U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

SEP 24 2019

1200 New Jersey Avenue, SE
Washington, D.C. 20590

Mr. Stanley Chapman
Executive VP and President of US Natural Gas Pipelines
TC Energy
700 Louisiana St., Suite 300
Houston, TX 77002

Docket No. PHMSA-RSPA-2004-18757

Dear Mr. Chapman:

On November 10, 2016, Columbia Gas Transmission (CGT), a subsidiary of TC Energy, applied to the Pipeline and Hazardous Materials Safety Administration (PHMSA) for the renewal of special permit PHMSA-RSPA-2004-18757, originally issued on February 25, 2005. The special permit renewal waives compliance of 49 Code of Federal Regulations 192.53(c), 192.121, and 192.619(a) for approximately 4,063 feet of natural gas transmission pipeline in CGT's Dundee Storage Field located in Schulyer County, New York.

PHMSA grants the renewal of this special permit (enclosed) based on a review of CGT's application letter and supporting attachments, tests and documentation required by the special permit conditions, and inspections conducted since the special permit was granted.

The special permit allows CGT to continue to use a fiberglass reinforced polyethylene plastic, composite pipe instead of steel pipe, when buried in Class 1 locations, and at maximum allowable operating pressure of 825 pounds per square inch gauge. The special permit renewal requires CGT to comply with the special permit conditions and limitations designed to maintain pipeline safety, including the pipeline monitoring and testing of the composite pipe properties.

My staff would be pleased to discuss this special permit renewal or any other regulatory matter with you. Sentho White, Director of Engineering and Research Division, may be contacted at 202-366-2415, on matters specific to this special permit renewal.

Sincerely,

Alan K. Mayberry
Associate Administrator for Pipeline Safety

Enclosure: Special Permit Renewal – PHMSA-RSPA-2004-18757

U.S. DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
SPECIAL PERMIT – RENEWAL

Special Permit Information:

Docket Number:	PHMSA-RSPA-2004-18757
Requested By:	Columbia Gas Transmission, L.L.C.
Operator ID#:	2616
Original Date Requested:	January 27, 2004
Original Special Permit Granted:	February 25, 2005
Renewal Effective Dates:	September 24, 2019 through September 24, 2029
Code Section(s):	49 CFR 192.53(c), 192.121, and 192.619(a)

Special Permit - Renewal:

By this order, subject to the terms and conditions set forth below, the Pipeline and Hazardous Materials Safety Administration (PHMSA) Office of Pipeline Safety (OPS) [1] grants this special permit renewal (PHMSA-RSPA-2004-18757) from September 24, 2019 through September 24, 2029, to Columbia Gas Transmission (CGT)[2], in continuing to waive compliance from 49 Code of Federal Regulations (CFR) 192.53(c), 192.121, and 192.619(a) for approximately 4,063 feet of natural gas transmission pipeline in its Dundee Storage Field located in Schulyer County, New York.

Purpose and Need:

On the condition that CGT complies with the terms and conditions set forth below, this special permit renewal waives compliance from 49 CFR 192.53(c), 192.121[3], and 192.619(a) for approximately 4,063 feet of natural gas transmission pipeline in CGT's Dundee Storage Field located in Schulyer County, New York. The special permit renewal is granted for the ***special***

[1] Throughout this special permit the usage of "PHMSA" or "PHMSA OPS" means the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration, Office of Pipeline Safety.

[2] The Dundee Storage Field is owned and operated by Columbia Gas Transmission, L.L.C., a subsidiary of TC Energy.

[3] The original special permit waived 49 CFR 192.123, which was merged into 49 CFR 192.121 and removed from 49 CFR Part 192 in 2019.

permit segment of the Dundee Storage Field storage well pipeline, which is located in a Class 1 location.

