# BEFORE THE PUBLIC SERVICE COMMISSION OF THE STATE OF MISSOURI

In the Matter of the Application of	)		
Roeslein Alternative Energy Services, LLC	)	File No. GE-2023	
for a Permanent Waiver From Certain	)		
Provisions of 20 CSR 4240-40.030 (MAOP)	)		

# **APPLICATION FOR WAIVERS**

COMES NOW Roeslein Alternative Energy Services, LLC ("RAES" or "Company"), pursuant to 20 CSR 4240-2.060(4), 20 CSR 4240-40.030(18), 20 CSR 4240-2.080(18), and 20 CSR 4240-4.017(1), and, for its *Application for Waivers*, respectfully states as follows to the Missouri Public Service Commission ("Commission").

# THE APPLICANT

- 1. RAES is a Missouri Limited Liability Company, organized and existing under the laws of the state of Missouri, with a registered address of 9200 Watson Road, Suite 200, St. Louis, Missouri, 63126. RAES' Certificate of Good Standing from the Missouri Secretary of State's Office is attached as **Appendix A**. RAES has no pending actions or final unsatisfied judgments or decisions against it from any state or federal agency or court that involve customer service or rates and has no overdue annual reports or assessment fees.
- 2. Pleadings, notices, orders, and other correspondence and communications regarding this docket should be addressed to the undersigned counsel for RAES and also to:

Tim Johnston Roeslein Alternative Energy Services, LLC 9200 Watson Road, Suite 200 St. Louis, MO 63126-1528

- 3. The mission of RAES and its affiliates is to discover and implement alternative biomass and energy solutions, with the goal of restoring millions of acres of grasslands on marginal land throughout the Midwest region. RAES affiliates create renewable natural gas (RNG), pipeline-quality natural gas produced from organic inputs and natural processes. After production and processing, RAES affiliates gather this RNG to a point where it may be compressed and injected into a transmission pipeline.
- 4. RAES is neither a "gas corporation" nor a "public utility" as those terms are defined at §386.020, RSMo. However, it does operate "gas plant" that is subject to the Commission's gas safety jurisdiction.<sup>1</sup>

# **BACKGROUND**

5. Impermeable covers have been installed on existing lagoons to harvest renewable natural gas from hog finishing farms, using anaerobic digestion technology developed and installed by RAES affiliates. The covers turn the lagoons into anaerobic digesters, where naturally occurring microorganisms decompose the manure in an oxygen free environment. Bio-gas rises to the top where it is collected and cleaned of impurities. What remains is more than 98 percent methane, with approximately the same chemical composition as natural gas, that can be used for vehicle fuel or injected into the natural gas grid system. The un-digestible solid residue can be used by local farmers as a natural fertilizer, and the water can be safely used for irrigation. As a part of this process, RAES constructs RNG gathering systems to bring this gas to a site for

<sup>&</sup>lt;sup>1</sup> See Order Denying Application in Part and Dismissing Application in Part, File No. GA-2016-0271 (Issued August 3, 2016).

injection into the ANR Pipeline (an interstate pipeline under the jurisdiction of the Federal Energy Regulatory Commission).

6. In the situation at issue in this Application, RAES is requesting to upgrade the maximum allowable operating pressure (MAOP) of the existing pipeline from the Somerset Farm located in Mercer County, Missouri, to the existing interconnect with the ANR Pipeline, also located in Mercer County. The requested upgrade would raise the MAOP from the current 100 psig to 125 psig. (See the map attached as **Appendix B**). This intrastate gas transmission pipeline is approximately 8.4 miles long and is located in a Class 1 location. RAES seeks a permanent waiver from Commission Rule 20 CSR 20 CSR 4240-40.030(3)(I)(3)(B)(I) as to that portion of its transmission line described above pursuant to Commission Rule 20 CSR 4240-40.030(18).

