

INFORMATION SHEET

PRESIDING: Commissioner Kemerait, Presiding; Chair Mitchell, and Commissioner ToNola D. Brown-Bland

PLACE: Dobbs Building, Raleigh, NC

DATE: Monday, July 11, 2022

TIME: 1:00 p.m. – 3:03 p.m.

DOCKET NOS.: G-39, Subs 46 and 47

COMPANY: Cardinal Pipeline Company – Rate Case

VOLUME NUMBER:

APPEARANCES

See Attached

WITNESSES

See Attached

EXHIBITS

See Attached

CONFIDENTIAL COPIES OF TRANSCRIPTS AND EXHIBITS ORDERED BY: Bob Kaylor, Mary Lynne Grigg, Kristin Athens, Gina Holt, Reita Coxton, Sonja Johnson, Neha Patel, and Bob Hinton

REPORTED BY: Joann Bunze

TRANSCRIBED BY: Joann Bunze

DATE FILED: July 14, 2022

TRANSCRIPT PAGES: 62

PREFILED PAGES: 290

TOTAL PAGES: 352

NORTH CAROLINA UTILITIES COMMISSION
APPEARANCE SLIP

DATE: July 14, 2022 DOCKET NO.: G-39 Subs 46, 47

ATTORNEY NAME and TITLE: Robert W. Kaylor

FIRM NAME: Law Office of Robert W. Kaylor, P.A.

ADDRESS: 353 E. Six Forks Rd., Ste. 260

CITY: Raleigh STATE: NC ZIP CODE: 27609

APPEARANCE ON BEHALF OF: Cardinal Pipeline Co. LLC

APPLICANT: COMPLAINANT: INTERVENOR:

PROTESTANT: RESPONDENT: DEFENDANT:

Non-confidential transcripts are located on the Commission's website. To view and/or print transcripts, go to <https://www.ncuc.net/>, hover over the Dockets tab and select Docket Search, enter the docket number and click search, select the highlighted docket number and select Documents for a list of all documents filed.

To receive an electronic **CONFIDENTIAL** transcript, please complete the following:

Yes, I have signed the Confidentiality Agreement.

Email: rkaylor@rwkaylorlaw.com

SIGNATURE: R W Kaylor

(Required for distribution of CONFIDENTIAL transcript)

NORTH CAROLINA UTILITIES COMMISSION
APPEARANCE SLIP

DATE: 7-11-22 DOCKET NO.: G-39 Sub 47

ATTORNEY NAME and TITLE: Kristin Athens
Attorney

FIRM NAME: McGuireWoods LLP

ADDRESS: 501 Fayetteville St. Suite 500

CITY: Raleigh STATE: NC ZIP CODE: 27601

APPEARANCE ON BEHALF OF: _____

Piedmont Natural Gas Company, Inc.

APPLICANT: ___ COMPLAINANT: ___ INTERVENOR:

PROTESTANT: ___ RESPONDENT: ___ DEFENDANT: ___

Non-confidential transcripts are located on the Commission's website. To view and/or print transcripts, go to <https://www.ncuc.net/>, hover over the Dockets tab and select Docket Search, enter the docket number and click search, select the highlighted docket number and select Documents for a list of all documents filed.

To receive an electronic **CONFIDENTIAL** transcript, please complete the following:

Yes, I have signed the Confidentiality Agreement.

Email: kathens@mcguirewoods.com

SIGNATURE: Krist

(Required for distribution of **CONFIDENTIAL** transcript)

NORTH CAROLINA UTILITIES COMMISSION
APPEARANCE SLIP

DATE: 7-11-22 DOCKET NO.: 6-39, Sub 47

ATTORNEY NAME and TITLE: _____

Mary Lynne Grigg

FIRM NAME: McGuire Woods

ADDRESS: 501 Fayetteville St.

CITY: Raleigh STATE: NC ZIP CODE: 27601

APPEARANCE ON BEHALF OF: _____

Public Service Company of North Carolina

APPLICANT: ___ COMPLAINANT: ___ INTERVENOR:

PROTESTANT: ___ RESPONDENT: ___ DEFENDANT: ___

Non-confidential transcripts are located on the Commission's website. To view and/or print transcripts, go to <https://www.ncuc.net/>, hover over the Dockets tab and select Docket Search, enter the docket number and click search, select the highlighted docket number and select Documents for a list of all documents filed.

To receive an electronic **CONFIDENTIAL** transcript, please complete the following:

Yes, I have signed the Confidentiality Agreement.

Email: marylg@marynewoods.com

SIGNATURE: [Signature]

(Required for distribution of CONFIDENTIAL transcript)

NORTH CAROLINA UTILITIES COMMISSION
PUBLIC STAFF - APPEARANCE SLIP

DATE July 11, 2022 DOCKET #: G-39, Sub 46, 47

PUBLIC STAFF MEMBER Gina Holt, Reita Coxton

ORDER FOR TRANSCRIPT OF TESTIMONY TO BE **E-MAILED** TO THE PUBLIC STAFF - PLEASE INDICATE YOUR DIVISION AS WELL AS YOUR E-MAIL ADDRESS BELOW:

ACCOUNTING Sonja.johnson@psnec.nc.gov

WATER _____

COMMUNICATIONS _____

ELECTRIC _____

GAS neha.patel@psncuc.nc.gov

TRANSPORTATION _____

ECONOMICS bob.hinton@psncuc.nc.gov

LEGAL _____

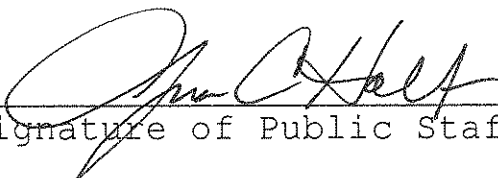
gina.holt@psncuc.nc.gov; reita.coxton@psncuc.nc.gov

CONSUMER SERVICES _____

PLEASE NOTE: Electronic Copies of the regular transcript can be obtained from the NCUC web site at <https://starw1.ncuc.net/NCUC/page/Dockets/portal.aspx> under the respective docket number.

1 Number of copies of confidential portion of regular transcript (assuming a confidentiality agreement has been signed). Confidential pages will still be received in paper copies.

*****PLEASE INDICATE BELOW WHO HAS SIGNED A CONFIDENTIALITY AGREEMENT. IF YOU DO NOT SIGN, YOU WILL NOT RECEIVE THE CONFIDENTIAL PORTIONS!!!!**



Signature of Public Staff Member

OFFICIAL COPY

Jul 14 2022

PLACE: Dobbs Building, Raleigh, North Carolina

DATE: Monday, July 11, 2022

DOCKET NO.: G-39, Sub 46

G-39, Sub 47

TIME: 1:00 p.m. - 3:03 p.m.

BEFORE: Commissioner Karen M. Kemerait

Chair Charlotte A. Mitchell

Commissioner ToNola D. Brown-Bland

IN THE MATTER OF:

Cardinal Pipeline Company, LLC,

Depreciation Rate Study as of December 31, 2020,

and

Adjustment in Its Rates and Charges

1 A P P E A R A N C E S:

2 FOR CARDINAL PIPELINE COMPANY, LLC:

3 Robert W. Kaylor, Esq.

4 Law Office of Robert W. Kaylor, P.A.

5 353 East Six Forks Road, Suite 260

6 Raleigh, North Carolina 27609

7

8 FOR PIEDMONT NATURAL GAS COMPANY, INC.:

9 Kristin Athens, Esq.

10 McGuireWoods LLP

11 201 North Tryon Street, Suite 3000

12 Charlotte, North Carolina 28202

13

14 FOR PUBLIC SERVICE COMPANY OF NORTH CAROLINA, INC.:

15 Mary Lynne Grigg, Esq.

16 McGuireWoods LLP

17 501 Fayetteville Street, Suite 500

18 Raleigh, North Carolina 27601

19

20

21

22

23

24

1 A P P E A R A N C E S Cont'd:
2 FOR THE USING AND CONSUMING PUBLIC:
3 Gina C. Holt, Esq.
4 Reita Coxton, Esq.
5 Public Staff - North Carolina Utilities Commission
6 4326 Mail Service Center
7 Raleigh, North Carolina 27699-4300

8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

OFFICIAL COPY

Jul 14 2022

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

T A B L E O F C O N T E N T S
E X A M I N A T I O N S

	PAGE
Prefiled Direct Testimony of Kerri Miller.....	15
Prefiled Rebuttal Testimony of Kerri Miller....	44
Prefiled Settlement Testimony of Kerri Miller..	56
Prefiled Direct Testimony of Michael Cousino...	63
Prefiled Direct Testimony of David Haag	70
Prefiled Rebuttal Testimony of David Haag	117
Prefiled Settlement Testimony of David Haag....	133
Prefiled Direct Testimony of Steven Fall	138
Prefiled Settlement Testimony of Steven Fall...	210
Prefiled Direct Testimony and Appendix A of ... Roxie McCullar	215
PANEL OF	PAGE
JOHN R. HINTON, SONJA R. JOHNSON, and NEHA PATEL	
Direct Examination By Ms. Holt.....	233
Prefiled Direct Testimony and Appendix A of ... Neha Patel	236
Prefiled Direct Testimony and Appendix A of ... Sonja R. Johnson	247
Prefiled Settlement Testimony of	260
Sonja R. Johnson	
Direct Examination By Ms. Coxton.....	264
Prefiled Direct Testimony and Appendix A of ... John R. Hinton	268

1	Prefiled Settlement Testimony and Appendix A... of John R. Hinton	305
2	Examination By Commissioner Kemerait.....	318
3	Examination By Chair Mitchell.....	333
4	Further Examination By Commissioner Kemerait...	336
5	Further Examination By Chair Mitchell.....	342
6	Examination By Mr. Kaylor.....	346

7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

OFFICIAL COPY

Jul 14 2022

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

E X H I B I T S

IDENTIFIED/ADMITTED

Application of Cardinal Pipeline Company, LLC	-/13
Miller Direct Exhibit KM-002.....		-/13
Miller Rebuttal Exhibit KM-004.....		-/13
Haag Direct Exhibits DH-002		-/13
Through DH-005		
Fall Direct Exhibits CPC-0002		-/13
through CPC-0007		
Settlement Agreement and		-/13
Stipulation		
McCullar Direct Exhibit RMM-1.....		-/214
Patel Exhibits A and B Corrected.....		234/349
Johnson Exhibit 1.....		246/349
Johnson Settlement Exhibit A.....		246/349
Hinton Direct Exhibits 1		266/349
Through 10		
Hinton Settlement Exhibit I.....		266/349

OFFICIAL COPY

Jul 14 2022

Docket No. G-39, Sub 47

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of:

Application of)	
Cardinal Pipeline Company, LLC)	
For an Adjustment in its Rates and Charges)	APPLICATION

Pursuant to Section 62-133 of the General Statutes of the State of North Carolina, and Rule R1-17 of the North Carolina Utilities Commission (“Commission” or “NCUC”), Cardinal Pipeline Company, LLC (“Cardinal”) hereby applies for authority to adjust its rates and charges for natural gas service, and in support thereof respectfully shows:

I

Background Information Regarding Applicant

Cardinal is a limited liability company originally formed on December 6, 1995 in the name of Cardinal Extension Company, LLC to acquire and extend an existing pipeline owned by the original Cardinal Pipeline Company, LLC in North Carolina. Cardinal’s members are: TransCardinal Company, LLC, a wholly owned subsidiary of Williams Partners Operating LLC; PSNC Cardinal Pipeline Company, a wholly owned subsidiary of Public Service Company of North Carolina, Inc.; and Piedmont Intrastate Pipeline Company, a wholly owned subsidiary of Piedmont Natural Gas Company, Inc.

Cardinal acquired the original Cardinal Pipeline on November 1, 1999 after the Cardinal Extension facilities were constructed and placed into service. The original Cardinal Pipeline merged into Cardinal Extension, the separate existence of the original Cardinal Pipeline ceased, and Cardinal Extension became the surviving company

operating under the name of Cardinal Pipeline Company, LLC. The surviving company acquired all the rights, privileges, immunities and franchises held by the original Cardinal Pipeline prior to the merger.

Cardinal is managed by a committee consisting of representatives from each member company. Cardinal Operating Company, LLC, a wholly owned subsidiary of Williams Partners Operating LLC, designed and constructed Cardinal and serves as the operator of the Cardinal system.

Cardinal's correct post office address and telephone number is:

Cardinal Pipeline Company, LLC
c/o Cardinal Operating Company, LLC
P.O. Box 1396
Houston, TX 77251-1396
Telephone: (713) 215-2000

The correct names and addresses of the Attorneys for Cardinal are:

David A. Glenn,
Cardinal Operating Company, LLC
Post Office Box 1396
Houston, Texas 77251-1396
Telephone: (713) 215-2341
david.a.glenn@williams.com

and Robert W. Kaylor
Robert W. Kaylor, P.A.
353 East Six Forks Road, Suite 260
Raleigh, North Carolina 27609
Telephone: (919) 828-5250
bkaylor@rwkaylorlaw.com

II

Jurisdiction of the Commission

Cardinal is an intrastate natural gas pipeline extending from Transcontinental Gas Pipe Line Company, LLC's Compressor Station 160 in Rockingham County, North Carolina to the Raleigh, North Carolina area and provides 478,450 dekatherms ("Dth") per day of firm natural gas transportation capacity to customers in North Carolina. Cardinal is engaged in providing natural gas utility service to the public and is a "public

utility” as defined in G.S. §62-3(23), subject to the jurisdiction of this Commission pursuant to G.S. §62-2.

III

Reasons Supporting an Increase in Cardinal’s General Rates and Charges

On March 15, 2017, Cardinal filed an application in Docket No. G-39, Sub 38 seeking a general decrease in its rates and charges. On June 9, 2017, Cardinal, the Public Staff, Piedmont and PSNC filed a Joint Stipulation in settlement of all aspects of Cardinal’s rate application. The NCUC approved the Joint Stipulation on July 27, 2017, in its “Order Decreasing Rates” (“July 27 Order”). The Joint Stipulation and Ordering Paragraph 5 of the July 27 Order requires Cardinal to file a general rate case no later than March 15, 2022. In compliance with the Joint Stipulation and the July 27 Order, Cardinal is submitting the instant Application.

By this Application, Cardinal seeks the approval of an adjustment in its rates that were established in Docket No. G-39 Sub 38, as subsequently adjusted by Docket Nos. M-100, Sub 138 and G-39, Sub 42 to comply with the NCUC Order Addressing the Impacts of the Federal Tax Cuts and Jobs Act on Public Utilities (“Federal Income Tax Reduction Filing”), sufficient to allow Cardinal to recover its cost of service including a just and reasonable return on its investment, as demonstrated in the testimony of Mr. David J. Haag.

Cardinal proposes rate changes that would produce an overall increase from the rates approved in the July 27 Order, as adjusted by the Federal Income Tax Reduction Filing. The increase in Cardinal’s proposed rates results in a \$919,530 increase in revenue as set forth on Statement G of Exhibit ___ (KM-001). Appendix I to the

Application provides a summary of the proposed changes in revenue by zone. Reasons supporting Cardinal's request for a general rate increase are set forth in the testimony and exhibits filed with this Application.

The rates and charges proposed herein are just, reasonable and nondiscriminatory and will provide Cardinal a fair return on its investment in property used and useful in providing service to the public.

IV

Effective Date of General Rate Change

Cardinal proposes to make the rates set forth in Schedule 2 of Exhibit ___ (KM-001) applicable to gas transported on and after May 1, 2022; however, Cardinal anticipates that the Commission will suspend the rates and set this application for hearing.

V

Exhibits and Schedules

Pursuant to the provisions of Rule R1-17(b) of the Commission's Rules and Regulations, Cardinal is filing with this Application (1) a one page summary of the proposed increases and changes affecting customers, which schedule has been identified as Appendix I (Rule R1-17(b)(9)(f)), (2) N.C.U.C. Form G-1 (Rule R1-17(b)(12)), and (3) the direct testimony and exhibits that will be relied upon by Cardinal at the hearing of this Docket (Rule R1-24(g)(2)). Exhibit ___ (KM-001) contains the following schedules required by Rule 1-17(b)(1) to (10):

Schedule 1. Schedule of Cardinal's present rates and charges now on file with and approved by the Commission. Rule R1-17(b)(1).

- Schedule 2.** Schedule of Cardinal's proposed rates and charges which Cardinal seeks to place in effect on May 1, 2022. Rule R1-17(b)(2).
- Schedule 3.** A statement showing the original cost of all property of Cardinal used or useful in the public service to which the proposed rates relate as of December 31, 2021. Rule R1-17(b)(3).
- Schedule 4.** A statement that Cardinal does not intend to offer proof as to the present fair value of its property.
- Schedule 5.** A statement of accrued depreciation on all property to which the proposed rates relate as of December 31, 2021, and of the rates and methods used in computing the amount charged to depreciation. Rule R1-17(b)(5).
- Schedule 6.** A statement of materials and supplies as of December 31, 2021. Rule R1-17(b)(6).
- Schedule 7.** A statement of cash working capital which Cardinal finds necessary to keep on hand for the efficient, economic operation of its business as of December 31, 2021. Rule R1-17(b)(7).
- Schedule 8.** A statement of gross revenues received, operating expenses and net operating income for return on investment for the twelve months ended December 31, 2021, as the same appear on Cardinal's books, together with (1) accounting and pro forma adjustments, (2) rates of return on the original cost rate base and (3) rates of return on common equity. Rule R1-17(b)(8) & (9).

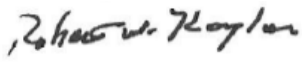
Schedule 9. A Balance Sheet as of December 31, 2021, and Income Statement for twelve months ended December 31, 2021. Rule R1-17(b)(10).

VI

WHEREFORE, Cardinal respectfully requests that the Commission approve the rates proposed herein and permit them to become effective as scheduled.

Respectfully submitted this 15th day of March, 2022.

CARDINAL PIPELINE COMPANY, LLC

By 
Robert W. Kaylor, P.A.
Its Attorney
353 East Six Forks Road, Suite 260
Raleigh, North Carolina 27609
Telephone: (919) 828-5250
bkaylor@rwkaylorlaw.com

Jordan Kirwin
Director – Rates & Regulatory
Cardinal Operating Company, LLC
P. O. Box 1396
Houston, Texas 77251
Telephone: (713) 215-3723
jordan.kirwin@williams.com

Scott Hallam
Vice President
Cardinal Operating Company, LLC
P. O. Box 1396
Houston, Texas 77251
Telephone: (713) 215-2100
Scott.hallam@williams.com

VERIFICATION

THE STATE OF TEXAS)
)
) SS
COUNTY OF HARRIS)

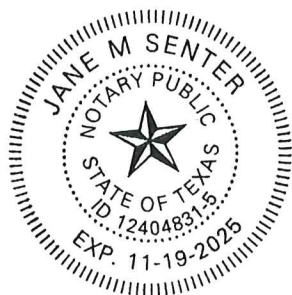
Glen Jasek, being first duly sworn, deposes and says:

That he is a Vice President of Cardinal Operating Company, that he has read the foregoing Application and knows the contents thereof, and that the same is true of his own knowledge except as to those matters and things therein alleged upon information and belief and as to those matters and things, he believes them to be true.