The special permit renewal allows CGT to use Fiberspar pipe instead of steel pipe at MAOP of 825 psig.[4] The special permit renewal allows alternative determination for composite pipe properties, and the MAOP as required in 49 CFR 192.53(c), 192.121, and 192.619(a). The special permit renewal allows composite pipe to be used in the ***special permit segment***. The composite pipe must meet the special permit conditions throughout its operational life, including:

- Maintain structural integrity under temperature and other environmental conditions,
- Be chemically compatible with the gas transported,
- Meet the requirements of 49 CFR Part 192 and the special permit renewal, and
- Perform on-going inspections and tests throughout the life of the composite pipe to validate the use of the alternative determination of the MAOP and confirm continued integrity of the ***special permit segment***.

Special Permit Segment:

Schulyer County, New York

PHMSA waives compliance from 49 CFR 192.53(c), 192.121, and 192.619(a) for the ***special permit segment*** defined as follows:

Special permit segment – *A*pproximately 4,063 feet of 4-inch Fiberspar LinePipe® fiberglass reinforced polyethylene plastic pipe installed at CGT's Dundee Storage Field in Schulyer County, New York, which consists of buried pipelines transporting natural gas to and from five (5) storage wells as described below:

- Line 9302 is 1,076 feet in length. Line 9302 is located approximately 400 feet from the nearest paved road (6 Corners Road), 960 feet from a non-permanent residence hunting cabin, and greater than 1,000 feet from the nearest permanent residence single family dwelling.

[4] Throughout this special permit the usage of "Fiberspar pipeline" or "Fiberspar pipe" means "Fiberspar LinePipe®".

- Line 9305 is 136 feet in length. Line 9305 is located approximately 350 feet from the nearest paved road (6 Corners Road) and is greater than 1,000 feet from the nearest permanent residence single family dwelling.
- Line 9341 is 1,327 feet in length. Line 9341 is located approximately 85 feet from a non-permanent residence hunting cabin, is 960 feet from the nearest paved road (Bigelow Road), and is 975 feet from the nearest permanent residence single family dwelling.
- Line 9343 is 472 feet in length. Line 9343 is located approximately 660 feet from a non-permanent residence hunting cabin, is greater than 1,000 feet from the nearest permanent residence single family dwelling, and is greater than 1,000 feet from the nearest paved road (6 Corners Road).
- Line 19321 is 1,052 feet in length. Line 19321 crosses a paved road (6 Corners Road) through an 8-inch diameter steel casing, is approximately 275 feet from a non-permanent residence hunting cabin, and is greater than 1,000 feet from the nearest permanent residence single family dwelling.

The ***special permit segment*** consists of five (5) buried 4-inch Fiberspar pipelines. The ***special permit segment*** does not apply to any aboveground piping or facilities or to any pipe made of materials other than Fiberspar LinePipe® fiberglass reinforced polyethylene plastic pipe or of dimensions not described herein.

On February 25, 2005, PHMSA granted the special permit based on the analysis set forth in the *"Special Permit Analysis and Findings"* document, which can be read in its entirety in Docket No. PHMSA-RSPA-2004-18757, in the Federal Docket Management System (FDMS) located on the Internet at www.regulations.gov. The special permit renewal is based on a review of documents provided by CGT in a renewal application letter dated November 10, 2016, tests and documentation required by the conditions within the original special permit, and PHMSA inspections conducted during the period in which the original special permit was in effect.

Conditions:

The renewal of this special permit is subject to CGT continuing to implement the following conditions on the ***special permit segment***.

1) **Maximum Allowable Operating Pressure**: CGT must maintain a maximum allowable operating pressure (MAOP) of 825 pounds per square inch gauge (psig) for the ***special permit segment***.

2) **Design Limitations**: CGT must operate the 4-inch Fiberspar LinePipe® within the ***special permit segment*** and the ***special permit segment*** must not include Class 2, 3, and 4 locations (as defined in 49 CFR 192.5) or high consequence areas (as defined in 49 CFR 192.903).

3) **Notifications to PHMSA and New York State, Department of Public Service**: For any condition in this special permit renewal requiring CGT to notify or send materials to PHMSA, CGT must additionally send notifications or copies to both the PHMSA Director of State Programs and to the Supervisor of the New York State, Department of Public Service, Office of Electricity, Gas & Water - Safety Section, which is the state authority for the CGT pipeline through an interstate agent agreement with PHMSA.