## 20 CSR 4240-40.030 WAIVER

- 7. The Applicant requests that the Commission grant a permanent waiver of compliance ("waiver") for the above-described gas transmission line in regard to the provisions of 20 CSR 4240-40.030(3)(I)(3)(B)(I), which, in relevant part, require as follows:
  - 3. Polyethylene (PE) Pipe Requirements. A. The federal regulation at 49 CFR 192.121(c)(1) is not adopted in this rule. (This federal regulation permits higher design pressures for certain types of PE pipe.) B. For PE pipe produced after January 22, 2019, a DF of 0.40 may be used in the design formula, provided: (I) The design pressure does not exceed 100 psig;
- 8. Waivers from these gas safety rules are permitted, upon a showing that gas safety is not compromised. Commission Rule 20 CSR 4240-40.030(18) states as follows:

- (18) Waivers of Compliance. Upon written request to the secretary of the commission, the commission, by authority order and under such terms and conditions as the commission deems appropriate, may waive in whole or part compliance with any of the requirements contained in this rule. Waivers will be granted only on a showing that gas safety is not compromised. If the waiver request would waive compliance with a federal requirement in 49 CFR part 192, additional actions shall be taken in accordance with 49 USC 60118 except when the provisions of subsection (17)(G) apply.
- 9. RAES intends to construct a new pipeline from the Badger-Wolf farm, located south of the Somerset farm, to the Somerset farm and tie this new pipeline into the existing pipeline from the Somerset farm to the existing interconnect with the ANR Pipeline system located north of Mercer, Missouri. The combined flow from the Somerset farm and from the Badger Wolf farm, and from other future connections south and east of the Badger Wolf farm, will be greater than the capacity of the existing line if operated at 100 psig. Upgrading the MAOP to 125 psig would allow this combined gas flow to be accommodated. Without this waiver, RAES will have to install an additional pipeline parallel to the existing pipeline. This additional pipeline would add considerable cost to the project and further encumber the public and private ROWS along the route.
- 10. Safety will not be compromised by the requested waiver because of the nature of the transmission line in question. The pipeline has been designed in accordance with the remainder of 20 CSR 4240-40.030(3)(I)(3), and the requested waiver will not exceed the maximum allowable operating pressure of 125 psig specified in 49 CFR Part 192.121, the Federal code corresponding to this section of the Missouri statute. 49 CFR Part 192.121 is attached hereto as **Appendix C**. RAES proposes to establish the requested MAOP by a method approved by existing regulation. Due to the seasonal nature of the flow through this pipeline, RAES has determined that the best

method for establishing the new MAOP will be to conduct a new pressure test in accordance with 49 CFR Part 192.513 and 20 CSR 4240-40.030(10)(G)(3). Thus, to establish a MAOP of 125 psig, the pipeline will have to safely achieve a test pressure of 188 psig.

- 11. The gas flowing on the line for which RAES seeks a waiver will not be used for service to any end users, only to deliver gas to the intrastate pipeline. Residences along the pipeline route are located more than 50 feet from the pipeline, which exceeds the separation distance for such pipelines in typical natural gas distribution standards.
- 12. The federal statute referenced by Commission Rule 20 CSR 4240-40.030(18) (49 U.S.C. 60118) states in relevant part that:
  - (d) WAIVERS BY STATE AUTHORITIES.

If a certification under section 60105 of this title or an agreement under section 60106 of this title is in effect, the State authority may waive compliance with a safety standard to which the certification or agreement applies in the same way and to the same extent the Secretary may waive compliance under subsection (c) of this section. However, the authority must give the Secretary written notice of the waiver at least 60 days before its effective date. If the Secretary makes a written objection before the effective date of the waiver, the waiver is stayed. After notifying the authority of the objection, the Secretary shall provide a prompt opportunity for a hearing. The Secretary shall make the final decision on granting the waiver.

13. RAES asks that the Commission grant the permanent waiver requested herein and take such further steps as are necessary to confirm the non-objection of the United States Secretary of Transportation.