Glen Jasek

Glen Jasek

SUBSCRIBED AND SWORN TO before me this 14th day of March 2022.



Jane M Senter

Notary Public, State of Texas

My Commission expires: 11-19-25

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47

APPENDIX I

SUMMARY OF THE CHANGE IN RATES AND CHARGES AFFECTING CUSTOMERS

Cardinal Pipeline Company, LLC is seeking in this proceeding an increase in its annual revenues of \$919,530, which is an overall increase of approximately 7.28%. Statement G of Exhibit ___(KM-002)) shows the revenues under the present and proposed base rates and the related changes by transportation service type.

A summary of the proposed revenue change is as follows:

<u>Service</u>	<u>Amount</u>	<u>Percent</u>
(Piedmont)		
Zone 1A Reservation	\$76,819	
Zone 1A Usage	0	
Total Zone 1A	<u>\$76,819</u>	13.50%
(PSNC)		
Zone 1B Reservation	\$138,999	
Zone 1B Usage	-	
Total Zone 1B	<u>\$138,999</u>	13.50%
(PSNC and Piedmont)		
Zone 2 Reservation	\$703,712	
Zone 2 Usage	-	
Total Zone 2	<u>\$703,712</u>	6.95%

CERTIFICATE OF SERVICE
DOCKET NO. G-39, Sub 47

I hereby certify that copies of the Cardinal Pipeline Company LLC's General Rate Case Application, Testimony and Schedules in Docket No. G-39, Sub 47, were served electronically or via U.S. mail, first class, postage prepaid, upon all parties of record.

This, the 15th day of March, 2022.



Jordan Kirwin
Director – Rates & Regulatory
Cardinal Operating Company, LLC
P.O. Box 1396
Houston, TX 77251
Telephone: (713)215-3723
jordan.kirwin@williams.com

EXHIBIT NO. CPC-0002

STEVEN R FALL - CV

Steven R Fall
on behalf of
Cardinal Pipeline Company, LLC



Brown, Williams, Moorhead & Quinn, Inc.
Energy Consultants

CURRICULUM VITAE

NAME

Steven Fall

BUSINESS ADDRESS

1155 15th Street N.W., Suite 1004
Washington, DC 20005

EDUCATION

Pennsylvania State University; Bachelor of Science in
Biology/Minor in Chemistry

Certifications:

Maryland State Highway Traffic Control Manager
OSHA 30 Card
Certificate of Completion – Deck and Ramp Guidelines
Certificate of Completion – Chimneys and Vents
Confidential Clearance Eligible
NUCA – National Utility Contractors Association
HeavyBid/HeavyJob Software
Foundation Software
RSMears

PRESENT POSITION

Vice President
Brown, Williams, Moorhead & Quinn, Inc.
1155 15th Street N.W., Suite 1004
Washington, DC 20005

**NATURE OF WORK
PERFORMED WITH FIRM**

Analysis of terminal negative salvage and pipeline operations. Natural gas pipeline terminal negative salvage testimony provided for the Federal Energy Regulatory Commission. A list of cases in which Mr. Fall provided testimony is attached below.

PREVIOUS EMPLOYMENT

Department of Consumer and Regulatory Affairs
Washington, DC (District of Columbia agency responsible for
issuance of and adherence to licenses and permits)

Project Manager 6/2017 – 10/2017
High impact position designated for situations requiring
immediate resolution.

Mobile Inspection Implementation: Research and development of the Mobile Inspection application and platform, which includes but is not limited to development of the Mobile Inspection Standard Operating Provisions Manual, training protocols and regimens.

International Accreditation Services Semi-Annual Report: Collection and interpretation of data from multiple departments summarized into a deliverable report required for inspection and permitting accreditation.

Hot Properties: District of Columbia properties undergoing construction that require guidance to achieve resolution of ongoing compliance difficulties. Understanding of the IRC, IBC, and DC Municipal Regulations required for situational analysis of safety and code compliance.

Anchor Construction Washington, DC
(Anchor Construction specializes in utility construction: water, storm, sewer, and conduits.)

Project Engineer 7/2014 – 6/2017
WSSC ESA IDIQ: Manage a \$32.5 million dollar sewer mainline repair, rehabilitation, and/or replacement project in coordination with the WSSC at the Cabin John and Paint Branch Basin. Required hands-on scheduling and management of materials, equipment, and crew members.

DDOT Klinge Valley Trail: \$7.6 million dollar green infrastructure installation including: bio-swale, bio-retention structures, permeable asphalt multi-use trail, Klinge Creek restoration, lighting and landscaping. Multi-agency coordination with underground utilities operated byDDOT, Washington Gas, National Park Service, PEPCO, and DC Water.

Howard Hughes Medical Institute Retaining Wall: \$1.5 million dollar project designed to remove, salvage and rebuild an existing retaining wall located on a designated conservation area at the Howard Hughes Medical Institute campus. Required understanding and compliance with restrictions imposed on operating areas, materials handling, and site restoration standards.

WSSC Large Meter Vault: \$575 thousand dollar large meter vault replacement project at various locations throughout Montgomery County, MD. Required hands-on scheduling and management of materials, equipment, and crew members.

Additional accomplishments and responsibilities include:

- Develop project objectives by reviewing project proposals, blue prints, drawings and required permits.
- Determine project responsibilities by identifying project phases and elements; assigning personnel to phases and elements; reviewing bids from contractors.
- Determine project specifications by studying product design, customer requirements, and performance standards.
- Determine project schedule by studying project plan and specifications; calculating time requirements; sequencing project elements.
- Develop and maintain project schedule by monitoring progress; coordinating activities through weekly and bi-weekly schedule updates.
- Control project plan by reviewing and inspecting design, specifications, and plan and schedule changes; recommending actions.
- Provide leadership through thorough communication of attainable goals, project direction and production analysis of daily/weekly/monthly activities.
- Maintain safe and clean working environment by enforcing OSHA mandated procedures, rules and regulations.

AKA White House Washington, DC
(The fusion of the long-term comfort of a luxury furnished apartment with the style and service of an intimate hotel)

Director of Engineering 7/2012 – 7/2014
Directly oversaw the \$1 million dollar renovation improvement, adding another level of hotel luxury suites to the existing facility. Received global recognition from company for outstanding work ethics and policies implemented. Improved department efficiency and established preventative maintenance procedures.

Additional accomplishments and responsibilities include:

Managed electrical systems, mechanical work and safety aspects of a 141 room hotel.

Directly oversaw the implementation of work planned for building maintenance, including assigning and delegating multiple projects to staff and vendors.

Monitored and controlled expenditures to successfully stay within property's monthly budget.

Supervised the maintenance of air conditioning, elevators, room appliances, building wire systems, roofing, landscaping and all operational equipment.

Independently created request for proposals to negotiate contract/vendor proposals.

Interviewed, trained, inspired and evaluated staff; disciplined and implemented corrective actions as necessary.

Developed the implemented the building Emergency Evacuation Plan in coordination with DC Fire Department.

Humanetics Corporation Eden Prairie, MN
(Humanetics is focused in three key areas organized around FDA regulatory boundaries: prescription drugs, medical foods, and consumer products)

Research Analyst 7/2005 – 3/2012

Oversaw and performed research and development of a radioprotectant in coordination with the Armed Forces Radiobiology Research Institute, Henry Jackson Foundation, Uniformed Services University of the Health Sciences, and BioReliance.

Designed and implemented testing of complex experiments to test prospective radiological protective and therapeutic agents.

Completed analysis on test results to assess the biological and physiological effects of designed experimentation.

Effectively communicated research ideas and methodology via written reports and oral presentations.

Generated experimental protocols and methodology.

Conducted laboratory site assessments, including site activation, interim monitoring and close-out visits.

Achieved proof of efficacy through preclinical testing conducted of an experimental radioprotectant designed to combat the effects of Acute Radiation Syndrome (ARS).

Organized and maintained detailed records of new research data as well as relevant published studies.

Provided technical guidance in training to no less than two dozen AFRRRI staff and military employees.
Completed yearly detailed FDA summary report.
Designed, implemented and updated experimental SOP's.

BioReliance Corporation Rockville, MD
(Provides nonclinical testing and manufacturing services for biologics)

Senior Research Associate 7/2000 – 7/2005
Team leader hired to assist in experimental development, data documentation and analysis at an established biotech corporation.

- Executed over 50 multi-phased experiments per year to assess the biological and physiological effects of carcinogenic exposure on rodents and cell cultures.
- Captured test results and collated consumable forms for supervisor.
- Assisted in the design of secondary experiments based on initial results.
- Ensured each experiment adhered to FDA mandated GLP standards.
- Provided daily briefings to laboratory manager regarding status and results of experiments.
- Designed and subsequently implemented and updated dozens of experimental SOP's.
- Monitored and maintained laboratory equipment and supplies.

#	JURISDICTION	CASE OR DOCKET NO.	UTILITY/ORGANIZATION INITIATING PROCEEDING	POSITION	SUBJECT MATTER
Formal Proceedings In Which Steven Fall Testified					
1	FERC	RP18-877	MOGAS PIPE LINE COMPANY	Witness	Natural Gas Terminal Decommissioning
2	FERC	RP18-940	EMPIRE PIPELINE INC.	Witness	Natural Gas Terminal Decommissioning
3	FERC	RP18-922	TRAILBLAZER PIPELINE COMPANY	Witness	Natural Gas Terminal Decommissioning
4	FERC	RP18-923	ENABLE MISSISSIPPI RIVER TRANSMISSION, LLC	Witness	Natural Gas Terminal Decommissioning
5	FERC	RP18-1115	SALTVILLE GAS STORAGE COMPANY	Witness	Natural Gas Terminal Decommissioning
6	FERC	RP18-1126	TRANSCONINENTAL GAS PIPELINE COMPANY	Witness	Natural Gas Terminal Decommissioning
7	FERC	RP19-78	PANHANDLE EASTERN PIPE LINE COMPANY, LP	Witness	Natural Gas Terminal Decommissioning
8	FERC	RP19-165	WBI ENERGY TRANSMISSION, INC.	Witness	Natural Gas Terminal Decommissioning
9	FERC	RP19-343	TEXAS EASTERN TRANSMISSION, LP	Witness	Natural Gas Terminal Decommissioning
10	FERC	RP19-352	SEA ROBIN PIPELINE COMPANY, LLC	Witness	Natural Gas Terminal Decommissioning
11	FERC	RP19-1426	NATIONAL FUEL GAS SUPPLY CORPORATION	Witness	Natural Gas Terminal Decommissioning
12	FERC	RP19-1523	PANHANDLE EASTERN PIPE LINE COMPANY, LP	Witness	Natural Gas Terminal Decommissioning
13	FERC	RP20-131	ENABLE MISSISSIPPI RIVER TRANSMISSION, LLC	Witness	Natural Gas Terminal Decommissioning
14	FERC	RP20-467	DOMINION ENERGY COVE POINT LNG, LP	Witness	Natural Gas Terminal Decommissioning
15	FERC	RP20-908	ALLIANCE PIPELINE, LP	Witness	Natural Gas Terminal Decommissioning
16	FERC	RP20-921	MARITIMES & NORTHEAST PIPELINE, LLC	Witness	Natural Gas Terminal Decommissioning

#	JURISDICTION	CASE OR DOCKET NO.	UTILITY/ORGANIZATION INITIATING PROCEEDING	POSITION	SUBJECT MATTER
17	FERC	RP20-980	EAST TENNESSEE NATURAL GAS, LLC	Witness	Natural Gas Terminal Decommissioning
18	FERC	RP21-441	FLORIDA GAS TRANSMISSION, LLC	Witness	Natural Gas Terminal Decommissioning
19	FERC	RP21-20	SHELL PIPELINE COMPANY, LP	Witness	Oil Pipeline Depreciation Testimony
21	FERC	RP21-1001	TEXAS EASTERN TRANSMISSION, LP	Witness	Natural Gas Terminal Decommissioning

DEPRECIATION STUDY WORKPAPERS

Docket No. G-39, Sub 46

Steven R Fall

on behalf of

Cardinal Pipeline Company, LLC



Brown, Williams, Moorhead & Quinn, Inc.

Energy Consultants

Cardinal Pipeline Company, LLC
Depreciation Study
Table of Contents

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

			<u>Page</u>
Recommended Rates			
Schedule	1	Comparison of Proposed and Present Depreciation Rates (Inclusive of Negative Salvage)	3
Schedule	2	Proposed and Present Depreciation and Negative Salvage Rate Components	4
Plant Data			
Schedule	3	Gas Plant in Service	5
Schedule	4	Near Term Capital Additions	6
Schedule	5	Depreciation Model Parameters	7
Average Remaining Lives			
Schedule	6	Average Remaining Life - Transmission	8
Depreciation Rates			
Schedule	7	Depreciation Rate Calculation	11
Negative Salvage Rates			
Schedule	8	Negative Salvage	12
Iowa Curves Sample			
Schedule	9	Iowa Curves Sampling	19

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 1 - Comparison of Proposed and Present Depreciation Rates (Inclusive of Negative Salvage)
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Plant in Service December 31, 2020 (A) \$	Fully Depreciated Plant (B) \$	Depreciable Plant (C) \$	Current Rates (D) %	Current Expense (E) \$	Proposed Rates (F) %	Proposed Expense (G) \$	Expense Difference (H) \$
1		Intangible Plant								
2	302	Intangible Plant - Franchises	176,783		176,783	4.00%	7,071	0.55%	972	(6,099)
3	303	Misc. Intangible Plant	898,093		898,093	2.19%	19,668	1.57%	14,100	(5,568)
4		Subtotal Intangible Plant	1,074,876	-	1,074,876	2.49%	26,740	1.40%	15,072	(11,667)
5										
7		Transmission Plant								
8	365.11	Land	658,661		-	0.00%	-	0.00%	-	-
9	365.12	Land Rights	96,745		96,745	2.00%	1,935	1.93%	1,867	(68)
10	365.2	Rights of Way	4,011,679		4,011,679	2.00%	80,234	1.97%	79,030	(1,204)
11	366.1	Compressor Station S & I	2,673,056		2,673,056	3.00%	80,192	3.51%	93,824	13,633
12	366.2	M & R Station S & I	1,428,304		1,428,304	2.63%	37,564	2.85%	40,707	3,142
13	367	Mains	100,830,092		100,830,092	2.20%	2,218,262	2.50%	2,520,752	302,490
14	368	Compressor Station Equipment	35,393,767		35,393,767	3.03%	1,072,431	2.94%	1,040,577	(31,854)
15	369	Meas & Reg Station Equipment	8,764,591		8,764,591	3.18%	278,714	2.49%	218,238	(60,476)
16		Subtotal Transmission	153,856,895	-	153,198,234	2.46%	3,769,332	2.61%	3,994,996	225,664
17										
18		General Plant								
19	390	Struct. & Impr. - Office Bldg	5,269	5,269	-	0.00%	-	10.00%	-	-
20	391	Office Furniture & Equipment								
21		OFF001- Tower Office Furniture & Equip	32,228	-	32,228	8.33%	2,685	10.00%	3,223	538
22		DPC001-Data Process & Comp. Equip.	-	-	-	25.00%	-	12.50%	-	-
23		DEV001-Developed Software	957,123	843,871	113,252	7.69%	8,709	6.67%	7,550	(1,159)
24	392.1	Transportation Equipment	3,761	3,761	-	18.00%	-	16.67%	-	-
25	394	Tools Shop & Garage Equipment	565,711	-	565,711	8.33%	47,124	5.00%	28,286	(18,838)
26	396	Power Operated Equipment	42,559	10,649	31,910	7.92%	2,527	10.00%	3,191	664
27	397	Communication Equipment	174,033	142,401	31,632	7.14%	2,259	4.35%	1,375	(883)
28			1,780,683	1,005,951	774,732	3.55%	63,303	2.45%	43,625	(19,678)
29										
30		Total	156,712,455	1,005,951	155,047,842	2.46%	3,859,374	2.59%	4,053,693	194,318



Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 2 - Proposed and Present Depreciation and Negative Salvage Rate Components
Docket No. G-39, Sub 46

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

Line No.	Account No.	Parameter	Current	Current	Current	Proposed	Proposed	Proposed
			Depreciation Rate	Negative Salvage Rate	Total	Depreciation Rate	Negative Salvage Rate	Total
			(A)	(B)	(C)	(D)	(E)	(F)
			%	%	%	%	%	%
1		Intangible Plant						
2	302	Intangible Plant - Franchises	4.00%		4.00%	0.55%		0.55%
3	303	Misc. Intangible Plant	2.00%	0.19%	2.19%	1.57%		1.57%
4								
5		Transmission Plant						
6	365.11	Land						
7	365.12	Land Rights	2.00%		2.00%	1.93%	0.00%	1.93%
8	365.2	Rights of Way	2.00%		2.00%	1.90%	0.07%	1.97%
9	366.1	Compressor Station S & I	2.86%	0.14%	3.00%	3.03%	0.48%	3.51%
10	366.2	M & R Station S & I	2.50%	0.13%	2.63%	2.60%	0.25%	2.85%
11	367	Mains	1/ 2.00%	0.20%	2.20%	1.75%	0.75%	2.50%
12	368	Compressor Station Equipment	3.03%		3.03%	2.63%	0.31%	2.94%
13	369	Meas & Reg Station Equipment	3.03%	0.15%	3.18%	2.13%	0.36%	2.49%
14								
15		General Plant						
16	390	Struct. & Impr. - Office Bldg	Various			10.00%		10.00%
17	391	Office Furniture and Equipment						
18		OFF001- Tower Office Furniture & Equip	8.33%		8.33%	10.00%		10.00%
19		DPC001-Data Process & Comp. Equip.	25.00%		25.00%	12.50%		12.50%
20		DEV001-Developed Software	7.69%		7.69%	6.67%		6.67%
21	392.1	Transportation Equipment	18.00%		18.00%	16.67%		16.67%
22	394	Tools Shop & Garage Equipment	8.33%		8.33%	5.00%		5.00%
23	396	Power Operated Equipment	7.92%		7.92%	10.00%		10.00%
24	397	Communication Equipment	7.14%		7.14%	4.35%		4.35%
25								
26		Total Composite Average Depreciation Rate			2.46%			2.59%

1/ Cardinal's negative salvage rate includes the costs of Cardinal's ARO and any negative salvage recovery will be sourced to the recovery of legal obligations first.