4) **Procedures for Inspections, Remediation, and Tests**: CGT must continue to develop, implement, and document procedures for the ***special permit segment*** as follows:
    a. Develop qualification procedures on joining methods through Fiberspar installation training courses and field training;
    b. Installation qualification procedures and Fiberspar joining methods must be available upon request to the Director, PHMSA Eastern Region;
    c. Should Fiberspar pipe remediation, replacement, repair, or new installations be required, CGT must have qualified Fiberspar personnel present and overseeing the installation. Notice must be given to the Director, PHMSA Eastern Region, of the date, time, and location of the remediation, replacement, repair, or new installation, and provide the Director an opportunity to witness the installation;
    d. Schedule five (5) inspections for 1, 2.5, 5, 7.5, and 10 years after installation; remove a minimum ten-foot pipe segment for inspection and perform both non-destructive and destructive testing on the pipe material. Non-destructive testing shall focus on the composition and degradation of the fiberglass reinforced polyethylene plastic pipe material, and the destructive testing shall be a hydrotest to burst pressure. Upon request, the results of the inspections and tests must be available to the Director, PHMSA Eastern Region;

e. Submit Fiberspar fiberglass reinforced polyethylene plastic pipe to ASTM for testing. If CGT fails to submit this pipe material to ASTM for testing and have this material listed as an acceptable material meeting ASTM requirement for new materials, and have a listing with the Plastics Pipe Institute (PPI) within five (5) years of the pipe's original installation, CGT must discontinue use of this pipe material at the end of the 5th year following initial installation, and comply with the regulatory requirements of 49 CFR 192.53(c), 192.121, 192.123, and 192.619(a). If it is determined that the commodity transported in this pipeline is not compatible with, and proves detrimental to this pipe material, or if CGT does not comply with any of these requirements, or the operational circumstances indicate that the special permit renewal compromises the safety of the pipeline, people or property, PHMSA reserves the right to terminate this special permit renewal.

5) Inspections and Tests to Confirm MAOP for Future Operations:

a) CGT must schedule and perform inspections during which non-destructive and destructive testing must be performed on the pipe material after installation. Nondestructive testing shall focus on the composition and degradation of the pipe material and destructive testing must include a hydrotest to burst pressure test.

b) As required by the conditions in the original special permit, CGT has performed inspections and tests at approximately 1, 2.5, 5, 7.5, 10, and 12.5 years after construction. Under renewal of the special permit, **Condition 5** sets additional requirements for inspections, testing, and related analyses. **Condition 5** sets a new schedule for inspections and tests going forward.

c) Remove a minimum ten (10) foot pipe segment for inspection during each inspection.

d) In accordance with the requirements of this special permit renewal, CGT must perform removal, replacement, installation of pipe and fittings, and other actions related to the removal of test segments.

e) All inspections, testing, and related analyses required under **Condition 5** <u>after the special permit renewal must be performed every 24 months, not to exceed 30 months, with the next to be performed prior to December 31, 2019.</u>

f) Perform additional inspections, testing, and related analyses as follows:

1. Short Term Hydrostatic Burst Pressure (STHB):

   CGT must modify the current STHB testing protocol to include a strain gage set up for the future test cycles. Bidirectional STHB pressure must be determined in duplicates with strain gages attached to the Fiberspar pipe in accordance with ASTM D1599-18, Standard Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings. In addition to the burst pressure, the focus of this test is on axial strain response under bidirectional loading as a pressure vessel. Early deviation from linear axial strain response could indicate a poor (or deteriorated) fiber-to-resin bonding while increased axial strain responses at the same hoop stress level could indicate a deteriorated resin matrix.

2. Interlaminar Shear Strength (ILSS):

   CGT must determine ILSS in accordance with ASTM D2344 / D2344M-13, "Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates". The appropriate specimen geometry must be used so the interlaminar shear will be the failure mode. Loss of ILSS could indicate a degraded fiber/resin bond and/or resin matrix.