# CONDITIONS

14. In conjunction with a grant of the waiver requested herein, RAES

recommends that the Commission include the following conditions:

- a. RAES may not serve any Missouri customers from this pipeline without prior Commission approval;
- b. RAES will perform a pressure test of the pipeline to a pressure of 188 psig to establish the new MAOP of 125 psig;
- c. RAES shall conduct leakage surveys and patrols along the entire length of the pipeline at intervals not exceeding four and one-half (4½) months, but at least four (4) times per calendar year;
- d. RAES shall conduct a class location study of the RAES transmission pipeline annually, notifying Commission Staff of any class location changes within 30 days of discovery; and,
- e. Whenever RAES is made aware (through notification by Missouri One Call, or other source) that its pipeline lies within the area described in the notice of excavation, or is within two (2) feet of such area, in addition to following the requirements of RSMo Chapter 319 to locate its line, RAES will have personnel onsite monitoring for damages to its pipeline during excavation work.

# 20 CSR 4240-4.017(1) WAIVER

- 15. Rule 20 CSR 4240-4.017(1) provides that "(a)ny person that intends to file a case shall file a notice with the secretary of the commission a minimum of sixty (60) days prior to filing such a case." A notice was not filed 60 days prior to the filing of this Petition, and RAES seeks a waiver of the 60-day notice requirement.
- 16. Rule 20 CSR 4240-4.017(1)(D) provides that a waiver may be granted for good cause. Good cause exists in this case. RAES declares (as verified below) that it has had not communication with the office of the Commission (as defined by Commission Rule 20 CSR 4240-4.015(10)) within the prior 150 days regarding any substantive issue likely to be in this case, other than those pleadings filed for record. Accordingly, for good cause shown, RAES moves for a waiver of the 60-day notice

requirement of Rule 20 CSR 4240-4.017(1) and acceptance of this Application.

WHEREFORE, RAES respectfully requests the Commission to grant the Company a waiver from the requirements of Commission Rule 20 CSR 4240-40.030(3)(I)(3)(B)(I), as described herein.

Respectfully submitted,

Dean L. Cooper

Mo. Bar 36592

BRYDON, SWEARENGEN & ENGLAND P.C.

312 East Capitol Avenue

P.O. Box 456

Jefferson City, MO 65102-0456

Telephone: (573) 635-7166

dcooper@brydonlaw.com

ATTORNEYS FOR ROESLEIN
ALTERNATIVE ENERGY SERVICES, LLC

# **CERTIFICATE OF SERVICE**

The undersigned certifies that a true and correct copy of the foregoing document was sent by electronic mail to the following counsel this 12<sup>th</sup> day of September, 2022:

Office of the General Counsel staffcounselservice@psc.mo.gov

Office of the Public Counsel opcservice@opc.mo.gov

Q1.Com

# **VERIFICATION**

STATE OF	Colorado		)
			) ss
COUNTY O	F Weld	,	)

I, Timothy Johnston, under penalty of perjury, and pursuant to Section 509.030, RSMo, state that I am a Vice President for Roeslein Alternative Energy Services, LLC ("RAES"), that I am authorized to execute this verification on behalf of RAES, and that the matters and things stated in the foregoing pleading are true and correct to the best of my information, knowledge, and belief. Additionally, no representative of RAES has had any communication with the office of the Missouri Public Service Commission as defined in Commission Rule 20 CSR 4240-4.015(10), within the immediately preceding 150 days regarding the subject matter of this Application (other than the filing, and dismissal, of a similar application in File No. GE-2023-0082).

Timothy Johnston, Vice President

September 12, 2022 Dated STATE OF MISSOUR

# John R. Ashcroft Secretary of State

CORPORATION DIVISION
CERTIFICATE OF GOOD STANDING

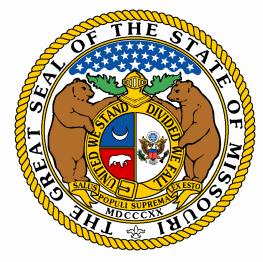
I, JOHN R. ASHCROFT, Secretary of State of the STATE OF MISSOURI, do hereby certify that the records in my office and in my care and custody reveal that

Roeslein Alternative Energy Services, LLC LC001479382

was created under the laws of this State on the 15th day of February, 2016, and is active, having fully complied with all requirements of this office.