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 3 - Plant Balances
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Plant		
			Plant in Service	Reserve for Negative Salvage	Reserve for Depreciation
			December 31, 2020	December 31, 2020	December 31, 2020
			(A)	(B)	(C)
			\$	\$	\$
1		Intangible Plant			
2	302	Intangible Plant - Franchises	176,783	-	(149,054)
3	303	Misc. Intangible Plant	898,093	(6,257)	(509,204)
4		Subtotal Intangible Plant	1,074,876	(6,257)	(658,258)
5					
7		Transmission Plant			
8	365.11	Land	658,661	-	-
9	365.12	Land Rights	96,745	-	(48,210)
10	365.2	Rights of Way	4,011,679	-	(1,990,158)
11	366.1	Compressor Station S & I	2,673,056	(13,722)	(599,867)
12	366.2	M & R Station S & I	1,428,304	(6,808)	(537,455)
13	367	Mains	100,830,092	(1,008,248)	(50,908,281)
14	368	Compressor Station Equipment	35,393,767	1,874	(8,859,071)
15	369	Meas & Reg Station Equipment	8,764,591	11,623	(3,674,653)
16		Subtotal Transmission	153,856,895	(1,015,281)	(66,617,694)
17					
18		General Plant			
19	390	Struct. & Impr. - Office Bldg	5,269		(5,269)
20	391	Office Furniture & Equipment			
21		OFF001- Tower Office Furniture & Equip	32,228		(24,197)
22		DPC001-Data Process & Comp. Equip.	-		-
23		DEV001-Developed Software	957,123		(902,108)
24	392.1	Transportation Equipment	3,761		(3,761)
25	394	Tools Shop & Garage Equipment	565,711		(345,372)
26	396	Power Operated Equipment	42,559		(35,664)
27	397	Communication Equipment	174,033		(159,868)
28		Subtotal General Plant	1,780,683	-	(1,476,239)
29					
30		Total	156,712,455	(1,021,537)	(68,752,191)

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 4 - Near Term Additions
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Current	Plant	Planned Additions 1/			Average
			Plant in Service	Balance Ratio	2022	2023	2024	Plant in Service 2/
			(A)	(B)	(C)	(D)	(E)	(F)
			\$	%	\$	\$	\$	\$
1		Intangible Plant						
2	302	Intangible Plant - Franchises	176,783	16.45%				176,783
3	303	Misc. Intangible Plant	898,093	83.55%	-	-	-	898,093
4		Subtotal Intangible Plant	1,074,876	100.00%	-	-	-	1,074,876
5								
6								
7		Transmission Plant						
8	365.11	Land	658,661	0.43%	6,432	6,432	6,432	668,309
9	365.12	Land Rights	96,745	0.06%	945	945	945	98,162
10	365.2	Rights of Way	4,011,679	2.61%	39,173	39,173	39,173	4,070,439
11	366.1	Compressor Station S & I	2,673,056	1.74%	26,102	26,102	26,102	2,712,208
12	366.2	M & R Station S & I	1,428,304	0.93%	13,947	13,947	13,947	1,449,225
13	367	Mains	100,830,092	65.53%	984,582	984,582	984,582	102,306,964
14	368	Compressor Station Equipment	35,393,767	23.00%	345,612	345,612	345,612	35,912,184
15	369	Meas & Reg Station Equipment	8,764,591	5.70%	85,584	85,584	85,584	8,892,968
16		Subtotal Transmission	153,856,895	100.00%	1,502,233	1,502,233	1,502,233	156,110,458
17								
18		General Plant						
19	390	Struct. & Impr. - Office Bldg	5,269	0.30%				5,269
20	391	Office Furniture & Equipment						
21		OFF001- Tower Office Furniture & Equip	32,228	1.81%				32,228
22		DPC001-Data Process & Comp. Equip.	-	0.00%				-
23		DEV001-Developed Software	957,123	53.75%				957,123
24	392.1	Transportation Equipment	3,761	0.21%				3,761
25	394	Tools Shop & Garage Equipment	565,711	31.77%				565,711
26	396	Power Operated Equipment	42,559	2.39%				42,559
27	397	Communication Equipment	174,033	9.77%				174,033
28		Subtotal General Plant	1,780,683	100.00%				1,780,683
29								
30								
31		Total	156,712,455		1,502,233	1,502,233	1,502,233	158,966,018

1/ Forecasted 3 years of plant additions based on previous 3 year average of plant additions

2/ Aver = [(A + 1/2C)+(A + C + 1/2D)+(A + C + D + 1/2E)]/3

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 5 - Model Parameters
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Average Age (A)	Average Service Life (B)	lowa Survivor Curve (C)	Average Remaining Lives 29-Yr (D)
1		Intangible Plant				
2	302	Intangible Plant - Franchises	22.00	85.00		28.63
3	303	Misc. Intangible Plant	20.40	60.00		27.60
4						
5						
6		Transmission Plant				
7	365.11	Land				
8	365.12	Land Rights	22.00	65.00	R2	26.39
9	365.2	Rights of Way	16.72	65.00	R2	26.84
10	366.1	Compressor Station S & I	9.00	45.00	R2	25.70
11	366.2	M & R Station S & I	16.30	45.00	R2	24.18
12	367	Mains	16.02	75.00	R4	28.63
13	368	Compressor Station Equipment	8.87	85.00	R3	28.59
14	369	Meas & Reg Station Equipment	12.83	60.00	L3	27.60
15						
16		General Plant				
17				US OMB Life Tables 1/		
18	390	Struct. & Impr. - Office Bldg		10.00	10.00%	
19	391	Office Furniture & Equipment				
20		OFF001- Tower Office Furniture & Equip		10.00	10.00%	
21		DPC001-Data Process & Comp. Equip.		8.00	12.50%	
22		DEV001-Developed Software		15.00	6.67%	
23	392.1	Transportation Equipment		6.00	16.67%	
24	394	Tools Shop & Garage Equipment		20.00	5.00%	
25	396	Power Operated Equipment		10.00	10.00%	
26	397	Communication Equipment		23.00	4.35%	

1/ Average service lives taken from United States Office of Management and Budget Useful Life and Disposal Table

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 6 - Average Remaining Lives - Transmission
Docket No. G-39, Sub 46

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

How to read this chart

Yrs	Year	Age	% Surviving	Plant Balance	Age	% Surviving	Plant Balance	Age	% Surviving	Plant Balance
		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
		%	%	\$	%	%	\$	%	%	\$
-	2021	61.57%	83.88%	35,023	33.85%	94.40%	98,162	25.72%	96.29%	4,070,439
1	2022	Plant average	83.88%	35,023	35.38%	94.00%	97,776	27.26%	95.97%	4,057,481
2	2023	age as a	83.88%	35,023	36.92%	93.56%	97,348	28.80%	95.64%	4,043,961
3	2024	percent of	Reference to Iowa Curve Table for	34,279	38.46%	93.12%	96,929	30.34%	95.27%	4,028,899
4	2025	proposed		34,279	40.00%	92.67%	96,493	31.88%	94.90%	4,014,158
5	2026	service life		34,279	41.54%	92.17%	96,009	33.42%	94.50%	3,997,750
6	2027	45.07%	% Surviving at each age interval	Plant surviving at each age interval	43.08%	91.68%	95,537	34.95%	94.11%	3,981,704
7	2028	46.73%			44.62%	91.14%	95,012	36.49%	93.70%	3,964,996
8	2029	48.40%			46.15%	90.61%	94,501	38.03%	93.24%	3,946,421
9	2030	50.07%	91.04%		47.69%	90.06%	93,970	39.57%	92.79%	3,928,277
10	2031	51.73%	91.00%	3,664,263	49.23%	89.46%	93,381	41.11%	92.30%	3,908,122
11	2032	53.40%	90.96%	3,662,794	50.77%	88.86%	92,807	42.65%	91.82%	3,888,449
12	2033	55.07%	90.93%	3,661,325	52.31%	88.21%	92,172	44.18%	91.31%	3,868,003
13	2034	56.73%	90.89%	3,659,856	53.85%	87.57%	91,553	45.72%	90.76%	3,845,314
14	2035	58.40%	90.86%	3,658,387	55.38%	86.90%	90,912	47.26%	90.21%	3,823,194
15	2036	60.07%	90.82%	3,656,918	56.92%	86.17%	90,202	48.80%	89.65%	3,800,228
16	2037	61.73%	90.78%	3,655,449	58.46%	85.46%	89,512	50.34%	89.02%	3,774,770
17	2038	63.40%	90.75%	3,653,980	60.00%	84.72%	88,797	51.88%	88.41%	3,749,977
18	2039	65.07%	90.71%	3,652,511	61.54%	83.90%	88,007	53.42%	87.74%	3,722,515
19	2040	66.73%	90.67%	3,651,042	63.08%	83.11%	87,240	54.95%	87.08%	3,695,791
20	2041	68.40%	90.64%	3,649,559	64.62%	82.23%	86,393	56.49%	86.40%	3,668,092
21	2042	70.07%	90.60%	3,648,076	66.15%	81.38%	85,571	58.03%	85.65%	3,637,446
22	2043	71.73%	90.56%	3,646,593	67.69%	80.50%	84,721	59.57%	84.92%	3,607,656
23	2044	73.40%	90.53%	3,645,110	69.23%	79.53%	83,783	61.11%	84.11%	3,574,722
24	2045	75.07%	90.49%	3,643,627	70.77%	78.60%	82,875	62.65%	83.32%	3,542,733
25	2046	76.73%	90.45%	3,643,627	72.31%	77.56%	81,874	64.18%	82.51%	3,509,642
26	2047	78.40%	90.42%	3,643,627	73.85%	76.56%	80,906	65.72%	81.61%	3,473,104
27	2048	80.07%	90.42%	3,640,661	75.38%	75.53%	79,907	67.26%	80.74%	3,437,661
28	2049	81.73%	90.42%	3,639,178	76.92%	74.39%	78,809	68.80%	79.84%	3,401,045
29	2050	83.40%	90.34%	3,637,695	78.46%	73.30%	77,747	70.34%	78.85%	3,360,670
					29-Yr Life	26.39	\$2,590,745	29-Yr Life	26.84	\$109,252,781
							\$20,414			\$709,768
							79%			83%

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 6 - Average Remaining Lives - Transmission
Docket No. G-39, Sub 46

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

		366.1 Compressor Station S & I			366.2 M & R Station S & I			367 Mains		
		9.00	\$2,712,208.18	9	16.30	\$1,449,224.82	9	16.02	\$102,429,201.06	11
		45.00	R2	\$ 48,339	45.00	R2	\$ 40,350	75.00	R4	\$ 89,742
		20.0%	25.70	\$ 781,278	36.2%	24.18	\$ 583,979	21.4%	28.63	\$ 4,398,742
<u>Yrs</u>	<u>Year</u>	<u>Age</u>	<u>% Surviving</u>	<u>Plant Balance</u>	<u>Age</u>	<u>% Surviving</u>	<u>Plant Balance</u>	<u>Age</u>	<u>% Surviving</u>	<u>Plant Balance</u>
		(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)
		%	%	\$	%	%	\$	%	%	\$
-	2021	20.00%	97.40%	2,712,208	36.22%	93.75%	1,449,225	21.36%	99.91%	102,306,964
1	2022	22.22%	96.98%	2,700,884	38.44%	93.12%	1,440,107	22.69%	99.89%	102,289,451
2	2023	24.44%	96.55%	2,689,316	40.67%	92.46%	1,430,443	24.03%	99.87%	102,267,588
3	2024	26.67%	96.10%	2,676,990	42.89%	91.75%	1,420,210	25.36%	99.84%	102,244,126
4	2025	28.89%	95.61%	2,663,870	45.11%	90.97%	1,408,874	26.69%	99.82%	102,217,222
5	2026	31.11%	95.07%	2,649,260	47.33%	90.18%	1,397,395	28.03%	99.79%	102,183,906
6	2027	33.33%	94.53%	2,634,390	49.56%	89.34%	1,385,267	29.36%	99.75%	102,148,433
7	2028	35.56%	93.94%	2,618,602	51.78%	88.45%	1,372,462	30.69%	99.71%	102,108,059
8	2029	37.78%	93.33%	2,601,852	54.00%	87.52%	1,358,952	32.03%	99.66%	102,058,444
9	2030	40.00%	92.67%	2,584,097	56.22%	86.49%	1,344,044	33.36%	99.61%	102,006,012
10	2031	42.22%	91.95%	2,564,409	58.44%	85.46%	1,329,006	34.69%	99.55%	101,946,758
11	2032	44.44%	91.21%	2,544,452	60.67%	84.36%	1,313,177	36.03%	99.48%	101,874,470
12	2033	46.67%	90.43%	2,523,345	62.89%	83.22%	1,296,529	37.36%	99.41%	101,798,622
13	2034	48.89%	89.61%	2,501,039	65.11%	81.95%	1,278,219	38.69%	99.33%	101,713,487
14	2035	51.11%	88.70%	2,476,382	67.33%	80.68%	1,259,811	40.03%	99.23%	101,610,346
15	2036	53.33%	87.78%	2,451,463	69.56%	79.35%	1,240,504	41.36%	99.12%	101,502,866
16	2037	55.56%	86.81%	2,425,188	71.78%	77.95%	1,220,274	42.69%	99.00%	101,383,010
17	2038	57.78%	85.79%	2,397,503	74.00%	76.49%	1,199,100	44.03%	98.86%	101,238,778
18	2039	60.00%	84.72%	2,368,355	76.22%	74.89%	1,175,933	45.36%	98.72%	101,089,470
19	2040	62.22%	83.53%	2,336,261	78.44%	73.30%	1,152,773	46.69%	98.56%	100,924,019
20	2041	64.44%	82.34%	2,303,958	80.67%	71.63%	1,128,624	48.03%	98.36%	100,726,207
21	2042	66.67%	81.09%	2,270,034	82.89%	69.89%	1,103,480	49.36%	98.16%	100,522,744
22	2043	68.89%	79.78%	2,234,442	85.11%	68.01%	1,076,131	50.69%	97.95%	100,298,663
23	2044	71.11%	78.34%	2,195,399	87.33%	66.13%	1,048,962	52.03%	97.69%	100,032,445
24	2045	73.33%	76.90%	2,156,257	89.56%	64.19%	1,020,822	53.36%	97.42%	99,760,332
25	2046	75.56%	75.39%	2,115,322	91.78%	62.18%	991,735	54.69%	97.13%	99,462,437
26	2047	77.78%	73.81%	2,072,563	94.00%	60.11%	961,734	56.03%	96.79%	99,110,712
27	2048	80.00%	72.17%	2,027,959	96.22%	57.88%	929,439	57.36%	96.44%	98,753,405
28	2049	82.22%	70.37%	1,979,340	98.44%	55.70%	897,716	58.69%	96.06%	98,364,548
29	2050	84.44%	68.59%	1,930,930	100.67%	53.46%	865,246	60.03%	95.61%	97,908,223
		29-Yr Life	25.70	\$69,693,860	29-Yr Life	24.18	\$35,046,969	29-Yr Life	28.63	\$2,929,544,782
				\$781,278			\$583,979			\$4,398,742
				71%			60%			96%

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 6 - Average Remaining Lives - Transmission
Docket No. G-39, Sub 46

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

		368 Compressor Station Equipment			369 Meas & Reg Station Equipment		
		8.87	\$36,000,883.20	10	12.83	\$8,957,044	5
		85.00	R3	\$ 67,474	60.00	L3	\$ 26,469
		10.4%	28.59	\$ 1,373,541	21.4%	27.60	\$ 1,484,032
Yrs	Year	Age	% Surviving	Plant Balance	Age	% Surviving	Plant Balance
		(S)	(T)	(U)	(V)	(W)	(X)
		%	%	\$	%	%	\$
-	2021	10.44%	99.76%	35,912,184	21.38%	99.88%	8,892,968
1	2022	11.61%	99.72%	35,897,025	23.05%	99.83%	8,888,323
2	2023	12.79%	99.68%	35,881,939	24.72%	99.76%	8,882,373
3	2024	13.96%	99.63%	35,864,095	26.38%	99.68%	8,875,436
4	2025	15.14%	99.57%	35,844,710	28.05%	99.58%	8,866,498
5	2026	16.32%	99.51%	35,823,683	29.72%	99.46%	8,855,803
6	2027	17.49%	99.46%	35,802,873	31.38%	99.33%	8,844,002
7	2028	18.67%	99.39%	35,778,395	33.05%	99.17%	8,829,489
8	2029	19.85%	99.31%	35,751,953	34.72%	98.98%	8,812,807
9	2030	21.02%	99.23%	35,723,426	36.38%	98.78%	8,794,993
10	2031	22.20%	99.16%	35,695,341	38.05%	98.55%	8,773,669
11	2032	23.38%	99.07%	35,662,473	39.72%	98.28%	8,749,696
12	2033	24.55%	98.97%	35,627,150	41.38%	98.00%	8,724,513
13	2034	25.73%	98.86%	35,589,236	43.05%	97.66%	8,694,715
14	2035	26.91%	98.75%	35,548,593	44.72%	97.29%	8,661,460
15	2036	28.08%	98.64%	35,508,815	46.38%	96.90%	8,626,646
16	2037	29.26%	98.51%	35,462,533	48.05%	96.44%	8,585,470
17	2038	30.44%	98.37%	35,413,091	49.72%	95.93%	8,539,444
18	2039	31.61%	98.23%	35,360,332	51.38%	95.39%	8,491,142
19	2040	32.79%	98.08%	35,308,922	53.05%	94.75%	8,433,882
20	2041	33.96%	97.92%	35,249,359	54.72%	94.04%	8,369,802
21	2042	35.14%	97.74%	35,186,006	56.38%	93.29%	8,302,601
22	2043	36.32%	97.56%	35,118,693	58.05%	92.40%	8,223,187
23	2044	37.49%	97.37%	35,053,361	59.72%	91.41%	8,134,837
24	2045	38.67%	97.16%	34,977,969	61.38%	90.39%	8,042,962
25	2046	39.85%	96.94%	34,898,100	63.05%	89.19%	7,935,577
26	2047	41.02%	96.71%	34,813,571	64.72%	87.87%	7,817,733
27	2048	42.20%	96.48%	34,731,833	66.38%	86.53%	7,697,041
28	2049	43.38%	96.22%	34,637,846	68.05%	84.98%	7,558,334
29	2050	44.55%	95.94%	34,538,643	69.72%	83.31%	7,408,936
		29-Yr Life	28.59	\$1,026,749,967	29-Yr Life	27.60	\$245,421,369
				\$1,373,541			\$1,484,032
				96%			83%

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule No. 7 - Depreciation Rate Calculations