3. Dynamic Mechanic Analysis (DMA):

   Other than glass transition temperature determined in accordance with ASTM D7028-07(2015), "Standard Test Method for Glass Transition Temperature (DMA Tg) of Polymer Matrix Composites by Dynamic Mechanical Analysis (DMA)", storage modulus, loss modulus, and tan delta must be calculated. Based on the information collected, CGT must evaluate the resin and fiber/resin bond degradation of the Fiberspar pipe.

4. Modulated Differential Scanning Calorimetry (DSC):

   CGT must conduct Fiberspar pipe tests to determine the specific heat capacity of the epoxy in the structural wall and High-Density Polyethylene (HDPE) liner in accordance with ASTM E2716-09(2014), "Standard Test Method for Determining Specific Heat Capacity by Sinusoidal Modulated Temperature Differential Scanning Calorimetry". DSC is the standard test

method for determining specific heat capacity by Sinusoidal Modulated Temperature Differential Scanning Calorimetry. The primary goal of modulated DSC is to determine the specific heat capacity of the resin matrix. A higher specific heat capacity is typically associated with degraded resin matrix, although no obvious change in glass transition temperature is noticeable.

5. Monitoring and Reporting of Fiberspar Life Expectancy:
   a. CGT must plot Fiberspar pipe burst pressures (current data and updated with future test results when available) versus time in service.
   b. CGT must update and re-evaluate this Fiberspar pipe burst pressure graph (see Figures 1 and 2 and Table 2 below, which were originally submitted by CGT) within 30 days of receipt of test results/report from the laboratory for each required sample test and must utilize the adjusted graphs after each burst test to reevaluate the projected life expectancy of the Fiberspar pipe.
   c. If the failure pressure ratio (FPR) (pipe burst pressure divided by MAOP) should meet or fall below 2.0, CGT must increase the **Condition 5(e)** test frequency to once per calendar year, but not to exceed 16 months, from the previous sample test date. As described in the "Proposed Sample Locations", the order in which the pipe samples are harvested must not change.
   d. If the FPR should fall below 1.67, CGT must notify the Director, PHMSA Eastern Region as soon as practicable, but not to exceed 30 days, and the test plan and MAOP must be modified to ensure operational safety. The Director, PHMSA Eastern Region may consider requiring changes to the special permit conditions, which may include, but are not limited to, sampling plan/timing, burst pressure limits, adjustments to testing requirements, etc. CGT must calculate and report the estimated service life based on this data and the MAOP.
6. The additional testing required by this **Condition 5** must be conducted in conjunction with the continuation of CGT's previous testing regimen (which

included Burst Pressure, Ultimate Axial Compression, Laminate Glass Transition Temperature, PE Linear Melting Point), per the original special permit and test samples extracted must be of adequate size to accommodate this additional testing.

7. All tests must be witnessed, analyzed, and test reports furnished by an independent third-party expert. CGT must provide all test reports to the Director, PHMSA Eastern Region, New York State Department of Public Service, and Fiberspar. Note: Both Jana Laboratories Inc. (JANA), of Aurora, Ontario, Canada and Woods Scientific have provided the third-party expert inspection and inspection reports for the original special permit.

g) CGT must monitor and report any other significant decreases or downward trends of other properties, including axial compression. CGT must notify the Director, PHMSA Eastern Region, as soon as practicable, but not to exceed 30 days, of any potential concerns with a decrease or downward trend and the test plan must be modified to ensure operational safety. The Director, PHMSA Eastern Region may consider requiring changes to the special permit conditions, which may include, but are not limited to, sampling plan/timing, burst pressure limits, adjustments to testing requirements, etc.

h) CGT must report the results of the inspections and tests to the Director, PHMSA Eastern Region within 60 days of completion of any testing required by the special permit renewal.