IN TESTIMONY WHEREOF, I hereunto set my hand and cause to be affixed the GREAT SEAL of the State of Missouri. Done at the City of Jefferson, this 6th day of September, 2022.

Secretary of State



Certification Number: CERT-09062022-0018

M<sup>c</sup>CLURE<sup>™</sup>

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CERTIFICATE OF AUTHORITY No. E-2006023253

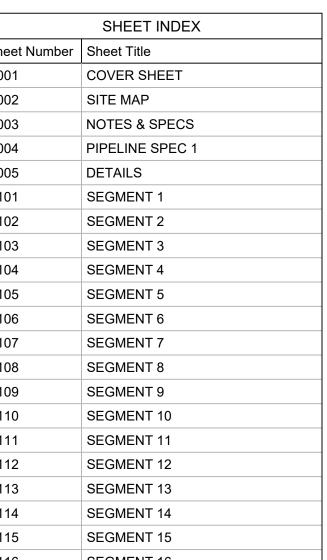
# MERCER COUNTY **KEY MAP SHOWING COUNTY**

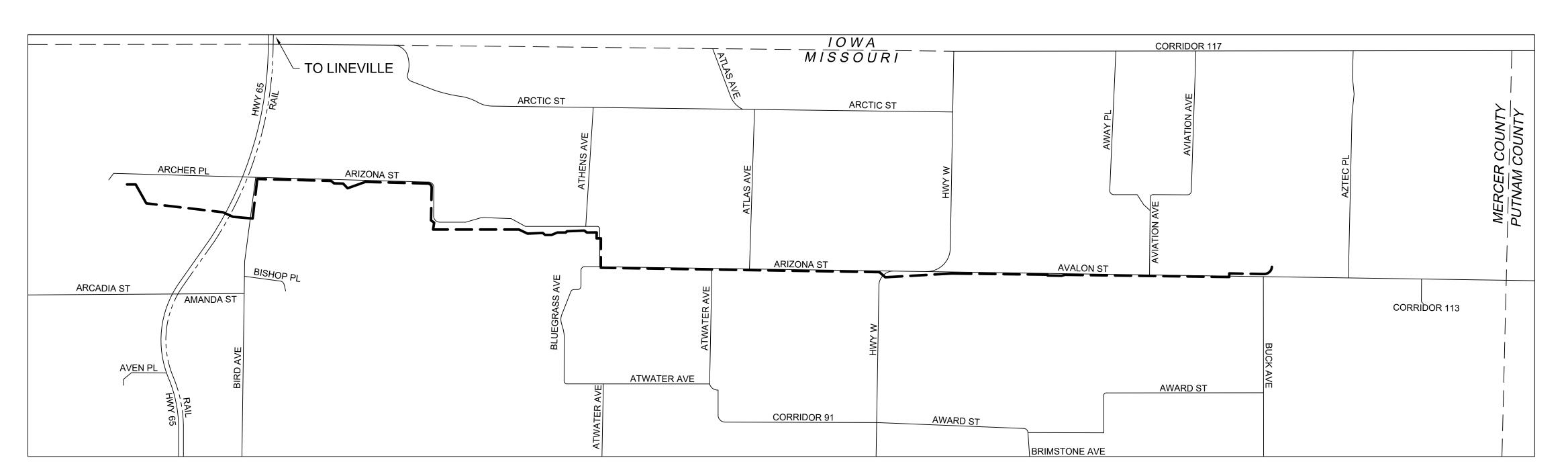
# SOMERSET TO TP2

# BIOGAS PIPELINE

MERCER COUNTY, MISSOURI

SHEET INDEX				
Sheet Number	Sheet Title			
C001	COVER SHEET			
C002	SITE MAP			
C003	NOTES & SPECS			
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C005	DETAILS			
C101	SEGMENT 1			
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C112	SEGMENT 12			
C113	SEGMENT 13			
C114	SEGMENT 14			
C115	SEGMENT 15			
C116	SEGMENT 16			