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 7 - Depreciation Rate Calculations
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Average Plant	Fully Depreciated	Depreciable	Depreciation	Net Plant	Average	Depreciation	
			in Service	Plant	Plant	Reserve	2021-2024	Remaining	Expense 1/	Rate
			2021-2024	(B)	(C)	December 31, 2020	(E)	(F)	(G)	(H)
			(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
			\$	\$	\$	\$	\$		\$	%
			Sch 4	Sch. 1	c = a - b	Sch. 3	e = a + d	Sch. 6	g = e / f	h = g / a
1		Intangible Plant								
2	302	Intangible Plant - Franchises	176,783		176,783	(149,054)	27,729	28.63	968	0.55%
3	303	Misc. Intangible Plant	898,093		898,093	(509,204)	388,889	27.60	14,092	1.57%
4		Subtotal Intangible Plant	1,074,876		1,074,876	(658,258)	416,618	27.66	15,060	1.40%
5										
6		Transmission Plant								
7	365.11	Land	668,309			-	668,309	0.00	-	0.00%
8	365.12	Land Rights	98,162		98,162	(48,210)	49,952	26.39	1,893	1.93%
9	365.2	Rights of Way	4,070,439		4,070,439	(1,990,158)	2,080,281	26.84	77,505	1.90%
10	366.1	Compressor Station S & I	2,712,208		2,712,208	(599,867)	2,112,342	25.70	82,204	3.03%
11	366.2	M & R Station S & I	1,449,225		1,449,225	(537,455)	911,770	24.18	37,703	2.60%
12	367.0	Mains	102,306,964		102,306,964	(50,908,281)	51,398,683	28.63	1,794,969	1.75%
13	368.0	Compressor Station Equipment	35,912,184		35,912,184	(8,859,071)	27,053,113	28.59	946,225	2.63%
14	369.0	Meas & Reg Station Equipment	8,892,968		8,892,968	(3,674,653)	5,218,315	27.60	189,088	2.13%
15		Subtotal Transmission	156,110,458		155,442,150	(66,617,694)	88,824,456	28.38	3,129,587	2.01%
16										
17		General Plant								
18	390	Struct. & Impr. - Office Bldg	5,269	5,269	-	(5,269)	-	-	-	10.00%
19	391	Office Furniture and Equipment								
20		OFF001- Tower Office Furniture & Equip	32,228	-	32,228	(24,197)	8,031	-	3,223	10.00%
21		DPC001-Data Process & Comp. Equip.	-	-	-	-	-	-	-	12.50%
22		DEV001-Developed Software	957,123	843,871	113,252	(902,108)	55,015	-	7,550	6.67%
23	392.1	Transportation Equipment	3,761	3,761	-	(3,761)	-	-	-	16.67%
24	394	Tools Shop & Garage Equipment	565,711	-	565,711	(345,372)	220,339	-	28,286	5.00%
25	396	Power Operated Equipment	42,559	10,649	31,910	(35,664)	6,894	-	3,191	10.00%
26	397	Communication Equipment	174,033	142,401	31,632	(159,868)	14,165	-	1,375	4.35%
27		Subtotal General Plant	1,780,683	1,005,951	774,732	(1,476,239)	304,444	6.98	43,625	2.45%
28										
29										
30		Total	158,966,018	1,005,951	157,291,758	(68,752,191)	89,545,519	28.09	3,188,272	2.01%

1/ The expense calculation for General Plant is g = c * h

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8 - Negative Salvage Cost Estimate - Total
Docket No. G-39, Sub 46

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

Line No.	Account No.	Parameter	Total Terminal Decommissioning (A) \$	Percent Plant Remaining (B) %	Interim Retirement Cost (C) \$	Terminal Decommissioning Interim Retirement Cost (D) \$
1		<u>Direct Cost Estimates</u>				
2						
3	367	Line Pipe Removal	4,098,783	79%	852,412	3,246,370
4						
5	367	Crossings Abandonment	16,170,093	96%	695,242	15,474,852
6						
7	366.2 / 369	Meter Station Removal	846,264	80%	169,218	677,046
8						
9	366.1 / 368	Compressor Station Removal	3,009,260	94%	167,884	2,841,376
10						
11	365	Right of Way Markers	70,737	83%	12,334	58,402
12						
13	367	Cathodic Protection	35,680	96%	1,534	34,146
14						
15	367	Taps	257,865	96%	11,087	246,778
16						
17	367	Valves	178,370	96%	7,669	170,701
18						
19		Subtotal	24,667,052		1,917,380	22,749,672
20						
21		Construction Management Costs	616,676		47,935	568,742
22						
23		10% Contingency Fees	2,528,373		196,531	2,331,841
24						
25		Salvage	(656,244)			(656,244)
26						
27		Grand Total	27,155,857		2,161,846	24,994,011
28						
29		Reserve for Negative Salvage	(1,015,281)			(1,015,281)
30						
31		Net to Recover	26,140,576		2,161,846	23,978,730
32						
33		Average Remaining Life (Years)	28.53		21.07	29.47
34						
35		Annual Requirement	916,258		102,598	813,660
36						
37		Recovery Rate	0.60%		0.07%	0.53%
38						
39		Depreciable Base	153,101,489			

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8a - Negative Salvage Cost Estimate - Account 365.2
Docket No. G-39, Sub 46

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim Retirement Cost	Terminal Decommissioning
			Decommissioning	Remaining		Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1		<u>Direct Cost Estimates - Acct 365</u>				
2						
3	367	Line Pipe Removal	-	79%	-	-
4						
5	367	Crossings Abandonment	-	96%	-	-
6						
7	366.2 / 369	Meter Station Removal	-	81%	-	-
8						
9	366.1 / 368	Compressor Station Removal	-	94%	-	-
10						
11	365	Right of Way Markers	70,737	83%	12,334	58,402
12						
13	367	Cathodic Protection	-	96%	-	-
14						
15	367	Taps	-	96%	-	-
16						
17	367	Valves	-	96%	-	-
18						
19		Subtotal	70,737		12,334	58,402
20						
21		Construction Management Costs	1,768		308	1,460
22						
23		10% Contingency Fees	7,251		1,264	5,986
24						
25		Salvage				
26						
27		Grand Total	79,756		13,907	65,849
28						
29		Reserve for Negative Salvage	-			-
30						
31		Net to Recover	79,756		13,907	65,849
32						
33		Average Remaining Life (Years)	26.84		26.84	26.84
34						
35		Annual Requirement	2,971		518	2,453
36						
37		Recovery Rate	0.07%		0.01%	0.06%
38						
39		Depreciable Base	4,011,679			

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8b - Negative Salvage Cost Estimate - Account 366.1
Docket No. G-39, Sub 46

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim	Terminal
			Decommissioning	Remaining	Retirement Cost	Decommissioning Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1	<u>Direct Cost Estimates - Acct 366.1</u>					
2						
3	367	Line Pipe Removal	-	79%	-	-
4						
5	367	Crossings Abandonment	-	96%	-	-
6						
7	366.2	Meter Station Removal	-	81%	-	-
8						
9	366.1	Compressor Station Removal	300,926	9%	272,512	28,414
10						
11	365	Right of Way Markers	-	83%	-	-
12						
13	367	Cathodic Protection	-	96%	-	-
14						
15	367	Taps	-	96%	-	-
16						
17	367	Valves	-	96%	-	-
18						
19		Subtotal	300,926		272,512	28,414
20						
21		Construction Management Costs	7,523		6,813	710
22						
23		10% Contingency Fees	30,845		27,933	2,912
24						
25		Salvage				
26						
27		Grand Total	339,294		307,258	32,037
28						
29		Reserve for Negative Salvage	(13,722)			(13,722)
30						
31		Net to Recover	325,572		307,258	18,315
32						
33		Average Remaining Life (Years)	25.70		25.70	25.70
34						
35		Annual Requirement	12,670		11,957	713
36						
37		Recovery Rate	0.48%		0.45%	0.03%
38						
39		Depreciable Base	2,673,056			

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8c - Negative Salvage Cost Estimate - Account 366.2
Docket No. G-39, Sub 46

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim Retirement Cost	Terminal Decommissioning
			Decommissioning	Remaining		Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1	<u>Direct Cost Estimates - Acct. 366.2</u>					
2						
3	367	Line Pipe Removal	-	79%	-	-
4						
5	367	Crossings Abandonment	-	96%	-	-
6						
7	366.2 / 369	Meter Station Removal	84,626	8%	77,856	6,770
8						
9	366.1 / 368	Compressor Station Removal	-	94%	-	-
10						
11	365	Right of Way Markers	-	83%	-	-
12						
13	367	Cathodic Protection	-	96%	-	-
14						
15	367	Taps	-	96%	-	-
16						
17	367	Valves	-	96%	-	-
18						
19		Subtotal	84,626		77,856	6,770
20						
21		Construction Management Costs	2,116		1,946	169
22						
23		10% Contingency Fees	8,674		7,980	694
24						
25		Salvage				
26						
27		Grand Total	95,416		87,783	7,634
28						
29		Reserve for Negative Salvage	(6,808)			(6,808)
30						
31		Net to Recover	88,608		87,783	826
32						
33		Average Remaining Life (Years)	24.18		24.18	24.18
34						
35		Annual Requirement	3,664		3,630	34
36						
37		Recovery Rate	0.25%		0.25%	0.00%
38						
39		Depreciable Base	1,428,304			

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8d - Negative Salvage Cost Estimate - Account 367
Docket No. G-39, Sub 46

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim Retirement Cost	Terminal Decommissioning
			Decommissioning	Remaining		Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1		<u>Direct Cost Estimates - Acct. 367</u>				
2						
3	367	Line Pipe Removal	4,098,783	79%	852,412	3,246,370
4						
5	367	Crossings Abandonment	16,170,093	96%	695,242	15,474,852
6						
7	366.2 / 369	Meter Station Removal	-	81%	-	-
8						
9	366.1 / 368	Compressor Station Removal	-	94%	-	-
10						
11	365	Right of Way Markers	-	83%	-	-
12						
13	367	Cathodic Protection	35,680	96%	1,534	34,146
14						
15	367	Taps	257,865	96%	11,087	246,778
16						
17	367	Valves	178,370	96%	7,669	170,701
18						
19		Subtotal	20,740,791		1,567,944	19,172,847
20						
21		Construction Management Costs	518,520		39,199	479,321
22						
23		10% Contingency Fees	2,125,931		160,714	1,965,217
24						
25		Salvage	(656,244)			(656,244)
26						
27		Grand Total	22,728,998		1,767,857	20,961,141
28						
29		Reserve for Negative Salvage	(1,008,248)			(1,008,248)
30						
31		Net to Recover	21,720,750		1,767,857	19,952,894
32						
33		Average Remaining Life (Years)	28.63		28.63	28.63
34						
35		Annual Requirement	758,542		61,738	696,804
36						
37		Recovery Rate	0.75%		0.06%	0.69%
38						
39		Depreciable Base	100,830,092			

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8e - Negative Salvage Cost Estimate - Account 368
Docket No. G-39, Sub 46

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim Retirement Cost	Terminal Decommissioning
			Decommissioning	Remaining		Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1		<u>Direct Cost Estimates - Acct. 368</u>				
2						
3	367	Line Pipe Removal	-	79%	-	-
4						
5	367	Crossings Abandonment	-	96%	-	-
6						
7	369	Meter Station Removal	-	81%	-	-
8						
9	368	Compressor Station Removal	2,708,334	85%	406,819	2,301,515
10						
11	365	Right of Way Markers	-	83%	-	-
12						
13	367	Cathodic Protection	-	96%	-	-
14						
15	367	Taps	-	96%	-	-
16						
17	367	Valves	-	96%	-	-
18						
19		Subtotal	2,708,334		406,819	2,301,515
20						
21		Construction Management Costs	67,708		10,170	57,538
22						
23		10% Contingency Fees	277,604		41,699	235,905
24						
25		Salvage				
26						
27		Grand Total	3,053,647		458,689	2,594,958
28						
29		Reserve for Negative Salvage	1,874			1,874
30						
31		Net to Recover	3,055,521		458,689	2,596,832
32						
33		Average Remaining Life (Years)	28.59		28.59	28.59
34						
35		Annual Requirement	106,872		16,043	90,828
36						
37		Recovery Rate	0.31%		0.05%	0.26%
38						
39		Depreciable Base	35,393,767			

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8f - Negative Salvage Cost Estimate - Account 369
Docket No. G-39, Sub 46

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim Retirement Cost	Terminal Decommissioning
			Decommissioning	Remaining		Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1	<u>Direct Cost Estimates - Acct. 369</u>					
2						
3	367	Line Pipe Removal	-	79%	-	-
4						
5	367	Crossings Abandonment	-	96%	-	-
6						
7	369	Meter Station Removal	761,637	72%	213,230	548,407
8						
9	366.1 / 368	Compressor Station Removal	-	94%	-	-
10						
11	365	Right of Way Markers	-	83%	-	-
12						
13	367	Cathodic Protection	-	96%	-	-
14						
15	367	Taps	-	96%	-	-
16						
17	367	Valves	-	96%	-	-
18						
19		Subtotal	761,637		213,230	548,407
20						
21		Construction Management Costs	19,041		5,331	13,710
22						
23		10% Contingency Fees	78,068		21,856	56,212
24						
25		Salvage				
26						
27		Grand Total	858,746		240,417	618,329
28						
29		Reserve for Negative Salvage	11,623			11,623
30						
31		Net to Recover	870,369		240,417	629,952
32						
33		Average Remaining Life (Years)	27.60		27.60	27.60
34						
35		Annual Requirement	31,538		8,712	22,827
36						
37		Recovery Rate	0.36%		0.10%	0.26%
38						
39		Depreciable Base	8,764,591			

Cardinal Pipeline Company, LLC

Depreciation Study

Schedule 9 - Iowa Curves

Docket No. G-39, Sub 46

Docket No. G-39, Sub 47
Exhibit No. CPC-0003

Age	L0	L1	L2	L3	L4	L5
0.10%	0.99992	0.99995	1.00000	0.99996	1.00000	1.00000
0.20%	0.99983	0.99989	1.00000	0.99993	1.00000	1.00000
0.30%	0.99973	0.99983	1.00000	0.99990	1.00000	1.00000
0.40%	0.99962	0.99978	1.00000	0.99986	1.00000	1.00000
0.50%	0.99950	0.99972	1.00000	0.99984	1.00000	1.00000
0.60%	0.99937	0.99966	1.00000	0.99981	1.00000	1.00000
0.70%	0.99923	0.99960	1.00000	0.99979	1.00000	1.00000
0.80%	0.99909	0.99954	1.00000	0.99976	1.00000	1.00000
0.90%	0.99894	0.99948	1.00000	0.99974	1.00000	1.00000
1.00%	0.99878	0.99942	1.00000	0.99972	1.00000	1.00000
1.10%	0.99862	0.99936	1.00000	0.99970	1.00000	1.00000
1.20%	0.99845	0.99930	1.00000	0.99968	1.00000	1.00000
1.30%	0.99827	0.99924	1.00000	0.99967	1.00000	1.00000
1.40%	0.99809	0.99917	1.00000	0.99965	1.00000	1.00000
1.50%	0.99791	0.99911	1.00000	0.99964	1.00000	1.00000
1.60%	0.99772	0.99905	1.00000	0.99963	1.00000	1.00000
1.70%	0.99752	0.99898	0.99999	0.99961	1.00000	1.00000
1.80%	0.99732	0.99891	0.99999	0.99960	1.00000	1.00000
1.90%	0.99712	0.99885	0.99999	0.99959	1.00000	1.00000
2.00%	0.99691	0.99878	0.99999	0.99958	1.00000	1.00000
2.10%	0.99670	0.99871	0.99999	0.99957	1.00000	1.00000
2.20%	0.99648	0.99864	0.99999	0.99956	1.00000	1.00000
2.30%	0.99626	0.99857	0.99999	0.99956	1.00000	1.00000
2.40%	0.99604	0.99850	0.99998	0.99955	1.00000	1.00000
2.50%	0.99581	0.99843	0.99998	0.99954	1.00000	1.00000
2.60%	0.99558	0.99836	0.99998	0.99954	1.00000	1.00000
2.70%	0.99534	0.99829	0.99998	0.99953	1.00000	1.00000
2.80%	0.99510	0.99821	0.99998	0.99952	1.00000	1.00000
2.90%	0.99486	0.99814	0.99997	0.99952	1.00000	1.00000

ATTACHMENT 2

DEPRECIATION SURVIVOR CURVE WORKPAPERS

Steven R Fall
on behalf of
Cardinal Pipeline Company, LLC



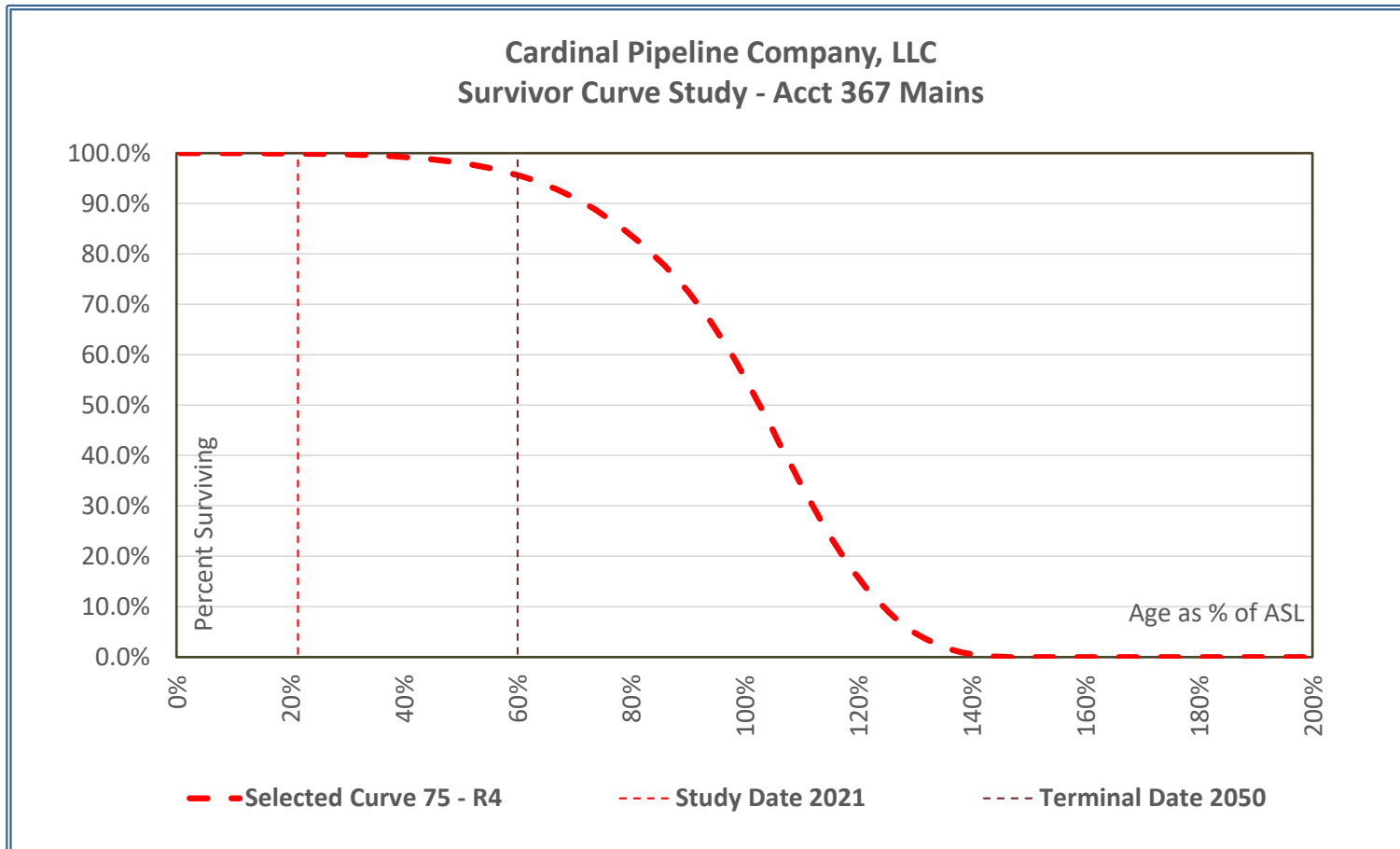
Brown, Williams, Moorhead & Quinn, Inc.
Energy Consultants

