan (VADEQ, 2020); however, the source count for wells does not include individual domestic or residential wells. ETNG is not aware of water supply wells within the ***special permit segment*** area.

In addition, according to the Roanoke County's GIS Information Systems Mapping, the special permit segment area is not part of the wellhead protection overlay district (Roanoke County, 2021).

XI. Consultation and Coordination

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

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XII. Responses to Public Comments Placed on Docket PHMSA-2022-0167

PHMSA published the special permit request in the Federal Register () for a 30-day public comment period from January 5, 2023 through February 6, 2023, and considered all comments received through February 6, 2023. 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 ETNG, and draft special permit conditions were available in Docket No. PHMSA-2022-0167 at: www.regulations.gov for public review

PHMSA received one (1) public comment concerning this special permit request from the Pipeline Safety Trust (PST) which asked PHMSA to examine several topics:

(1) PST Comment: PST encourages PHMSA to alter Condition 3(a) of the special permit to require any tapping, branching, or splitting of the ***special permit segment*** that contains the SmartPipe® be approved by PHMSA prior to implementation. The current proposed condition allows for these activities so long as the Smart Pipe Company, Inc., manufactured fittings are used.

- **PHMSA Response**: PHMSA has reviewed this comment and agrees that ETNG should notify and receive a no objection letter prior to any tap, branch, or splitting of the ***special permit segment***. The special permit conditions have been modified to include this additional requirement.

(2) PST Comment: PST requests that PHMSA limit the term of the special permit to five (5) years due to this being a pilot project for alternative technology.

- **PHMSA Response**: PHMSA clarifies that this action is a special permit issued pursuant to 49 USC 60118 and 49 CFR 190.341. PHMSA has reviewed this comment and agrees that this special permit should be limited to five (5) years. This limitation is due to the ***special permit segment*** being in a Class 3 location. With this limitation PHMSA will receive two (2) sets of test results prior to a renewal request.

XIII. Finding of No Significant Impact

In consideration of the FEA, the special permit conditions explained above, and the SPAF document, PHMSA finds that no significant negative impact to human health of safety or the environment will result from the issuance and full implementation of the above-described special permit to waive the of 49 CFR 192.53(c), 192.121, 192.144, 192.149, 192.150, 192.619(a), 192.624, 192.710, and 192.714 (effective May 24, 2023) for the ***special permit segment***, which consists of 0.64 mile of 8.625-inch diameter pipeline located in Roanoke County, Virginia. This special permit, pursuant to 49 USC 60118 and 49 CFR 190.341, will require ETNG to implement additional conditions on the operations, maintenance, and integrity management of the ***special permit segment***.

The granted special permit conditions are available in the FDMS Docket No. PHMSA-2023-0001 at: www.regulations.gov for public review.

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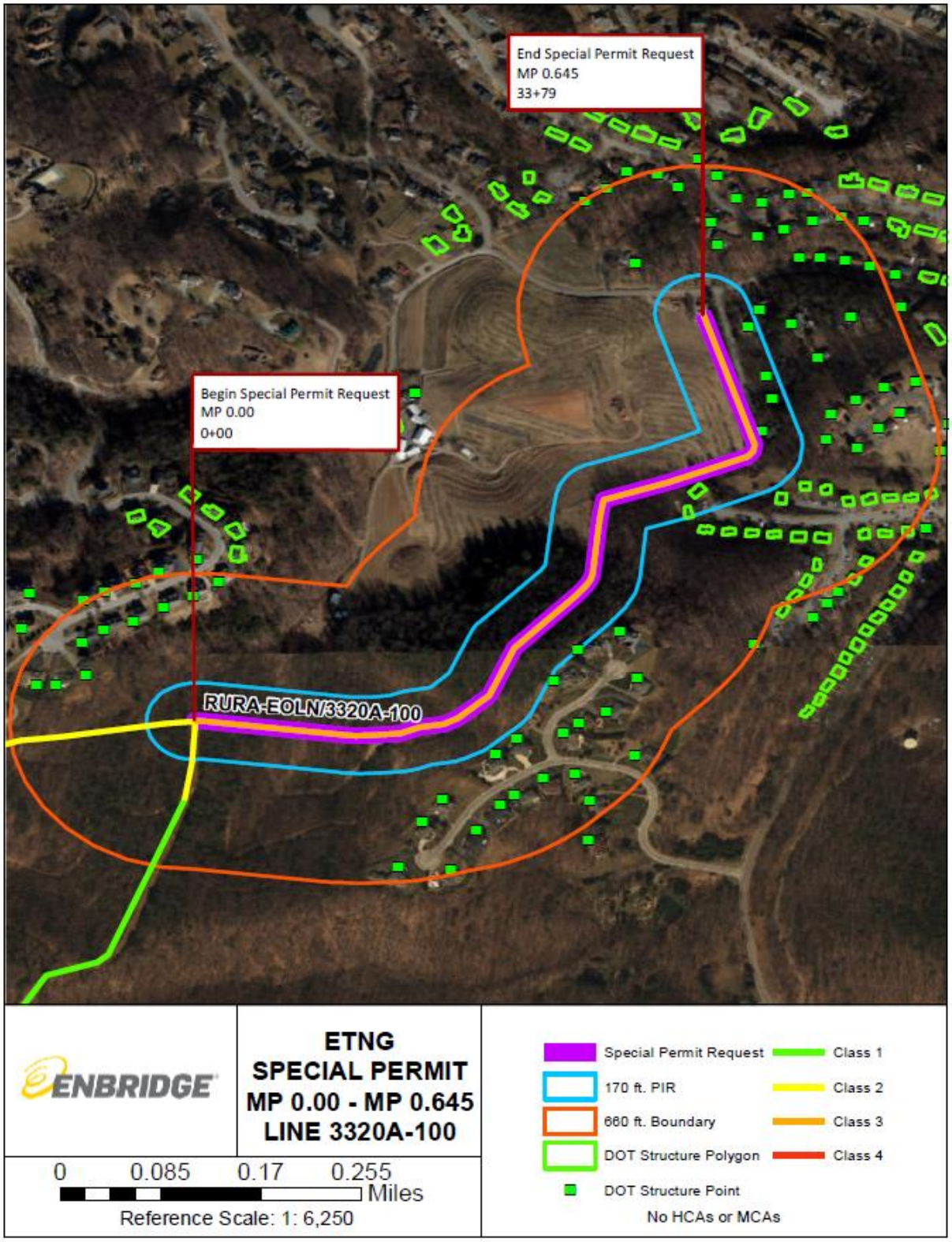
The special permit with conditions granted to ETNG and SPAF for Docket No. PHMSA-2022-0167 can be found the Federal Dockets Management System located on the internet at www.regulations.gov or on the PHMSA website for special permits issued at https://www.phmsa.dot.gov/pipeline/special-permits-state-waivers/special-permits-issued.

Completed by PHMSA in Washington, DC on: March 31, 2023

Attachment A – Special Permit Segment 1



Last Page of the FEA and FONSI