# STANDARD LEGEND (PLAN VIEW)

0	SANITARY SEWER MANHOLE	□,	TELEPHONE PEDESTAL
©	SANITARY SEWER CLEANOUT	€	CABLE TV MANHOLE / VAULT
<b>(A)</b>	AIR RELEASE MANHOLE/DRAIN	$\square_{rv}$	CABLE TV PEDESTAL
90	MANHOLE STORM SEWER MANHOLE	×	GAS VALVE
	STORM SEWER CLEANOUT	՛®	BOLLARD (BUMPER POST)
	STORM SEWER INTAKE	<del></del>	ROADWAY SIGN
	STORM SEWER BEEHIVE INTAKE	MB	MAILBOX
	FLARED END SECTION	<b>®</b>	WELL
<b>∑</b> □	FIRE HYDRANT	$\odot$	DECIDUOUS TREE
× × ×	WATER VALVE	*	EVERGREEN TREE
	WATER VALVE MANHOLE	٥	SHRUB OR BUSH
₩ * <del>*</del>	CURB STOP		TREE OR SHRUB LINE
	WATER METER MANHOLE		STUMP
<b>(M)</b> YH	YARD HYDRANT	₩₩	MONITORING WELL
₩.	ELECTRIC MANHOLE / VAULT	<b></b>	SOIL BORINGS
(E)	ELECTRIC PEDESTAL /	<b>9</b> 00	FLAG POLE
	TRANSFORMER		SATELLITE DISH
<del>==</del>	OUTDOOR ELECTRIC POWER OUTLET	<b>&gt;</b> -	SLOPE INDICATORS
Ø	POWER POLE	·	CONTROL POINT
$\varnothing_{_{\! STL}}$	POWER POLE w/ STREET LIGHT		BENCHMARK
<b>\$</b>	STREET LIGHT POLE		SECTION CORNER
<b>→</b>	GUY WIRE		IRON PIN SET
13)	TRAFFIC SIGNAL		IRON PIN FOUND
®	TRAFFIC SIGNAL BOX		INON FIN I COND
™)	TRAFFIC SIGNAL MANHOLE / VAULT		
(RP)	RAILROAD CROSSING SIGNAL		
•	TELEPHONE MANHOLE / VAULT		

EXISTING WATERLINE
EXISTING FENCE
EXISTING TELEPHONE LINE
EXISTING UNDERGROUND GAS LINE
EXISTING OVERHEAD POWER
EXISTING EDGE OF CONCRETE
EXISTING EDGE OF ASPHALT
EXISTING EDGE OF GRAVEL
EXISTING SANITARY SEWER LINE
PROPERTY LINE
CENTERLINE OF ROAD
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR

		RE	VIS	SIC	N.	TA	BL	Ε															
REVISION#	DATE	DESCRIPTION	C001	C002	C003	C004	C005	C101	C102	C103	C104	C105	C106	C107	C108	C109	C110	C111	C112	C113	C114	C115	C116
0	8/16/19	ISSUE FOR BID	Х	Х	Х	Х	Χ	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
1	10/3/2019	ISSUE FOR CONSTRUCTION	Х	Х	Х	Х	Χ	Х	Х	Х	Х	Х	Х	Χ	Х	Χ	Х	Χ	Х	Х	Х	Χ	Х
2	11/7/2019	REVISE AREA 3000 LOCATION	Х																				Х
3	11/18/2019	ADDITIONAL RR BORE DETAIL							Х														
4	2/21/2020	STA 0+00 TO 9+00 REVISION						Х															
5	6/1/2021	AS-BUILT	Х	Х				Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х

THIS DOCUMENT HAS BEEN ELECTRONICALLY SIGNED, SEALED AND DATED.