Cardinal Pipeline Company, LLC Survivor Curve Study - Acct 367 Mains

Docket No. G-39, Sub 47
 Exhibit No. CPC-0004

Salient Statistical Results

Economic Life	Ave Age at Study Date:	Average Service Life	Age as % of ASL	Iowa Curve	Conformance Index	Retirement Index	Average Remaining Life
2050	16.02	75	21.4%	R4	1	98%	28.63



Historical Plant Balances

Year	BOY Balance	Additions	Retirements	Adjustments	Transfers	EOY Balance
1990	-	-	-	-	-	-
1991	-	-	-	-	-	-
1992	-	-	-	-	-	-
1993	-	-	-	-	-	-
1994	-	-	-	-	-	-
1995	-	-	-	-	-	-
1996	-	-	-	-	-	-
1997	-	-	-	-	-	-
1998	-	-	-	-	-	-
1999	-	-	-	-	-	-
2000	-	-	-	-	-	-
2001	-	-	-	-	-	-
2002	-	-	-	-	-	-
2003	-	-	-	-	-	-
2004	-	-	-	-	95,319,992	95,319,992
2005	95,319,992	-	-	-	-	95,319,992
2006	95,319,992	554,762	-	-	-	95,874,754
2007	95,874,754	(51,789)	-	-	-	95,822,965
2008	95,822,965	-	-	-	-	95,822,965
2009	95,822,965	95,339	-	-	-	95,918,304
2010	95,918,304	11,823	-	-	-	95,930,127
2011	95,930,127	-	-	-	-	95,930,127
2012	95,930,127	335,866	1,081	-	-	96,264,912
2013	96,264,912	36,710	-	-	-	96,301,622
2014	96,301,622	243,384	-	-	-	96,545,006
2015	96,545,006	2,057	-	-	-	96,547,063
2016	96,547,063	35,320	-	-	-	96,582,383
2017	96,582,383	-	-	-	-	96,582,383
2018	96,582,383	(26,593)	-	-	-	96,555,790
2019	96,555,790	742,236	5,451	-	-	97,292,575
2020	97,292,575	3,653,221	115,705	-	-	100,830,091
		4,404,184	121,156	Σ of last 5 years:		
		880,837	24,231	Ave last 5 yrs		

Goodness of Fit Test Statistics

Docket No. G-39, Sub 47
 Exhibit No. CPC-0004

Best 5-Year Retirement Predictors					
<u>Ranking</u>	<u>ASL / Curve</u>	Average	Annual	Retirement	Conformance
		<u>Remaining Life</u>	<u>Retirements</u>	<u>Index</u>	<u>Index</u>
1	75 - R4	28.63	24,612	98.4%	1.07
2	55 - L4	27.54	22,634	93.4%	1.07
3	10 - R3	28.96	26,420	91.0%	182.99
4	100 - S2	28.67	21,797	90.0%	1.07
5	150 - R3	28.84	26,863	89.1%	1.07
6	90 - L3	28.61	26,863	89.1%	1.07
7	95 - S2	28.60	27,284	87.4%	1.07
8	145 - R3	28.83	27,631	86.0%	1.07
9	10 - L5	28.97	20,413	84.2%	211.82
10	40 - R5	23.20	19,538	80.6%	1.07

Best Conformance Indices					
<u>Ranking</u>	<u>ASL / Curve</u>	Average	Annual	Retirement	Conformance
		<u>Remaining Life</u>	<u>Retirements</u>	<u>Index</u>	<u>Index</u>
L Curves 1	10 - L4	28.66	245,497	-813.1%	655.56
L Curves 2	10 - L5	28.97	20,413	84.2%	211.82
L Curves 3	5 - L0	29.00	-	0.0%	104.05
S Curves 1	10 - S3	28.87	89,047	-167.5%	269.75
S Curves 2	10 - S6	29.00	-	0.0%	208.79
S Curves 3	10 - S5	29.00	0	0.0%	201.07
R Curves 1	10 - R5	29.00	-	0.0%	196.46
R Curves 2	10 - R4	29.00	-	0.0%	185.63
R Curves 3	10 - R3	28.96	26,420	91.0%	182.99

Selected Survivor Curve					
	<u>ASL / Curve</u>	Average	Annual	Retirement	Conformance
		<u>Remaining Life</u>	<u>Retirements</u>	<u>Index</u>	<u>Index</u>
Selected	75 - R4	28.63	24,612	98.4%	1.07



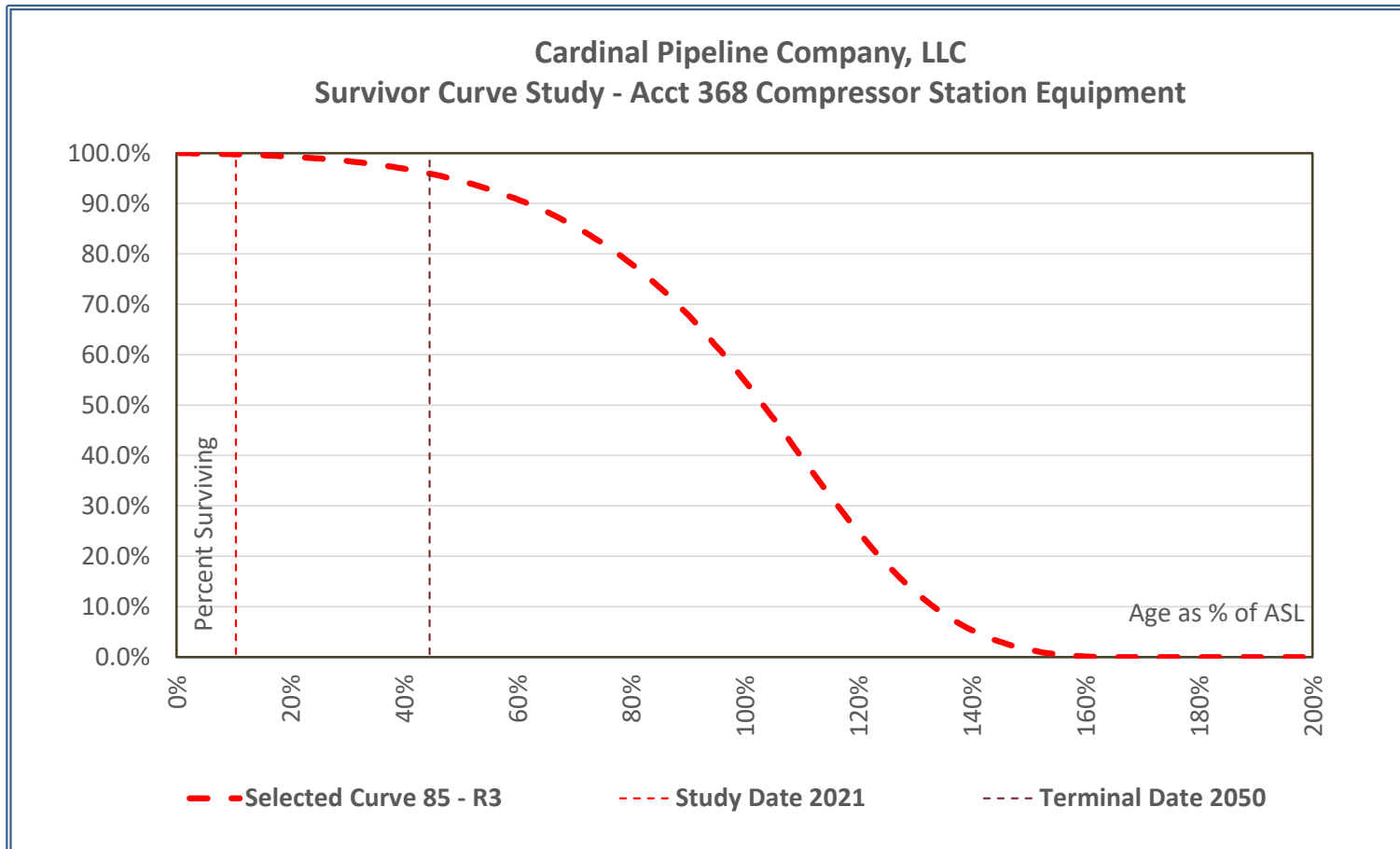
Selected Curve		Selected Curve Forecasted Survivorship & Interim Retirements					
75 - R4	Year	Age	Age as % of ASL	Percent Surviving	Surviving Plant	Interim Retirements	
Original Installations					102,429,201		
Surviving Balance	2021	16.0	21.36%	99.9063%	102,306,964		
1st Forecast Year	2022	17.0	22.69%	99.8892%	102,289,451	17,513	
2	2023	18.0	24.03%	99.8678%	102,267,588	21,863	
3	2024	19.0	25.36%	99.8449%	102,244,126	23,462	
4	2025	20.0	26.69%	99.8186%	102,217,222	26,904	
5	2026	21.0	28.03%	99.7861%	102,183,906	33,316	
6	2027	22.0	29.36%	99.7515%	102,148,433	35,473	
7	2028	23.0	30.69%	99.7121%	102,108,059	40,374	
8	2029	24.0	32.03%	99.6636%	102,058,444	49,615	
9	2030	25.0	33.36%	99.6124%	102,006,012	52,432	
10	2031	26.0	34.69%	99.5546%	101,946,758	59,254	
11	2032	27.0	36.03%	99.4840%	101,874,470	72,288	
12	2033	28.0	37.36%	99.4100%	101,798,622	75,848	
13	2034	29.0	38.69%	99.3269%	101,713,487	85,135	
14	2035	30.0	40.03%	99.2262%	101,610,346	103,141	
15	2036	31.0	41.36%	99.1212%	101,502,866	107,480	
16	2037	32.0	42.69%	99.0042%	101,383,010	119,855	
17	2038	33.0	44.03%	98.8634%	101,238,778	144,232	
18	2039	34.0	45.36%	98.7176%	101,089,470	149,308	
19	2040	35.0	46.69%	98.5561%	100,924,019	165,451	
20	2041	36.0	48.03%	98.3630%	100,726,207	197,812	
21	2042	37.0	49.36%	98.1644%	100,522,744	203,463	
22	2043	38.0	50.69%	97.9456%	100,298,663	224,081	
23	2044	39.0	52.03%	97.6857%	100,032,445	266,218	
24	2045	40.0	53.36%	97.4200%	99,760,332	272,113	
25	2046	41.0	54.69%	97.1292%	99,462,437	297,895	
26	2047	42.0	56.03%	96.7858%	99,110,712	351,725	
27	2048	43.0	57.36%	96.4370%	98,753,405	357,307	
28	2049	44.0	58.69%	96.0573%	98,364,548	388,857	
29	2050	45.0	60.03%	95.6118%	97,908,223	456,326	
					2,929,544,782	4,398,742	
			Average Remaining Life		28.6	24,612	
						Total Interm Retires	
						5 Yr Ave Ann Retires	

Cardinal Pipeline Company, LLC Survivor Curve Study - Acct 368 Compressor Station Equipment

Docket No. G-39, Sub 47
 Exhibit No. CPC-0004

Salient Statistical Results

Economic Life	Ave Age at Study Date:	Average Service Life	Age as % of ASL	Iowa Curve	Conformance Index	Retirement Index	Average Remaining Life
2050	8.87	85	10.4%	R3	3916	100%	28.59



Historical Plant Balances

Year	BOY Balance	Additions	Retirements	Adjustments	Transfers	EOY Balance
1990	-	-	-	-	-	-
1991	-	-	-	-	-	-
1992	-	-	-	-	-	-
1993	-	-	-	-	-	-
1994	-	-	-	-	-	-
1995	-	-	-	-	-	-
1996	-	-	-	-	-	-
1997	-	-	-	-	-	-
1998	-	-	-	-	-	-
1999	-	-	-	-	-	-
2000	-	-	-	-	-	-
2001	-	-	-	-	-	-
2002	-	-	-	-	-	-
2003	-	-	-	-	-	-
2004	-	-	-	-	-	-
2005	-	-	-	-	-	-
2006	-	-	-	-	-	-
2007	-	-	-	-	-	-
2008	-	-	-	-	-	-
2009	-	-	-	-	-	-
2010	-	-	-	-	-	-
2011	-	-	-	-	-	-
2012	-	35,807,448	-	-	(414,452)	35,392,996
2013	35,392,996	38,129	-	-	-	35,431,125
2014	35,431,125	1,307	-	-	-	35,432,432
2015	35,432,432	(41,089)	-	-	-	35,391,343
2016	35,391,343	89,390	88,699	-	-	35,392,034
2017	35,392,034	-	-	-	-	35,392,034
2018	35,392,034	-	-	-	-	35,392,034
2019	35,392,034	-	-	-	-	35,392,034
2020	35,392,034	1,733	-	-	-	35,393,767
		91,123	88,699	Σ of last 5 years:		
		18,225	17,740	Ave last 5 yrs		



Goodness of Fit Test Statistics

Docket No. G-39, Sub 47
 Exhibit No. CPC-0004

Best 5-Year Retirement Predictors					
<u>Ranking</u>	<u>ASL / Curve</u>	<u>Average Remaining Life</u>	<u>Annual Retirements</u>	<u>Retirement Index</u>	<u>Conformance Index</u>
1	85 - R3	28.59	17,700	99.8%	3915.74
2	105 - S1	28.49	17,232	97.1%	608.28
3	95 - L2	28.48	16,913	95.3%	584.78
4	100 - S1	28.43	19,407	90.6%	656.35
5	90 - R3	28.64	15,934	89.8%	2425.90
6	90 - L2	28.40	19,684	89.0%	633.53
7	45 - R4	27.51	15,741	88.7%	553.07
8	80 - R3	28.52	19,988	87.3%	38887.97
9	5 - S2	28.94	15,382	86.7%	1.02
10	110 - S1	28.55	15,214	85.8%	578.84

Best Conformance Indices					
<u>Ranking</u>	<u>ASL / Curve</u>	<u>Average Remaining Life</u>	<u>Annual Retirements</u>	<u>Retirement Index</u>	<u>Conformance Index</u>
L Curves 1	15 - L5	5.68	2,234,094	-12393.7%	988.47
L Curves 2	80 - L2	28.17	27,303	46.1%	829.76
L Curves 3	40 - L3	24.67	61,964	-149.3%	779.58
S Curves 1	25 - S3	15.67	219,511	-1037.4%	993.85
S Curves 2	90 - S1	28.25	26,205	52.3%	850.45
S Curves 3	45 - S2	26.08	48,136	-71.3%	646.84
R Curves 1	80 - R3	28.52	19,988	87.3%	38887.97
R Curves 2	35 - R4	24.38	42,390	-39.0%	882.10
R Curves 3	20 - R5	10.61	160,009	-702.0%	409.60

Selected Survivor Curve					
	<u>ASL / Curve</u>	<u>Average Remaining Life</u>	<u>Annual Retirements</u>	<u>Retirement Index</u>	<u>Conformance Index</u>
Selected	85 - R3	28.59	17,700	99.8%	3915.74



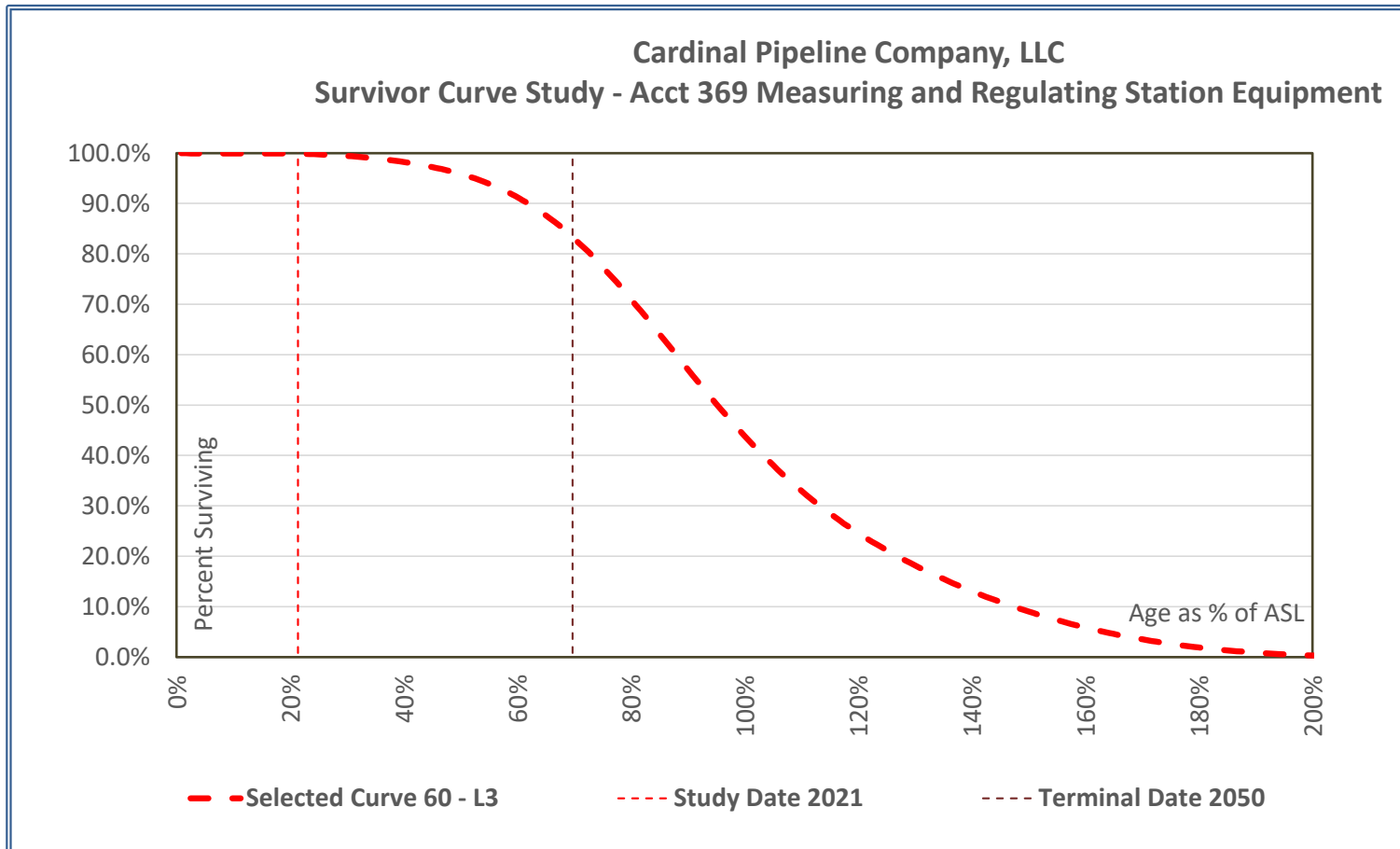
Selected Curve		Selected Curve Forecasted Survivorship & Interim Retirements				
85 - R3	Year	Age	Age as % of ASL	Percent Surviving	Surviving Plant	Interim Retirements
Original Installations					36,000,883	
Surviving Balance	2021	8.9	10.44%	99.7592%	35,912,184	
1st Forecast Year	2022	9.9	11.62%	99.7170%	35,897,025	15,159
2	2023	10.9	12.79%	99.6751%	35,881,939	15,086
3	2024	11.9	13.97%	99.6256%	35,864,095	17,844
4	2025	12.9	15.15%	99.5717%	35,844,710	19,385
5	2026	13.9	16.32%	99.5133%	35,823,683	21,028
6	2027	14.9	17.50%	99.4555%	35,802,873	20,810
7	2028	15.9	18.68%	99.3875%	35,778,395	24,478
8	2029	16.9	19.85%	99.3141%	35,751,953	26,443
9	2030	17.9	21.03%	99.2348%	35,723,426	28,526
10	2031	18.9	22.21%	99.1495%	35,692,693	30,733
11	2032	19.9	23.38%	99.0655%	35,662,473	30,220
12	2033	20.9	24.56%	98.9674%	35,627,150	35,323
13	2034	21.9	25.73%	98.8621%	35,589,236	37,914
14	2035	22.9	26.91%	98.7492%	35,548,593	40,644
15	2036	23.9	28.09%	98.6387%	35,508,815	39,778
16	2037	24.9	29.26%	98.5102%	35,462,533	46,282
17	2038	25.9	30.44%	98.3728%	35,413,091	49,442
18	2039	26.9	31.62%	98.2263%	35,360,332	52,758
19	2040	27.9	32.79%	98.0835%	35,308,922	51,411
20	2041	28.9	33.97%	97.9180%	35,249,359	59,562
21	2042	29.9	35.15%	97.7420%	35,186,006	63,353
22	2043	30.9	36.32%	97.5551%	35,118,693	67,314
23	2044	31.9	37.50%	97.3736%	35,053,361	65,331
24	2045	32.9	38.68%	97.1642%	34,977,969	75,393
25	2046	33.9	39.85%	96.9423%	34,898,100	79,869
26	2047	34.9	41.03%	96.7075%	34,813,571	84,529
27	2048	35.9	42.21%	96.4593%	34,724,195	89,376
28	2049	36.9	43.38%	96.2194%	34,637,846	86,349
29	2050	37.9	44.56%	95.9439%	34,538,643	99,203
					1,026,739,681	
Average Remaining Life					28.6	
					1,373,541	Total Interm Retires
					17,700	5 Yr Ave Ann Retires