6) Additional Conditions for the Special Permit Renewal:

a. CGT must monitor class locations and the development of any high consequence area in the ***special permit segment,*** and report any changes to PHMSA, within 30 days of any documented changes.

b. CGT must conduct leakage detection surveys of the entire ***special permit segment*** two (2) times per calendar year at a minimum, not to exceed 7 ½ months between surveys, utilizing industry standard leak detection equipment capable of parts per million detections of gas in air (flame ionization or similar). CGT must repair all leaks as they are found, and notify the Director, PHMSA Eastern Region of any leaks found as soon as it is safe to do so. Leak testing procedures, equipment, and

scheduling must be documented within the CGT O&M Procedures. The first survey must be performed within 30 days of grant of this special permit renewal, or not more than 7 ½ months from the last leakage survey documented by CGT that would have met the requirements of this **Condition 6(b)**.

c. If at any time, CGT becomes aware of a threat to the integrity of the ***special permit segment*** that poses a risk to the public or a failure risk, CGT shall notify the Director, PHMSA Eastern Region immediately. Concurrent with such notification, CGT must outline the potential mitigative and integrity measures that will be used to address the threat or risk, including replacement with steel line pipe per 49 CFR Part 192.

d. CGT must notify the Director, PHMSA Eastern Region as soon as practicable, but not to exceed 30 days, if:

   1. Repairs or modifications are required or made to the ***special permit segment*** Fiberspar pipe, including fittings;
   2. The ***special permit segment*** is at any time damaged or hit; or
   3. The pipe or fitting manufacturer modifies or discontinues any items used in the ***special permit segment***.[5]

7) **Annual Reporting:** Following the renewal of this special permit, CGT must annually[6,7] report the following to the Director, PHMSA Eastern Region with copies to the PHMSA Director, Engineering and Research Division, and PHMSA Director, Standards and Rulemaking Division:[8]

   a. The number of new residences, other structures intended for human occupancy and public gathering areas built within 220 yards of the pipeline centerline and along the ***special permit segment***.

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[5] Fiberspar has made modifications to their product since 2005. The 12.5-year sample was the first section to be replaced with the new Fiberspar pipe.

[6] Annual reports must be placed by CGT in www.regulations.gov at docket: PHMSA-RSPA-2004-18757.

[7] Annual reports shall be received by PHMSA by the last day of the month in which the special permit renewal is dated. For example, the annual report for a special permit renewal dated September 15, 2019, shall be received by PHMSA no later than September 30, each year beginning in 2020.

[8] The requirements for annual reporting do not excuse CGT from other more immediate reporting requirements of this special permit renewal or 49 CFR Parts 191 or 192.

b. Any new integrity threats identified during the previous year and the results of any excavations, tests, or other integrity assessments performed during the previous year in the ***special permit segment***.

c. Updated test results and projected service life as shown in Figures 1 and 2 and Table 1.

d. A summary of the findings of the semi-annual leak survey required in **Condition 6(b)** for the ***special permit segment***.

e. Any reportable incident, any leak normally indicated on the DOT Annual Report, and all repairs on the pipeline that occurred during the previous year in the ***special permit segment***.

f. Any on-going damage prevention initiatives affecting the ***special permit segment*** and a discussion of the success of the initiatives.

g. Any mergers, acquisitions, transfer of assets, or other events affecting the regulatory responsibility of the company operating the pipeline.

8) **Certification:** A senior executive officer of CGT, vice president or higher, must certify in writing the following for the special permit renewal.

a. CGT pipeline meets the conditions described in this special permit renewal and 49 CFR Part 192 for the ***special permit segment***.

b. CGT must maintain the following records for the ***special permit segment*** and included these requirements in CGT's O&M Manual:

1. Documents (material test reports) certifying that the pipe in the ***special permit segment*** meets the requirements of ASTM D-2517, material and operating standards in this special permit renewal, and 49 CFR Part 192.
2. Documentation of compliance with all conditions of this special permit renewal must be retained for the applicable life of this special permit renewal for the referenced ***special permit segment***.

c. All written manuals for the CGT ***special permit segment*** must be updated to include all additional construction, and O&M requirements of this special permit renewal and 49 CFR Part 192.

d. CGT has reviewed and modified its damage prevention program relative to the CGT ***special permit segment*** to include any additional conditions required by the special permit renewal.