> Christopher M. Sander MO PE-2001004658 June 1, 2021

ISSUE DATE 8/16/2019 REVISIONS #1 IFC - 2019-10-03 #2 REVISE AREA 3000 LOCATION 2019-11-07 #3 ADDITIONAL RR BORE DETAILS 2019-11-18 #4 STA 0+00 TO 9+00 REVISION #5 AS-BUILT 2021-05-28

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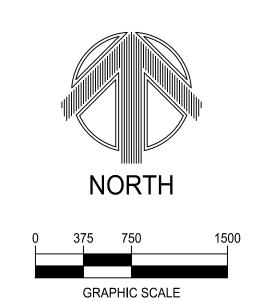
CONTROL POINTS TABLE					
CONTROL POINTS	DESCRIPTION	NORTHING	EASTING	ELEVATION	
50	CP 1/2	1722315.32'	1389477.45'	1087.24'	
51	CP 1/2	1722479.37'	1385349.87'	1058.90'	
52	CP 1/2	1722600.71'	1378342.42'	1099.67'	
53	CP 1/2	1722667.57'	1372461.61'	1054.91'	
54	CP 1/2	1722591.70'	1376738.83'	1096.46'	
55	CP 1/2	1722756.83'	1369197.46'	1092.08'	
56	CP 1/2	1725180.02'	1361525.62'	1082.94'	
57	CP 1/2	1725800.23'	1355489.00'	1095.58'	
58	CP 1/2	1725936.86'	1351215.55'	1068.66'	
60	TBM 80PNY	1725924.23'	1351235.02'	1069.95'	
201	CP- HT	1725658.14'	1351134.35'	1083.26'	
203	BM - NAIL IN PP	1725906.87'	1351254.36'	1073.42'	
300	CP TRAV STA	1722669.80'	1371253.78'	1023.90'	
301	CP TRAV STA	1722651.67'	1371406.06'	1026.26'	
23205	CP- SKW TP50	1722315.31'	1389477.53'	1087.33'	
23206	CP- CESO 206	1722329.66'	1389485.75'	1086.86'	
23225	TBM- EXISTRR	1722325.48'	1389415.29'	1086.56'	
32496	СР	1722450.65'	1384208.16'	1020.38'	
32497	CP	1722453.88'	1384129.38'	1018.83'	
34306	CP	1722383.95'	1382883.84'	1010.87'	
34307	CP	1722369.47'	1382938.44'	1017.50'	
34312	CP	1723816.12'	1364243.12'	988.38'	
34328	СР	1723968.12'	1364104.07'	987.97'	
34344	СР	1723953.76'	1364018.32'	988.90'	
34361	СР	1723776.28'	1365269.59'	1033.19'	
34370	СР	1723709.03'	1365276.78'	1033.58'	
81716	СР	1723771.66'	1365232.76'	1029.02'	
81717	СР	1723806.73'	1365361.36'	1044.44'	



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CERTIFICATE OF AUTHORITY No. E-2006023253



# SOMERSET GAS PIPE MERCER COUNT

SITE

THIS DOCUMENT HAS BEEN ELECTRONICALLY SIGNED, SEALED AND DATED.

Christopher M. Sander MO PE-2001004658

June 1, 2021 ISSUE DATE

8/16/2019 REVISIONS #1 IFC - 2019-10-03 #2 REVISE AREA 3000 LOCATION 2019-11-07 #3 ADDITIONAL RR BORE DETAILS 2019-11-18 #4 STA 0+00 TO 9+00 REVISION #5 AS-BUILT 2021-05-28

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APPENDIX C

This content is from the eCFR and is authoritative but unofficial.



Displaying title 49, up to date as of 8/19/2022. Title 49 was last amended 8/16/2022.

# Title 49 - Transportation

Subtitle B - Other Regulations Relating to Transportation

Chapter I - Pipeline and Hazardous Materials Safety Administration, Department of Transportation Subchapter D - Pipeline Safety

Part 192 - Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards Subpart C - Pipe Design

### **EDITORIAL NOTE ON PART 192**

Editorial Note: Nomenclature changes to part 192 appear at 71 FR 33406, June 9, 2006.