Cardinal Pipeline Company, LLC Survivor Curve Study - Acct 369 Measuring and Regulating Station Equipment

Docket No. G-39, Sub 47
 Exhibit No. CPC-0004

Salient Statistical Results

Economic Life	Ave Age at Study Date:	Average Service Life	Age as % of ASL	Iowa Curve	Conformance Index	Retirement Index	Average Remaining Life
2050	12.83	60	21.4%	L3	2	99%	27.60



Historical Plant Balances

Year	BOY Balance	Additions	Retirements	Adjustments	Transfers	EOY Balance
1990	-	-	-	-	-	-
1991	-	-	-	-	-	-
1992	-	-	-	-	-	-
1993	-	-	-	-	-	-
1994	-	-	-	-	-	-
1995	-	-	-	-	-	-
1996	-	-	-	-	-	-
1997	-	-	-	-	-	-
1998	-	-	-	-	-	-
1999	-	-	-	-	-	-
2000	-	-	-	-	-	-
2001	-	-	-	-	-	-
2002	-	-	-	-	-	-
2003	-	-	-	-	-	-
2004	-	-	-	-	4,545,451	4,545,451
2005	4,545,451	20,781	-	-	-	4,566,232
2006	4,566,232	11,443	-	-	-	4,577,675
2007	4,577,675	-	-	-	-	4,577,675
2008	4,577,675	-	-	-	-	4,577,675
2009	4,577,675	-	-	-	-	4,577,675
2010	4,577,675	-	-	-	-	4,577,675
2011	4,577,675	-	-	-	-	4,577,675
2012	4,577,675	3,974,722	27,371	-	-	8,525,026
2013	8,525,026	(1,611)	-	-	-	8,523,415
2014	8,523,415	40,392	-	-	-	8,563,807
2015	8,563,807	16,270	-	-	-	8,580,077
2016	8,580,077	131,734	25,262	-	-	8,686,549
2017	8,686,549	16,566	-	-	-	8,703,115
2018	8,703,115	5,411	-	-	-	8,708,526
2019	8,708,526	67,508	11,443	-	-	8,764,591
2020	8,764,591	-	-	-	-	8,764,591
		221,219	36,705	Σ of last 5 years:		
		44,244	7,341	Ave last 5 yrs		

Goodness of Fit Test Statistics

Docket No. G-39, Sub 47
 Exhibit No. CPC-0004

Best 5-Year Retirement Predictors					
<u>Ranking</u>	<u>ASL / Curve</u>	Average	Annual	Retirement	Conformance
		<u>Remaining Life</u>	<u>Retirements</u>	<u>Index</u>	<u>Index</u>
1	60 - L3	27.60	7,433	98.7%	1.94
2	95 - L2	28.30	7,021	95.6%	1.94
3	150 - R2	28.55	7,690	95.2%	1.96
4	105 - S1	28.32	6,959	94.8%	1.94
5	75 - R3	28.25	7,848	93.1%	1.95
6	80 - R3	28.37	6,788	92.5%	1.95
7	40 - L4	24.00	7,929	92.0%	1.93
8	30 - R5	16.61	7,983	91.3%	1.93
9	145 - R2	28.53	8,011	90.9%	1.96
10	100 - S1	28.23	8,059	90.2%	1.94

Best Conformance Indices					
<u>Ranking</u>	<u>ASL / Curve</u>	Average	Annual	Retirement	Conformance
		<u>Remaining Life</u>	<u>Retirements</u>	<u>Index</u>	<u>Index</u>
L Curves 1	10 - L5	27.37	101,668	-1184.9%	15.04
L Curves 2	15 - L0	18.18	323,073	-4200.9%	13.84
L Curves 3	15 - L1	16.79	391,409	-5131.8%	9.93
S Curves 1	10 - S6	29.00	93	1.3%	161.62
S Curves 2	10 - S5	28.78	13,474	16.5%	23.94
S Curves 3	10 - S4	27.49	93,775	-1077.4%	11.86
R Curves 1	10 - R5	28.82	10,775	53.2%	17.96
R Curves 2	10 - R4	27.21	110,409	-1304.0%	10.87
R Curves 3	10 - R3	24.79	263,351	-3387.4%	8.60

Selected Survivor Curve					
	<u>ASL / Curve</u>	Average	Annual	Retirement	Conformance
		<u>Remaining Life</u>	<u>Retirements</u>	<u>Index</u>	<u>Index</u>
Selected	60 - L3	27.60	7,433	98.7%	1.94



Selected Curve		Selected Curve Forecasted Survivorship & Interim Retirements					
60 - L3	Year	Age	Age as % of ASL	Percent Surviving	Surviving Plant	Interim Retirements	
Original Installations					8,957,044		
Surviving Balance	2021	12.8	21.38%	99.8775%	8,892,968		
1st Forecast Year	2022	13.8	23.05%	99.8257%	8,888,323	4,644	
2	2023	14.8	24.72%	99.7592%	8,882,373	5,951	
3	2024	15.8	26.38%	99.6818%	8,875,436	6,937	
4	2025	16.8	28.05%	99.5820%	8,866,498	8,937	
5	2026	17.8	29.72%	99.4626%	8,855,803	10,696	
6	2027	18.8	31.38%	99.3308%	8,844,002	11,801	
7	2028	19.8	33.05%	99.1688%	8,829,489	14,513	
8	2029	20.8	34.72%	98.9826%	8,812,807	16,683	
9	2030	21.8	36.38%	98.7837%	8,794,993	17,814	
10	2031	22.8	38.05%	98.5456%	8,773,669	21,323	
11	2032	23.8	39.72%	98.2780%	8,749,696	23,974	
12	2033	24.8	41.38%	97.9968%	8,724,513	25,183	
13	2034	25.8	43.05%	97.6641%	8,694,715	29,798	
14	2035	26.8	44.72%	97.2929%	8,661,460	33,255	
15	2036	27.8	46.38%	96.9042%	8,626,646	34,814	
16	2037	28.8	48.05%	96.4445%	8,585,470	41,176	
17	2038	29.8	49.72%	95.9306%	8,539,444	46,026	
18	2039	30.8	51.38%	95.3914%	8,491,142	48,302	
19	2040	31.8	53.05%	94.7521%	8,433,882	57,259	
20	2041	32.8	54.72%	94.0367%	8,369,802	64,080	
21	2042	33.8	56.38%	93.2864%	8,302,601	67,201	
22	2043	34.8	58.05%	92.3998%	8,223,187	79,415	
23	2044	35.8	59.72%	91.4134%	8,134,837	88,350	
24	2045	36.8	61.38%	90.3877%	8,042,962	91,875	
25	2046	37.8	63.05%	89.1888%	7,935,577	107,386	
26	2047	38.8	64.72%	87.8732%	7,817,733	117,844	
27	2048	39.8	66.38%	86.5257%	7,697,041	120,692	
28	2049	40.8	68.05%	84.9771%	7,558,334	138,707	
29	2050	41.8	69.72%	83.3092%	7,408,936	149,399	
					245,421,369		
Average Remaining Life					27.6		
					1,484,032	Total Interm Retires	
					7,433	5 Yr Ave Ann Retires	



CARDINAL PIPELINE COMPANY, LLC
COST ESTIMATE PACKET

Cardinal Pipeline Company, LLC
Summary of Terminal Decommissioning Cost Estimate - Transmission

Line No.	Particular (A)	Cost (\$) (B)	Item (C)	Total TDC Estimate (\$) (D)	Total Adjusted (*) Cost Estimate (\$) (E)
1	A. DECOMMISSIONING COSTS				
2	<u>Transmission Line</u>		<u>Cost / Mile</u>	<u>Total Miles</u>	<u>Total</u>
3	1-1 - <24" Pipeline Clean and Purge	\$ 41,443	104.9	\$ 4,348,608	
4	1-2 - Trench Excavation	\$ 96,404	0.3	\$ 26,301	
5	1-3 - Pipe Removal	\$ 201,377	0.3	\$ 54,939	
6	1-4 - Trench Backfill	\$ 117,728	0.3	\$ 32,118	
7	1-5 - Trench Restoration	\$ 10,769	0.3	\$ 2,938	
8				*	\$ 4,098,783
10	<u>Abandonment</u>		<u>Cost /</u>	<u>Total Crossing</u>	<u>Total</u>
12	2-2 - Road Crossing Abandonment	\$ 26,565	155	\$ 4,117,508	
13	2-4 - Highway Crossing Abandonment	\$ 29,324	2	\$ 58,648	
14	2-5 - RR Line Crossing Abandonment	\$ 45,573	4	\$ 182,291	
16	2-7 - Water Crossing Abandonment	\$ 45,089	294	\$ 13,256,034	
17				*	\$ 16,170,093
19	<u>Meter Station</u>		<u>Cost / Station</u>	<u>Total Stations</u>	<u>Total</u>
20	3-1 - Small Meter Station Removal	\$ 11,144	2	\$ 22,288	
21	3-2 - Small Meter Station Sub Material Removal	\$ 13,974	2	\$ 27,949	
22	3-3 - Small Meter Station Backfill and Restoration	\$ 12,524	2	\$ 25,048	
23				*	\$ 69,111
24	3-4 - Medium Meter Station Removal	\$ 42,966	2	\$ 85,933	
25	3-5 - Medium Meter Station Sub Material Removal	\$ 45,977	2	\$ 91,954	
26	3-6 - Medium Meter Station Backfill and Restoration	\$ 71,288	2	\$ 142,576	
27				*	\$ 294,185
28	3-7 - Large Meter Station Removal	\$ 42,422	3	\$ 127,267	
29	3-8 - Large Meter Station Sub Material Removal	\$ 54,792	3	\$ 164,375	
30	3-9 - Large Meter Station Backfill and Restoration	\$ 78,155	3	\$ 234,466	
31				*	\$ 482,968
33	<u>Compressor Station</u>		<u>Ave. Cost / Station</u>	<u>Total Stations</u>	<u>Total</u>
34	Compressor Station Removal	\$ 3,278,061	1	\$ 3,278,061	
35				*	\$ 3,009,260
37	<u>Cathodic Protection</u>		<u>Cost / CP</u>	<u>Total CP</u>	<u>Total</u>
38	5-1 - Cathodic Protection - Rectifier Removal	\$ 3,541	10	\$ 35,410	
39	5-2 - Cathodic Protection - Test Site Removal	\$ 346	10	\$ 3,457	
40				*	\$ 35,680
42	<u>Right of Way Markers</u>		<u>Cost / ROW</u>	<u>Total ROW</u>	<u>Total</u>
43	6-1 - ROW Marker Removal	\$ 58	1330	\$ 77,055	
44				*	\$ 70,737
46	<u>Tap Removal</u>		<u>Cost / Tap</u>	<u>Total Taps</u>	<u>Total</u>
47	7-1 - Tap Locations	\$ 6,384	44	\$ 280,898	
48				*	\$ 257,865
58	<u>Mainline Valve</u>		<u>Cost / Location</u>	<u>Total Valves</u>	<u>Total</u>
59	8-1 - Mainline Valve Site	\$ 10,795	18	\$ 194,303	
60				*	\$ 178,370
50				Base Total:	\$ 24,667,052
51			C.M. Expense	\$ 616,676	\$ 25,283,728
52					\$ 25,283,728
53	B. CONTINGENCY		10% Contingency Fees	\$ 2,528,373	\$ 27,812,101
54				Subtotal:	\$ 27,812,101
55	C. SALVAGE				
56			Salvage Material - Scrap Metal:	\$ (656,244)	
58					
59				Grand Total:	\$ 27,155,857
60	* City Cost Index Adjustment Factor Used	= 0.9180			
61	0.9180 is the Average City Cost Index Adjustment Factor of locations found within CPC's Geographic Locations				

OFFICIAL COPY

NOV 15 2022

**1-1 - Pipeline Clean and Purge
 Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for small equipment, placed in rear of, or towed by pickup truck	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton	4	2	\$ -	\$ 130.00	\$ 48.50	\$ 178.50
16588	C.F.	Gas Pipelines, Nitrogen purge method, lengths 1000' to 10,000'		0	0	\$1,824.68	\$ 2,156.44	\$ 1,824.68	\$ 5,805.80
5280	L.F.	Sewer pipelines, cleaning, pig method, lengths 1000' to 10,000', 4" diameter through 24" diameter, minimum		0	0	\$ -	\$ -	\$ -	\$ 21,859.20
15	Ton	Hazardous waste cleanup/pickup/disposal, dumpsite disposal charge, maximum		0	0	\$ -	\$ -	\$ -	\$ 6,825.00
0.8	Week	Field personnel, general purpose laborer, average		0.2	40	\$ -	\$ 1,640.00	\$ -	\$ 1,640.00
0.4	Week	Field personnel, general purpose laborer, average		0.2	40	\$ -	\$ 820.00	\$ -	\$ 820.00
0.2	Week	Field personnel, field engineer, engineer,		0	0	\$ -	\$ 555.00	\$ -	\$ 555.00
0.2	Week	Field personnel, field engineer, engineer,		0	0	\$ -	\$ 555.00	\$ -	\$ 555.00
1	Ea.	Mobilization or demobilization, delivery charge for small equipment, placed in rear of, or towed by pickup truck	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton	4	2	\$ -	\$ 130.00	\$ 48.50	\$ 178.50
1	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 535.00	\$ -	\$ 535.00
0.5	Day	Environmental Engineer		1	8	\$ -	\$ 257.50	\$ -	\$ 257.50
114	\$/Day	Per Diem		1	100	\$ -	\$ -	\$ -	\$ 1,420.83
1	Job	Permitting cost		0	0	\$ -	\$ 812.61	\$ -	\$ 812.61

Total

\$ 41,442.94

OFFICIAL COPY

MAY 15 2022

**1-2 - Trench Excavation
Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 515.00	\$ 380.00	\$ 895.00
5280	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic	1000	0.02	\$ 475.20	\$ 8,923.20	\$ 211.20	\$ 9,609.60
10560	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	2 Laborers 1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$5,068.80	\$ 21,859.20	\$ 3,168.00	\$ 30,096.00
391	C.Y.	Topsoil stripping and stockpiling, topsoil, sandy loam, ideal conditions, 200 HP dozer	1 Equip. Oper. (medium) .5 Laborer 1 Dozer, 200 H.P.	2300	0	\$ -	\$ 93.84	\$ 285.43	\$ 379.27
2124	B.C.Y.	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering	1 Equip. Oper. (crane) 1 Laborer 1 Hyd. Excavator, .75 C.Y.	270	0.06	\$ -	\$ 7,709.56	\$ 6,074.20	\$ 13,783.75
17	Day	Rent truck pickup 3/4 ton 4 wheel drive, Incl. Hourly		0	0	\$ -	\$ -	\$ 4,559.06	\$ 4,559.06
3	Week	Field personnel, field engineer, senior engineer,		0	0	\$ -	\$ 10,875.00	\$ -	\$ 10,875.00
3	Week	Field personnel, superintendent, maximum		0	0	\$ -	\$ 9,750.00	\$ -	\$ 9,750.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 515.00	\$ 380.00	\$ 895.00
17	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 9,095.00	\$ -	\$ 9,095.00
8	Day	Environmental Engineer		1	8	\$ -	\$ 4,120.00	\$ -	\$ 4,120.00
114	\$/Day	Per Diem		1	32.12	\$ -	\$ -	\$ -	\$ 456.37
1	Job	Permitting cost		0	0	\$ -	\$ 1,890.28	\$ -	\$ 1,890.28

Total

\$ 96,404.33

OFFICIAL COPY

MAY 15 2022

**1-3 - Pipe Removal
 Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 515.00	\$ 380.00	\$ 895.00
5280	L.F.	Selective demolition, natural gas, steel pipe, pipe, 18" - 24", excludes excavation	1 Equip. Oper. (crane) 1 Hyd. Crane, 25 Ton (Daily)	160	0.2	\$ -	\$ 60,456.00	\$ 30,888.00	\$ 91,344.00
33	Ea.	Delivery charge for pipe, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 16,995.00	\$ 12,540.00	\$ 29,535.00
33	Day	Crane crew, daily use for small jobs, 25-ton truck-mounted hydraulic crane,	1 Equip. Oper. (crane) 1 Hyd. Crane, 25 Ton (Daily)	1	8	\$ -	\$ 18,810.00	\$ 29,370.00	\$ 48,180.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 515.00	\$ 380.00	\$ 895.00
33	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 17,655.00	\$ -	\$ 17,655.00
16	Day	Environmental Engineer		1	8	\$ -	\$ 8,240.00	\$ -	\$ 8,240.00
114	\$/Day	Per Diem		1	48.2	\$ -	\$ -	\$ -	\$ 684.84
1	Job	Permitting cost		0	0	\$ -	\$ 3,948.58	\$ -	\$ 3,948.58