CGT must send the certifications for the special permit renewal required in **Condition 8 (a) through (d)** with completion date, compliance documentation summary, and the required senior executive signature and date of signature to the PHMSA Associate Administrator for Pipeline Safety, with copies to the Director, PHMSA Eastern Region; and to the Federal Register Docket (PHMSA-RSPA-2004-18757) at www.regulations.gov within six (6) months of the issuance date of this special permit renewal.

Limitations:

This special permit renewal 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 CGT 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 CGT to submit the certifications required by **Condition 8 (Certification)** within the time frames specified may result in revocation of this special permit.
4) 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.
5) If CGT sells, merges, transfers, or otherwise disposes of all or part of the assets known as the CGT ***special permit segment***, CGT 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.

6) PHMSA grants this special permit renewal to limit it to a term of ten (10) years from the date of renewal. If CGT elects to seek future renewal of this special permit, CGT must submit its renewal request at least 180 days prior to expiration of the special permit renewal to the PHMSA Associate Administrator for Pipeline Safety, with copies to the PHMSA Deputy Associate Administrator for Field Operations; PHMSA Deputy Associate Administrator for Policy and Programs; Director, PHMSA Eastern Region; PHMSA Director, Standards and Rulemaking Division; and PHMSA Director, Engineering and Research Division. All requests for a renewal must include a summary report in accordance with the requirements in **Condition 7 (Annual Reporting)** and must demonstrate that the special permit renewal is still consistent with pipeline safety. PHMSA may seek additional information from CGT prior to granting any request for special permit renewal.

AUTHORITY: 49 U.S.C. 60118(c)(1), 49 CFR 1.97, and 49 CFR 190.341,
Issued in Washington, DC on SEP 24 2019.

Alan K. Mayberry,
Associate Administrator for Pipeline Safety

Figure 1: Fiberspar Burst Pressures (Actual and Projected)