# § 192.121 Design of plastic pipe.

(a) Design pressure. The design pressure for plastic pipe is determined in accordance with either of the following formulas:

$$P = 2S \frac{t}{(D-t)}(DF)$$

$$P = \frac{2S}{(SDR - 1)}(DF)$$

- P = Design pressure, gage, psi (kPa).
- S = For thermoplastic pipe, the hydrostatic design basis (HDB) is determined in accordance with the listed specification at a temperature equal to 73 °F (23 °C), 100 °F (38 °C), 120 °F (49 °C), or 140 °F (60 °C). In the absence of an HDB established at the specified temperature, the HDB of a higher temperature may be used in determining a design pressure rating at the specified temperature by arithmetic interpolation using the procedure in Part D.2 of PPI TR-3/2012, (incorporated by reference, see § 192.7). For reinforced thermosetting plastic pipe, 11,000 psig (75,842 kPa).
- t = Specified wall thickness, inches (mm).
- D = Specified outside diameter, inches (mm).
- SDR = Standard dimension ratio, the ratio of the average specified outside diameter to the minimum specified wall thickness, corresponding to a value from a common numbering system that was derived from the American National Standards Institute (ANSI) preferred number series 10.
- DF = Design Factor, a maximum of 0.32 unless otherwise specified for a particular material in this section
- (b) General requirements for plastic pipe and components.
  - (1) Except as provided in paragraphs (c) through (f) of this section, the design pressure for plastic pipe may not exceed a gauge pressure of 100 psig (689 kPa) for pipe used in:
    - (i) Distribution systems; or
    - (ii) Transmission lines in Class 3 and 4 locations.
  - (2) Plastic pipe may not be used where operating temperatures of the pipe will be:
    - (i) Below -20 °F (-29 °C), or below -40 °F (-40 °C) if all pipe and pipeline components whose operating temperature will be below -20 °F (-29 °C) have a temperature rating by the manufacturer consistent with that operating temperature; or
    - (ii) Above the temperature at which the HDB used in the design formula under this section is determined.

- (3) Unless specified for a particular material in this section, the wall thickness of plastic pipe may not be less than 0.062 inches (1.57 millimeters).
- (4) All plastic pipe must have a listed HDB in accordance with PPI TR-4/2012 (incorporated by reference, see § 192.7).

# (c) Polyethylene (PE) pipe requirements.

- (1) For PE pipe produced after July 14, 2004, but before January 22, 2019, a design pressure of up to 125 psig may be used, provided:
  - (i) The material designation code is PE2406 or PE3408.
  - (ii) The pipe has a nominal size (Iron Pipe Size (IPS) or Copper Tubing Size (CTS)) of 12 inches or less (above nominal pipe size of 12 inches, the design pressure is limited to 100 psig); and
  - (iii) The wall thickness is not less than 0.062 inches (1.57 millimeters).
- (2) For PE pipe produced on or after January 22, 2019, a DF of 0.40 may be used in the design formula, provided:
  - (i) The design pressure does not exceed 125 psig;
  - (ii) The material designation code is PE2708 or PE4710;
  - (iii) The pipe has a nominal size (IPS or CTS) of 24 inches or less; and
  - (iv) The wall thickness for a given outside diameter is not less than that listed in table 1 to this paragraph (c)(2)(iv).

Table 1 to Paragraph (c)(2)(iv)

PE pipe: minimum wall thickness and SDR values					
Pipe size (inches)	Minimum wall thickness (inches)	Corresponding SDR (values)			
1/2" CTS	0.090	7			
1/2" IPS	0.090	9.3			
3/4" CTS	0.090	9.7			
3/4" IPS	0.095	11			
1" CTS	0.099	11			
1" IPS	0.119	11			
1 <sup>1</sup> / <sub>4</sub> " IPS	0.151	11			
1 <sup>1</sup> / <sub>2</sub> " IPS	0.173	11			
2"	0.216	11			
3"	0.259	13.5			
4"	0.265	17			
6"	0.315	21			
8"	0.411	21			
10"	0.512	21			