Total

\$ 201,377.42

OFFICIAL COPY

NOV 15 2022

**1-4 - Trench Backfill
Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 515.00	\$ 380.00	\$ 895.00
22	M.S.F.	Soil preparation, structural soil mixing, scarify subsoil, municipal, 50 HP skid steer loader w/scarifiers	1 Equip. Oper. (light) 1 Loader-Backhoe, 40 H.P.	120	0.07	\$ -	\$ 95.48	\$ 53.90	\$ 149.38
614	L.C.Y.	Cycle timing (wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 4,052.69	\$ 5,434.29	\$ 9,486.99
614	C.Y.	Soils for earthwork, common borrow, spread with 200 HP dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	1 Equipment Oper. (med.) .5 Laborer 2 Truck Drivers (heavy) 2 Dump Trucks, 12 C.Y., 400 H.P. 1 Dozer, 200 H.P.	600	0.05	\$ 9,118.56	\$ 1,750.03	\$ 3,014.96	\$ 13,883.54
3129	C.Y.	Topsoil stripping and stockpiling, topsoil, sandy loam, ideal conditions, 200 HP dozer	1 Equip. Oper. (medium) .5 Laborer 1 Dozer, 200 H.P.	2300	0	\$ -	\$ 750.96	\$ 2,284.17	\$ 3,035.13
3129	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$ 36,452.85	\$ 18,461.10	\$ 54,913.95
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 515.00	\$ 380.00	\$ 895.00
40	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 21,400.00	\$ -	\$ 21,400.00
20	Day	Environmental Engineer		1	8	\$ -	\$ 10,300.00	\$ -	\$ 10,300.00
114	\$/Day	Per Diem		1	32.43	\$ -	\$ -	\$ -	\$ 460.78
1	Job	Permitting cost		0	0	\$ -	\$ 2,308.40	\$ -	\$ 2,308.40

Total

\$117,728.17

OFFICIAL COPY

NOV 15 2022

**1-5 - Trench Restoration
 Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for small equipment, placed in rear of, or towed by pickup truck		4	2	\$ -	\$ 130.00	\$ 48.50	\$ 178.50
5	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor		1.5	16	\$ -	\$ 4,475.00	\$ 660.00	\$ 5,135.00
2347	S.Y.	Seeding, mechanical seeding, 44 lb/M.S.Y.		2500	0	\$610.22	\$ 492.87	\$ 281.64	\$ 1,384.73
1	Ea.	Mobilization or demobilization, delivery charge for small equipment, placed in rear of, or towed by pickup truck		4	2	\$ -	\$ 130.00	\$ 48.50	\$ 178.50
4	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 2,140.00	\$ -	\$ 2,140.00
2	Day	Environmental Engineer		1	8	\$ -	\$ 1,030.00	\$ -	\$ 1,030.00
114	\$/Day	Per Diem		1	36	\$ -	\$ -	\$ -	\$ 511.50
1	Job	Permitting cost		0	0	\$ -	\$ 211.16	\$ -	\$ 211.16

Total

\$ 10,769.39

OFFICIAL COPY

MAY 15 2022

**2-2 - Road Crossing Abandonment
Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
800	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic 2 Laborers	1000	0.02	\$ 72.00	\$ 1,352.00	\$ 32.00	\$ 1,456.00
800	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$ 384.00	\$ 1,656.00	\$ 240.00	\$ 2,280.00
8	Ea.	8'x16' 3-Ply Temp. Matting, Includes Install/Remove, 6" Mulch		0	0	\$14,256.00	\$ -	\$ -	\$ 14,256.00
10	C.Y.	Subsurface investigation, test pits, loader/backhoe, light soil	1 Equipment Oper. (med.) 1 Laborer 1 Backhoe Loader, 80 H.P.	28	0.57	\$ -	\$ 345.00	\$ 92.50	\$ 437.50
30	L.F.	Sewer pipelines, cleaning, pig method, lengths 1000' to 10,000', 4" diameter through 24" diameter, minimum		0	0	\$ -	\$ -	\$ -	\$ 124.20
0.4	Week	Field personnel, general purpose laborer, average		0.2	40	\$ -	\$ 820.00	\$ -	\$ 820.00
0.2	Week	Field personnel, field engineer, engineer, average		0	0	\$ -	\$ 555.00	\$ -	\$ 555.00
95	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 11.40	\$ 15.20	\$ 11.40	\$ 38.00
4	C.Y.	Structural concrete, ready mix, flowable fill, 40-80 psi, includes ash, Portland cement Type I, sand and water, delivered, excludes all additives and treatments		0	0	\$ 338.00	\$ -	\$ -	\$ 338.00
4	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 288.00	\$ -	\$ 288.00
4	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,200.00	\$ 1,260.00	\$ -	\$ 2,460.00
10	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$ 116.50	\$ 59.00	\$ 175.50
14.22	S.Y.	Seeding, mechanical seeding, 44 lb/M.S.Y.	1 Equip. Oper. (light) 1 Loader-Backhoe, 40 H.P.	2500	0	\$ 3.70	\$ 2.99	\$ 1.71	\$ 8.39
2	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,070.00	\$ -	\$ 1,070.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	65.11	\$ -	\$ -	\$ -	\$ 925.10
1	Job	Permitting cost		0	0	\$ -	\$ 520.87	\$ -	\$ 520.87

Total

\$ 26,564.56

OFFICIAL COPY

MAY 15 2022

**2-4 - Highway Crossing Abandonment
Unit Cost Estimate**

OFFICIAL COPY

MAY 15 2022

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
800	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic 2 Laborers	1000	0.02	\$ 72.00	\$ 1,352.00	\$ 32.00	\$ 1,456.00
800	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$ 384.00	\$ 1,656.00	\$ 240.00	\$ 2,280.00
10	C.Y.	Subsurface investigation, test pits, loader/backhoe, light soil	1 Equipment Oper. (med.) 1 Laborer 1 Backhoe Loader, 80 H.P.	28	0.57	\$ -	\$ 345.00	\$ 92.50	\$ 437.50
8	Ea.	8'x16' 3-Ply Temp. Matting, Includes Install/Remove, 6" Mulch		0	0	\$14,256.00	\$ -	\$ -	\$ 14,256.00
150	L.F.	Sewer pipelines, cleaning, pig method, lengths 1000' to 10,000', 4" diameter through 24" diameter, minimum		0	0	\$ -	\$ -	\$ -	\$ 621.00
0.4	Week	Field personnel, general purpose laborer, average		0.2	40	\$ -	\$ 820.00	\$ -	\$ 820.00
0.2	Week	Field personnel, field engineer, engineer, average		0	0	\$ -	\$ 555.00	\$ -	\$ 555.00
472	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 56.64	\$ 75.52	\$ 56.64	\$ 188.80
18	C.Y.	Structural concrete, ready mix, flowable fill, 40-80 psi, includes ash, Portland cement Type I, sand and water, delivered, excludes all additives and treatments		0	0	\$ 1,521.00	\$ -	\$ -	\$ 1,521.00
4	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 288.00	\$ -	\$ 288.00
4	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,200.00	\$ 1,260.00	\$ -	\$ 2,460.00
10	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$ 116.50	\$ 59.00	\$ 175.50
14.22	S.Y.	Seeding, mechanical seeding, 44 lb/M.S.Y.	1 Equip. Oper. (light) 1 Loader-Backhoe, 40 H.P.	2500	0	\$ 3.70	\$ 2.99	\$ 1.71	\$ 8.39
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	68.11	\$ -	\$ -	\$ -	\$ 967.73
1	Job	Permitting cost		0	0	\$ -	\$ 574.98	\$ -	\$ 574.98

Total

\$ 29,323.90

**2-5 - Railroad Crossing Abandonment
Unit Cost Estimate**

OFFICIAL COPY
MAY 15 2022

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
800	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman	1000	0.02	\$ 72.00	\$1,352.00	\$ 32.00	\$ 1,456.00
800	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	2 Laborers	650	0.04	\$ 384.00	\$1,656.00	\$ 240.00	\$ 2,280.00
16	Ea.	8'x16' 3-Ply Temp. Matting, Includes Install/Remove, 6" Mulch	1 Equip. Oper. (light)	0	0	\$28,512.00	\$ -	\$ -	\$28,512.00
10	C.Y.	Subsurface investigation, test pits, loader/backhoe, light soil	1 Equipment Oper. (med.) 1 Laborer 1 Backhoe Loader, 80 H.P.	28	0.57	\$ -	\$ 345.00	\$ 92.50	\$ 437.50
200	L.F.	Sewer pipelines, cleaning, pig method, lengths 1000' to 10,000', 4" diameter through 24" diameter, minimum		0	0	\$ -	\$ -	\$ -	\$ 828.00
0.4	Week	Field personnel, general purpose laborer, average		0.2	40	\$ -	\$ 820.00	\$ -	\$ 820.00
0.2	Week	Field personnel, field engineer, engineer, average		0	0	\$ -	\$ 555.00	\$ -	\$ 555.00
629	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 75.48	\$ 100.64	\$ 75.48	\$ 251.60
24	C.Y.	Structural concrete, ready mix, flowable fill, 40-80 psi, includes ash, Portland cement Type I, sand and water, delivered, excludes all additives and treatments		0	0	\$ 2,028.00	\$ -	\$ -	\$ 2,028.00
4	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber	15	1.07	\$ -	\$ 288.00	\$ -	\$ 288.00
4	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size	1 Plumber Apprentice	1.9	4.21	\$ 1,200.00	\$1,260.00	\$ -	\$ 2,460.00
1	Day	Rent tractor with A frame boom and winch 225 HP, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 545.95	\$ 545.95
1	Day	Rent crane, flatbed mounted, 3 ton capacity, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 351.60	\$ 351.60
10	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$ 116.50	\$ 59.00	\$ 175.50
14.22	S.Y.	Seeding, mechanical seeding, 44 lb/M.S.Y.	1 Equip. Oper. (light) 1 Loader-Backhoe, 40 H.P.	2500	0	\$ 3.70	\$ 2.99	\$ 1.71	\$ 8.39
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	68.11	\$ -	\$ -	\$ -	\$ 967.73
1	Job	Permitting cost		0	0	\$ -	\$ 893.59	\$ -	\$ 893.59

Total

\$45,572.86

**2-7 - Water Crossing Abandonment
Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
2	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 390.00	\$ 204.00	\$ 594.00
800	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic 2 Laborers	1000	0.02	\$ 72.00	\$ 1,352.00	\$ 32.00	\$ 1,456.00
800	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$ 384.00	\$ 1,656.00	\$ 240.00	\$ 2,280.00
16	Ea.	8'x16' 3-Ply Temp. Matting, Includes Install/Remove, 6" Mulch		0	0	\$28,512.00	\$ -	\$ -	\$ 28,512.00
10	C.Y.	Subsurface investigation, test pits, loader/backhoe, light soil	1 Equipment Oper. (med.) 1 Laborer 1 Backhoe Loader, 80 H.P.	28	0.57	\$ -	\$ 345.00	\$ 92.50	\$ 437.50
150	L.F.	Sewer pipelines, cleaning, pig method, lengths 1000' to 10,000', 4" diameter through 24" diameter, minimum		0	0	\$ -	\$ -	\$ -	\$ 621.00
0.4	Week	Field personnel, general purpose laborer, average		0.2	40	\$ -	\$ 820.00	\$ -	\$ 820.00
0.2	Week	Field personnel, field engineer, engineer, average		0	0	\$ -	\$ 555.00	\$ -	\$ 555.00
472	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 56.64	\$ 75.52	\$ 56.64	\$ 188.80
18	C.Y.	Structural concrete, ready mix, flowable fill, 40-80 psi, includes ash, Portland cement Type I, sand and water, delivered, excludes all additives and treatments		0	0	\$ 1,521.00	\$ -	\$ -	\$ 1,521.00
4	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint		15	1.07	\$ -	\$ 288.00	\$ -	\$ 288.00
4	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,200.00	\$ 1,260.00	\$ -	\$ 2,460.00
1	Day	Rent tractor with A frame boom and winch 225 HP, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 545.95	\$ 545.95
1	Day	Rent crane, flatbed mounted, 3 ton capacity, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 351.60	\$ 351.60
14.22	S.Y.	Seeding, mechanical seeding, 44 lb/M.S.Y.	1 Equip. Oper. (light) 1 Loader-Backhoe, 40 H.P.	2500	0	\$ 3.70	\$ 2.99	\$ 1.71	\$ 8.39
2	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 390.00	\$ 204.00	\$ 594.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	59.91	\$ -	\$ -	\$ -	\$ 851.22
1	Job	Permitting cost		0	0	\$ -	\$ 884.09	\$ -	\$ 884.09

Total

\$ 45,088.55

OFFICIAL COPY

MAY 15 2022

**3-1 - Small Meter Station Removal
Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
92	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic	1000	0.02	\$ 8.28	\$ 155.48	\$ 3.68	\$ 167.44
92	L.F.	Fencing demolition, remove chain link posts & fabric, 8' to 10' high	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	445	0.05	\$ -	\$ 277.84	\$ 48.76	\$ 326.60
1	Ea.	Steel tank, single wall, above ground, 15,000 thru 30,000 gallon, selective demolition, excluding foundation, pumps or piping	2 Pipe Fitters 1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Flatbed Trailer, 40 Ton 1 Truck Tractor, 6x4, 380 H.P. 1 Hyd. Crane, 80 Ton 1 Hyd. Excavator, 2 C.Y.	2	16	\$ -	\$ 1,150.00	\$ 1,700.00	\$ 2,850.00
2	Ea.	Selective demolition, parking appurtenances, pipe bollards, 6"-12" diameter	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	80	0.3	\$ -	\$ 33.60	\$ 5.94	\$ 39.54
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
1	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 535.00	\$ -	\$ 535.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	80.37	\$ -	\$ -	\$ -	\$ 1,141.92
1	Job	Permitting cost		0	0	\$ -	\$ 218.51	\$ -	\$ 218.51

Total

\$ 11,144.01

OFFICIAL COPY
MAY 15 2022

**3-2 - Small Meter Station Sub Material Removal
Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
92	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high		650	0.04	\$ 44.16	\$ 190.44	\$ 27.60	\$ 262.20
58	B.C.Y.	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering		270	0.06	\$ -	\$ 210.54	\$ 165.88	\$ 376.42
58	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment		72	0.11	\$ -	\$ 382.80	\$ 513.30	\$ 896.10
4	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 288.00	\$ -	\$ 288.00
4	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,200.00	\$ 1,260.00	\$ -	\$ 2,460.00
1	Ea.	Selective demolition, utility materials, utility valves, 14"-24", excludes excavation		2	14	\$ -	\$ 770.00	\$ 105.00	\$ 875.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		0	0	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	75.49	\$ -	\$ -	\$ -	\$ 1,072.59
1	Job	Permitting cost		0	0	\$ -	\$ 274.01	\$ -	\$ 274.01

Total

\$ 13,974.32

3-3 - Small Meter Station Backfill and Restoration
Unit Cost Estimate

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
92	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment		72	0.11	\$ -	\$ 607.20	\$ 814.20	\$ 1,421.40
2	M.S.F.	Soil preparation, structural soil mixing, scarify subsoil, municipal, 50 HP skid steer loader w/scarifiers		120	0.07	\$ -	\$ 8.68	\$ 4.90	\$ 13.58
1	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor		1.5	16	\$ -	\$ 895.00	\$ 132.00	\$ 1,027.00
92	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$ 1,071.80	\$ 542.80	\$ 1,614.60
92	S.Y.	Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed with wood fiber mulch added		8900	0	\$ 222.64	\$ 9.20	\$ 6.44	\$ 238.28
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
2	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,070.00	\$ -	\$ 1,070.00
1	Day	Environmental Engineer		0	0	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	72.38	\$ -	\$ -	\$ -	\$ 1,028.40
1	Job	Permitting cost		0	0	\$ -	\$ 245.57	\$ -	\$ 245.57

Total

\$ 12,523.83

**3-4 - Medium Meter Station Removal
Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
489	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic 2 Laborers	1000	0.02	\$ 44.01	\$ 826.41	\$ 19.56	\$ 889.98
489	L.F.	Fencing demolition, remove chain link posts & fabric, 8' to 10' high	1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	445	0.05	\$ -	\$ 1,476.78	\$ 259.17	\$ 1,735.95
22529	C.F.	Building demolition, small buildings or single buildings, steel, includes 20 mile haul, excludes salvage, foundation demolition or dump fees	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (medium) 2 Truck Drivers (heavy) 1 Crawler Loader, 3 C.Y. 2 Dump Trucks, 12 C.Y., 400 H.P.	14800	0	\$ -	\$ 4,280.51	\$ 3,829.93	\$ 8,110.44
3	Ea.	Steel tank, single wall, above ground, 15,000 thru 30,000 gallon, selective demolition, excluding foundation, pumps or piping	2 Pipe Fitters 1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Flatbed Trailer, 40 Ton 1 Truck Tractor, 6x4, 380 H.P. 1 Hyd. Crane, 80 Ton 1 Hyd. Excavator, 2 C.Y.	2	16	\$ -	\$ 3,450.00	\$ 5,100.00	\$ 8,550.00
1119	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 111.90	\$ 134.28	\$ 111.90	\$ 358.08
356	L.F.	Selective demolition, natural gas, steel pipe, pipe, 18" - 24", excludes excavation	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (crane) 2 Cutting Torches 2 Sets of Gases 1 Hyd. Crane, 12 Ton	160	0.2	\$ -	\$ 4,076.20	\$ 2,082.60	\$ 6,158.80
4	Day	Rented truck, flatbed, GVW = 20,000 Lbs, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 1,133.08	\$ 1,133.08
4	Day	Crane crew, daily use for small jobs, 25-ton truck-mounted hydraulic crane, portal to portal	1 Equip. Oper. (crane) 1 Hyd. Crane, 25 Ton (Daily)	1	8	\$ -	\$ 2,280.00	\$ 3,560.00	\$ 5,840.00
2	Ea.	Selective demolition, utility poles & cross arms, utility poles, wood, 20'-30' high	1 Electrician Foreman 1 Electrician .5 Equip. Oper. (crane) .5 S.P. Crane, 4x4, 5 Ton	6	3.33	\$ -	\$ 506.00	\$ 70.00	\$ 576.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	91.6	\$ -	\$ -	\$ -	\$ 1,301.48
1	Job	Permitting cost		0	0	\$ -	\$ 842.48	\$ -	\$ 842.48