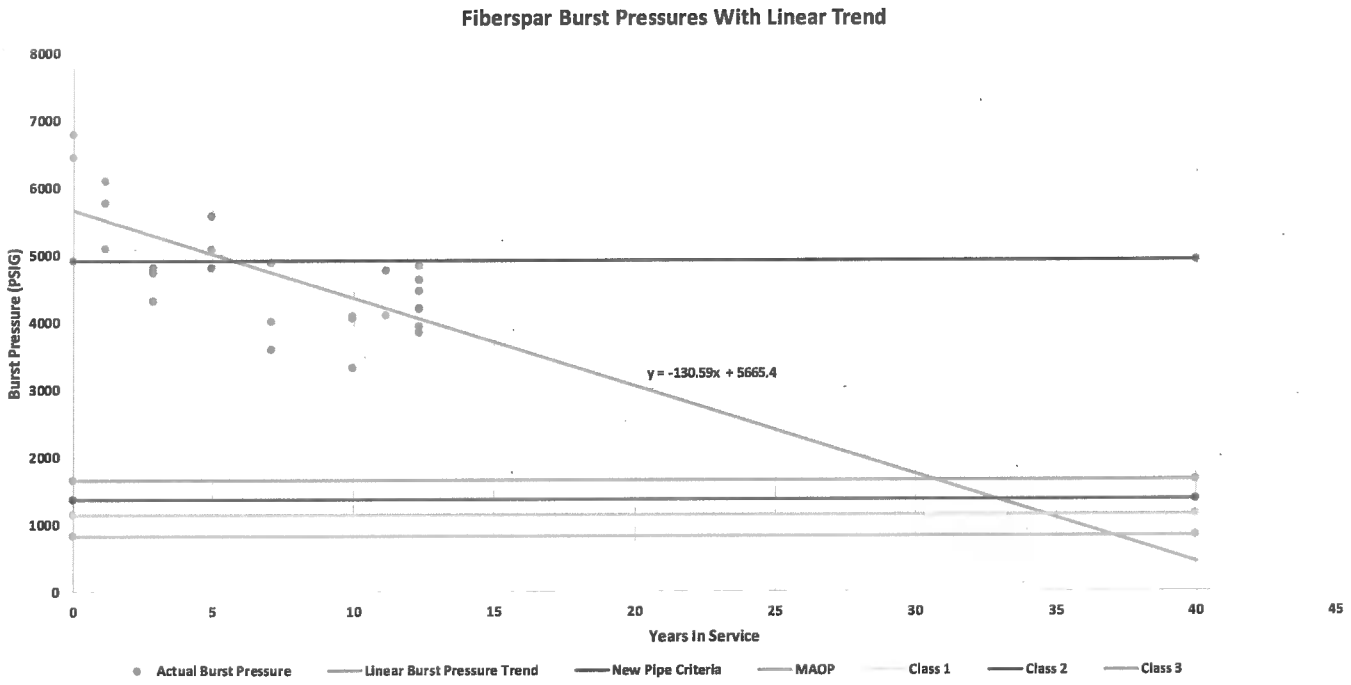

Figure 2: Fiberspar Burst Pressures with Logarithmic Trend

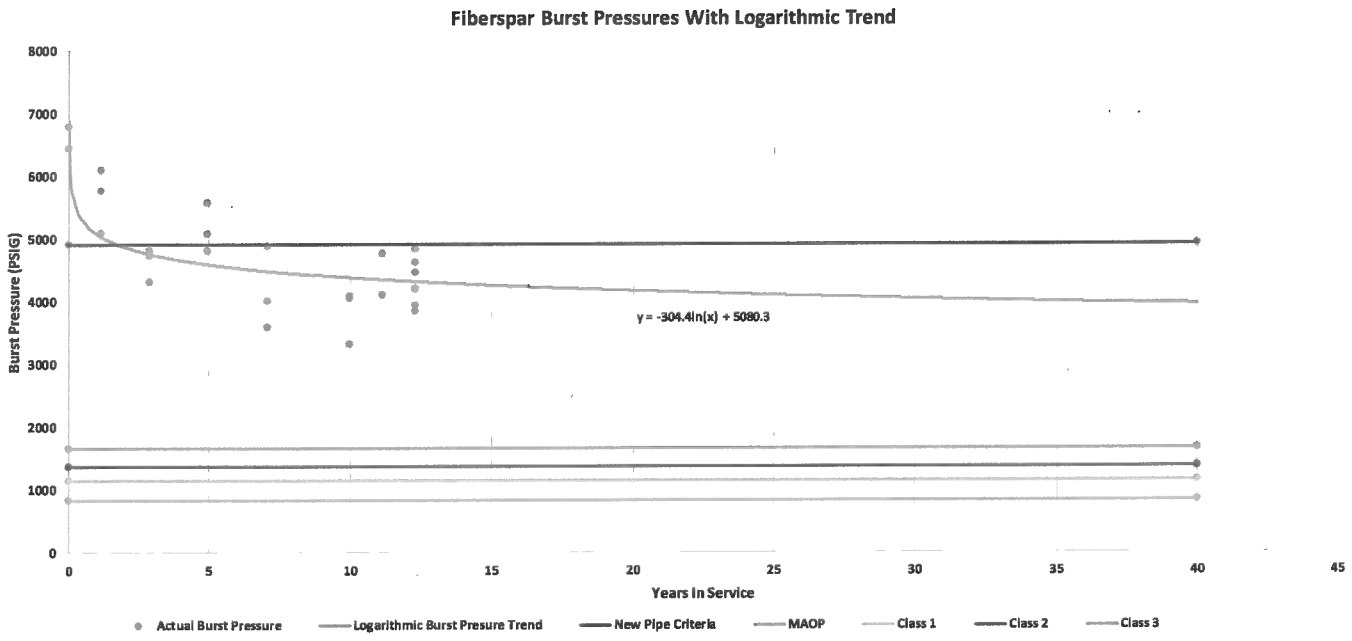

Table 1: Projected Average Burst Pressures and Projected Service Life

Table 1: Linear Burst Pressure Trend			
	Safety Factor	Burst Pressure (PSIG)	Years in Service
MAOP	N/A	825	37.06
Class 1	1.39	1145	34.61
Class 2	1.67	1375	32.85
Class 3	2.0	1650	30.74