APPENDIX C PE pipe: minimum wall thickness and SDR values Pipe size Minimum wall thickness **Corresponding SDR** (inches) (values) (inches) 12" 0.607 21 16" 21 0.762 18" 21 0.857 20" 0.952 21 22" 1.048 21 24" 1.143 21

# (d) Polyamide (PA-11) pipe requirements.

- (1) For PA-11 pipe produced after January 23, 2009, but before January 22, 2019, a DF of 0.40 may be used in the design formula, provided:
  - (i) The design pressure does not exceed 200 psig;
  - (ii) The material designation code is PA32312 or PA32316;
  - (iii) The pipe has a nominal size (IPS or CTS) of 4 inches or less; and
  - (iv) The pipe has a standard dimension ratio of SDR-11 or less (i.e., thicker wall pipe).
- (2) For PA-11 pipe produced on or after January 22, 2019, a DF of 0.40 may be used in the design formula, provided:
  - (i) The design pressure does not exceed 250 psig;
  - (ii) The material designation code is PA32316;
  - (iii) The pipe has a nominal size (IPS or CTS) of 6 inches or less; and
  - (iv) The minimum wall thickness for a given outside diameter is not less than that listed in table 2 to paragraph (d)(2) (iv):

Table 2 to Paragraph (d)(2)(iv)

PA-11 pipe: minimum wall thickness and SDR values					
Pipe size (inches)	Minimum wall thickness (inches)	Corresponding SDR (values)			
1/2" CTS	0.090	7.0			
1/2" IPS	0.090	9.3			
<sup>3</sup> / <sub>4</sub> " CTS	0.090	9.7			
3/4" IPS	0.095	11			
1" CTS	0.099	11			
1" IPS	0.119	11			
1 <sup>1</sup> / <sub>4</sub> IPS	0.151	11			

APPENDIX PA-11 pipe: minimum wall thickness and SDR values					
Pipe size (inches)	Minimum wall thickness (inches)	Corresponding SDR (values)			
1 <sup>1</sup> / <sub>2</sub> " IPS	0.173	11			
2" IPS	0.216	11			
3" IPS	0.259	13.5			
4" IPS	0.333	13.5			
6" IPS	0.491	13.5			

- (e) *Polyamide (PA-12) pipe requirements*. For PA-12 pipe produced after January 22, 2019, a DF of 0.40 may be used in the design formula, provided:
  - (1) The design pressure does not exceed 250 psig;
  - (2) The material designation code is PA42316;
  - (3) The pipe has a nominal size (IPS or CTS) of 6 inches or less; and
  - (4) The minimum wall thickness for a given outside diameter is not less than that listed in table 3 to paragraph (e)(4).

Table 3 to Paragraph (e)(4)

PA-12 pipe: minimum wall thickness and SDR values					
Pipe size (inches)	Minimum wall thickness (inches)	Corresponding SDR (values)			
1/2" CTS	0.090	7			
1/2" IPS	0.090	9.3			
3/4" CTS	0.090	9.7			
3/4" IPS	0.095	11			
1" CTS	0.099	11			
1" IPS	0.119	11			
1 <sup>1</sup> / <sub>4</sub> " IPS	0.151	11			
1 <sup>1</sup> / <sub>2</sub> " IPS	0.173	11			
2" IPS	0.216	11			
3" IPS	0.259	13.5			
4" IPS	0.333	13.5			
6" IPS	0.491	13.5			

<sup>(</sup>f) Reinforced thermosetting plastic pipe requirements.

- (1) Reinforced thermosetting plastic pipe may not be used at operating temperatures above 150 °F (66 C).
- (2) The wall thickness for reinforced thermosetting plastic pipe may not be less than that listed in the following table:

	Nominal size in inches (millimeters)	Minimum wall thickness in inches (millimeters)
2 (51)		0.060 (1.52)
3 (76)		0.060 (1.52)
4 (102)		0.070 (1.78)
6 (152)		0.100 (2.54)

[Amdt. 192-124, 83 FR 58716, Nov. 20, 2018, as amended at 86 FR 2238, Jan. 11, 2021]