Total

\$ 42,966.29

OFFICIAL COPY

MAY 15 2022

**3-5 - Medium Meter Station Sub Material Removal
Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
489	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high		650	0.04	\$ 234.72	\$ 1,012.23	\$ 146.70	\$ 1,393.65
72	S.Y.	Demolish, remove pavement & curb, remove concrete, rod reinforced, to 6" thick, excludes hauling and disposal fees	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (light) 1 Equip. Oper. (medium) 1 Backhoe Loader, 48 H.P. 1 Hyd. Hammer (1200 lb.) 1 F.E. Loader, W.M., 4 C.Y. 1 Pvm. Rem. Bucket	200	0.12	\$ -	\$ 482.40	\$ 482.40	\$ 964.80
12	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 79.20	\$ 106.20	\$ 185.40
1333	B.C.Y.	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering		270	0.06	\$ -	\$ 4,838.79	\$ 3,812.38	\$ 8,651.17
1333	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment		72	0.11	\$ -	\$ 8,797.80	\$11,797.05	\$ 20,594.85
6	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 432.00	\$ -	\$ 432.00
6	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,800.00	\$ 1,890.00	\$ -	\$ 3,690.00
1	Ea.	Selective demolition, septic tanks and related components, precast septic tanks, 1000-1250 gal., excludes excavation	1 Labor Foreman (outside) 1 Skilled Worker 1 Laborer .5 Equip. Oper. (crane) .5 S.P. Crane, 4x4, 5 Ton	8	3.5	\$ -	\$ 193.00	\$ 26.50	\$ 219.50
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
7	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 3,745.00	\$ -	\$ 3,745.00
3	Day	Environmental Engineer		0	0	\$ -	\$ 1,545.00	\$ -	\$ 1,545.00
114	\$/Day	Per Diem		1	65.22	\$ -	\$ -	\$ -	\$ 926.67
1	Job	Permitting cost		0	0	\$ -	\$ 953.96	\$ -	\$ 953.96

Total

\$ 45,977.00

3-6 - Medium Meter Station Backfill and Restoration
Unit Cost Estimate

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
1333	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment		72	0.11	\$ -	\$ 8,797.80	\$11,797.05	\$ 20,594.85
12	M.S.F.	Soil preparation, structural soil mixing, scarify subsoil, municipal, 50 HP skid steer loader w/scarifiers		120	0.07	\$ -	\$ 52.08	\$ 29.40	\$ 81.48
12	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor		1.5	16	\$ -	\$10,740.00	\$ 1,584.00	\$ 12,324.00
1333	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$15,529.45	\$ 7,864.70	\$ 23,394.15
1333	S.Y.	Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed with wood fiber mulch added		8900	0	\$ 3,225.86	\$ 133.30	\$ 93.31	\$ 3,452.47
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
8	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 4,280.00	\$ -	\$ 4,280.00
4	Day	Environmental Engineer		0	0	\$ -	\$ 2,060.00	\$ -	\$ 2,060.00
114	\$/Day	Per Diem		1	72.38	\$ -	\$ -	\$ -	\$ 1,028.40
1	Job	Permitting cost		0	0	\$ -	\$ 1,397.81	\$ -	\$ 1,397.81

Total

\$ 71,288.16

**3-7 - Large Meter Station Removal
Unit Cost Estimate**

OFFICIAL COPY
MAY 15 2022

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
439	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic	1000	0.02	\$ 39.51	\$ 741.91	\$ 17.56	\$ 798.98
439	L.F.	Fencing demolition, remove chain link posts & fabric, 8' to 10' high	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	445	0.05	\$ -	\$ 1,325.78	\$ 232.67	\$ 1,558.45
13	Ea.	Selective demolition, parking appurtenances, pipe bollards, 6"-12" diameter	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	80	0.3	\$ -	\$ 218.40	\$ 38.61	\$ 257.01
40079	C.F.	Building demolition, small buildings or single buildings, steel, includes 20 mile haul, excludes salvage, foundation demolition or dump fees	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (medium) 2 Truck Drivers (heavy) 1 Crawler Loader, 3 C.Y. 2 Dump Trucks, 12 C.Y., 400 H.P.	14800	0	\$ -	\$ 7,615.01	\$ 6,813.43	\$ 14,428.44
2	Ea.	Steel tank, single wall, above ground, 15,000 thru 30,000 gallon, selective demolition, excluding foundation, pumps or piping	2 Pipe Fitters 1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Flatbed Trailer, 40 Ton 1 Truck Tractor, 6x4, 380 H.P. 1 Hyd. Crane, 80 Ton 1 Hyd. Excavator, 2 C.Y.	2	16	\$ -	\$ 2,300.00	\$ 3,400.00	\$ 5,700.00
1348	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 134.80	\$ 161.76	\$ 134.80	\$ 431.36
429	L.F.	Selective demolition, natural gas, steel pipe, pipe, 18" - 24", excludes excavation	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (crane) 2 Cutting Torches 2 Sets of Gases 1 Hyd. Crane, 12 Ton	160	0.2	\$ -	\$ 4,912.05	\$ 2,509.65	\$ 7,421.70
3	Day	Rented truck, flatbed, GVW = 20,000 Lbs, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 849.81	\$ 849.81
3	Day	Crane crew, daily use for small jobs, 25-ton truck-mounted hydraulic crane, portal to portal	1 Equip. Oper. (crane) 1 Hyd. Crane, 25 Ton (Daily)	1	8	\$ -	\$ 1,710.00	\$ 2,670.00	\$ 4,380.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	64.57	\$ -	\$ -	\$ -	\$ 917.43
1	Job	Permitting cost		0	0	\$ -	\$ 884.26	\$ -	\$ 884.26

Total

\$ 42,422.44

**3-8 - Large Meter Station Sub Material Removal
Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
439	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high		650	0.04	\$ 210.72	\$ 908.73	\$ 131.70	\$ 1,251.15
128	S.Y.	Demolish, remove pavement & curb, remove concrete, rod reinforced, to 6" thick, excludes hauling and disposal fees	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (light) 1 Equip. Oper. (medium) 1 Backhoe Loader, 48 H.P. 1 Hyd. Hammer (1200 lb.) 1 F.E. Loader, W.M., 4 C.Y. 1 Pvm. Rem. Bucket	200	0.12	\$ -	\$ 857.60	\$ 857.60	\$ 1,715.20
22	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 145.20	\$ 194.70	\$ 339.90
1329	B.C.Y.	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering		270	0.06	\$ -	\$ 4,824.27	\$ 3,800.94	\$ 8,625.21
1329	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment		72	0.11	\$ -	\$ 8,771.40	\$11,761.65	\$ 20,533.05
6	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 432.00	\$ -	\$ 432.00
6	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,800.00	\$ 1,890.00	\$ -	\$ 3,690.00
8	Ea.	Selective demolition, utility materials, utility valves, 14"-24", excludes excavation		2	14	\$ -	\$ 6,160.00	\$ 840.00	\$ 7,000.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
5	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 2,675.00	\$ -	\$ 2,675.00
2	Day	Environmental Engineer		0	0	\$ -	\$ 1,030.00	\$ -	\$ 1,030.00
114	\$/Day	Per Diem		1	75.72	\$ -	\$ -	\$ -	\$ 1,075.86
1	Job	Permitting cost		0	0	\$ -	\$ 1,074.35	\$ -	\$ 1,074.35

Total

\$ 54,791.72

3-9 - Large Meter Station Backfill and Restoration
Unit Cost Estimate

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
1329	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment		72	0.11	\$ -	\$ 8,771.40	\$11,761.65	\$ 20,533.05
12	M.S.F.	Soil preparation, structural soil mixing, scarify subsoil, municipal, 50 HP skid steer loader w/scarifiers		120	0.07	\$ -	\$ 52.08	\$ 29.40	\$ 81.48
12	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor		1.5	16	\$ -	\$10,740.00	\$ 1,584.00	\$ 12,324.00
1329	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$15,482.85	\$ 7,841.10	\$ 23,323.95
1329	S.Y.	Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed with wood fiber mulch added		8900	0	\$ 3,216.18	\$ 132.90	\$ 93.03	\$ 3,442.11
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
17	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 9,095.00	\$ -	\$ 9,095.00
8	Day	Environmental Engineer		0	0	\$ -	\$ 4,120.00	\$ -	\$ 4,120.00
114	\$/Day	Per Diem		1	72.38	\$ -	\$ -	\$ -	\$ 1,028.40
1	Job	Permitting cost		0	0	\$ -	\$ 1,532.46	\$ -	\$ 1,532.46

Total

\$ 78,155.45

Cardinal Pipeline Company, LLC
Compressor Station Summary Report

<u>Line No.</u>	<u>Particular</u>	<u>Cost (\$)</u>	<u>Total Cost (\$)</u>
	(A)	(B)	
1	1 Clayton	<u>Cost / Phase</u>	
2	4-1 - Compressor Station Removal	\$ 453,588	
3	4-2 - Compressor Station Sub Material Removal	\$ 1,988,334	
4	4-3 - Compressor Station Backfill and Restoration	\$ 836,139	
5		Total	<u>\$3,278,061</u>

OFFICIAL COPY

NOV 15 2022

**4-1 - Clayton Compressor Station Removal
Unit Cost Estimate**

OFFICIAL COPY

NOV 15 2022

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
2014	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic	1000	0.02	\$ 181.26	\$ 3,403.66	\$ 80.56	\$ 3,665.48
2014	L.F.	Fencing demolition, remove chain link posts & fabric, 8' to 10' high	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	445	0.05	\$ -	\$ 6,082.28	\$ 1,067.42	\$ 7,149.70
2639	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 263.90	\$ 316.68	\$ 263.90	\$ 844.48
840	L.F.	Selective demolition, natural gas, steel pipe, pipe, 18" - 24", excludes excavation	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (crane) 2 Cutting Torches 2 Sets of Gases 1 Hyd. Crane, 12 Ton	160	0.2	\$ -	\$ 9,618.00	\$ 4,914.00	\$ 14,532.00
494369	C.F.	Building demolition, small buildings or single buildings, steel, includes 20 mile haul, excludes salvage, foundation demolition or dump fees	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (medium) 2 Truck Drivers (heavy) 1 Crawler Loader, 3 C.Y. 2 Dump Trucks, 12 C.Y., 400 H.P.	14800	0	\$ -	\$ 93,930.11	\$84,042.73	\$ 177,972.84
3	Ea.	Boiler, gas and or oil or solid, 12,200 thru 25,000 MBH, selective demolition	1 Steamfitter Foreman (inside) 2 Steamfitters 1 Steamfitter Apprentice	0.12	267	\$ -	\$ 56,100.00	\$ -	\$ 56,100.00
11	Ea.	Air conditioner, split unit air conditioner, package unit, 3 ton, selective demolition	2 Steamfitters 1 Steamfitter Apprentice	3	8	\$ -	\$ 5,940.00	\$ -	\$ 5,940.00
27	Ea.	Steel tank, single wall, above ground, 15,000 thru 30,000 gallon, selective demolition, excluding foundation, pumps or piping	2 Pipe Fitters 1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Flatbed Trailer, 40 Ton 1 Truck Tractor, 6x4, 380 H.P. 1 Hyd. Crane, 80 Ton 1 Hyd. Excavator, 2 C.Y.	2	16	\$ -	\$ 31,050.00	\$45,900.00	\$ 76,950.00
9	Ea.	Selective demolition, utility poles & cross arms, utility poles, wood, 20'-30' high	1 Electrician Foreman 1 Electrician .5 Equip. Oper. (crane) .5 S.P. Crane, 4x4, 5 Ton	6	3.33	\$ -	\$ 2,277.00	\$ 315.00	\$ 2,592.00
1	Ea.	Selective demolition, radio towers, guyed, 200' high, 70 lb section	1 Struc. Steel Foreman (outside) 1 Struc. Steel Worker 1 Truck Driver (light) 1 Flatbed Truck, Gas, 3 Ton	0.7	34.29	\$ -	\$ 2,350.00	\$ 1,325.00	\$ 3,675.00
42	Day	Crane crew, daily use for small jobs, 25-ton truck-mounted hydraulic crane, portal to portal	1 Equip. Oper. (crane) 1 Hyd. Crane, 25 Ton (Daily)	1	8	\$ -	\$ 23,940.00	\$37,380.00	\$ 61,320.00
42	Day	Rent trailer, platform, flush deck 2 axle, 25 ton, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 9,031.26	\$ 9,031.26
40	Ton	Selective demolition, dump charges, typical urban city, rubbish only, includes tipping fees only		0	0	\$2,780.00	\$ -	\$ -	\$ 2,780.00

1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
14	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 7,490.00	\$ -	\$ 7,490.00
7	Day	Environmental Engineer		1	8	\$ -	\$ 3,605.00	\$ -	\$ 3,605.00
114	\$/Day	Per Diem		1	400.9	\$ -	\$ -	\$ -	\$ 5,695.98
1	Job	Permitting cost		0	0	\$ -	\$ 8,893.87	\$ -	\$ 8,893.87

Total

\$ 453,587.61

OFFICIAL COPY

Mar 15 2022

**4-2 - Clayton Compressor Station Sub Material Removal
Unit Cost Estimate**

OFFICIAL COPY

MAY 15 2022

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
2014	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	2 Laborers 1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$ 966.72	\$ 4,168.98	\$ 604.20	\$ 5,739.90
26529	C.F.	Selective demolition, cutout, concrete, elevated slab, bar reinforced, over 6 C.F., excludes loading and disposal	1 Labor Foreman (outside) 4 Laborers 1 Air Compressor, 250 cfm 2 Breakers, Pavement, 60 lb. 2 -50' Air Hoses, 1.5	50	0.8	\$ -	\$ 1,100,953.50	\$ 206,926.20	\$ 1,307,879.70
5263	S.Y.	Demolish, remove pavement & curb, remove concrete, rod reinforced, to 6" thick, excludes hauling and disposal fees	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (light) 1 Equip. Oper. (medium) 1 Backhoe Loader, 48 H.P. 1 Hyd. Hammer (1200 lb.) 1 F.E. Loader, W.M., 4 C.Y. 1 Pvm. Rem. Bucket	200	0.12	\$ -	\$ 35,262.10	\$ 35,262.10	\$ 70,524.20
1860	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 12,276.00	\$ 16,461.00	\$ 28,737.00
15280	B.C.Y.	Excavating, bulk, dozer, open site, bank measure, sand and gravel, 200 HP dozer, 300' haul	1 Equip. Oper. (medium) .5 Laborer 1 Dozer, 200 H.P.	310	0.03	\$ -	\$ 27,351.20	\$ 82,512.00	\$ 109,863.20
15280	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 100,848.00	\$ 135,228.00	\$ 236,076.00
2	Month	Rent front end loader, 4WD, art. frame, diesel, 7 - 9 CY 475 HP, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 83,420.48	\$ 83,420.48
8	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 576.00	\$ -	\$ 576.00
8	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 2,400.00	\$ 2,520.00	\$ -	\$ 4,920.00
40	Ton	Selective demolition, dump charges, typical urban city, rubbish only, includes tipping fees only		0	0	\$ 2,780.00	\$ -	\$ -	\$ 2,780.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
117	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 62,595.00	\$ -	\$ 62,595.00
58	Day	Environmental Engineer		1	9	\$ -	\$ 29,870.00	\$ -	\$ 29,870.00
114	\$/Day	Per Diem		1	71.49	\$ -	\$ -	\$ -	\$ 1,015.75
1	Job	Permitting cost		0	0	\$ -	\$ 38,986.94	\$ -	\$ 38,986.94

Total

\$ 1,988,334.17

**4-3 - Albany Compressor Station Backfill and Restoration
Unit Cost Estimate**

OFFICIAL COPY

MAY 15 2022

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,525.00	\$ 1,000.00	\$ 2,525.00
138	M.S.F.	Soil preparation, structural soil mixing, scarify subsoil, municipal, 50 HP skid steer loader w/scarifiers	1 Equip. Oper. (light) 1 Loader-Backhoe, 40 H.P.	120	0.07	\$ -	\$ 590.64	\$ 304.98	\$ 895.62
15280	C.Y.	Soils for earthwork, common borrow, spread with 200 HP dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	1 Equipment Oper. (med.) .5 Laborer 2 Truck Drivers (heavy) 2 Dump Trucks, 12 C.Y., 400 H.P. 1 Dozer, 200 H.P.	600	0.05	\$211,628.00	\$ 42,784.00	\$ 74,260.80	\$ 328,672.80
15280	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 99,320.00	\$133,700.00	\$ 233,020.00
138	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor	2 Laborers 1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	1.5	16	\$ -	\$121,440.00	\$ 17,940.00	\$ 139,380.00
15280	E.C.Y.	Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	1 Equip. Oper. (medium) .5 Laborer 1 Dozer, 200 H.P. 1 Vibratory Roller, Towed, 23 Ton	800	0.01	\$ -	\$ 10,543.20	\$ 42,936.80	\$ 53,480.00
15280	S.Y.	Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed with wood fiber mulch added	1 Laborer 1 Equip. Oper. (medium) 1 Truck Driver (heavy) 1 Hydromulcher, T.M., 3000 Gal. 1 Truck Tractor, 220 H.P.	8900	0	\$ 34,838.40	\$ 1,528.00	\$ 1,069.60	\$ 37,436.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,525.00	\$ 1,000.00	\$ 2,525.00
26	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 13,780.00	\$ -	\$ 13,780.00
13	Day	Environmental Engineer		1	8	\$ -	\$ 6,890.00	\$ -	\$ 6,890.00
114	\$/Day	Per Diem		1	80.24	\$ -	\$ -	\$ -	\$ 1,140.08
1	Job	Permitting cost		0	0	\$ -	\$ 16,394.89	\$ -	\$ 16,394.89

Total

\$ 836,139.39

5-1 - Cathodic Protection - Rectifier Removal
Unit Cost Estimate

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
3	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 585.00	\$ 306.00	\$ 891.00
10	Ea.	Cathodic protection, rectifiers, silicon type, air cooled, 28 V/10 A, underground storage tanks	.5 Electrician Foreman 2 Electricians	3.5	5.71	#####	\$ 4,400.00	\$ -	\$ 30,400.00
0.25	Ton	Selective demolition, dump charges, typical urban city, reclamation station, usual charge, includes tipping fees only		0	0	\$ 20.25	\$ -	\$ -	\$ 20.25
3	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 585.00	\$ 306.00	\$ 891.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	27.71	\$ -	\$ -	\$ -	\$ 393.71
1	Job	Permitting cost		0	0	\$ -	\$ 694.32	\$ -	\$ 694.32

Total

\$ 35,410.28

OFFICIAL COPY

MAY 15 2022

5-2 - Cathodic Protection - Test Site Removal
Unit Cost Estimate

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
10	Ea.	Signs, traffic sign removal, to 10 S.F., including supports	3 Laborers 1 Equip. Oper. (light) 1 Crane, Flatbed Mounted, 3 Ton	16	2	\$ -	\$ 1,100.00	\$ 164.00	\$ 1,264.00
0.25	Ton	Selective demolition, dump charges, typical urban city, reclamation station, usual charge, includes tipping fees only		0	0	\$ 20.25	\$ -	\$ -	\$ 20.25
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
1	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 535.00	\$ -	\$ 535.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 635.00	\$ -	\$ 635.00
114	\$/Day	Per Diem		1	24	\$ -	\$ -	\$ -	\$ 341.00
1	Job	Permitting cost		0	0	\$ -	\$ 67.79	\$ -	\$ 67.79

Total

\$ 3,457.04

OFFICIAL COPY

MAY 15 2022

**6-1 - ROW Marker Removal
Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
10	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 1,950.00	\$ 1,020.00	\$ 2,970.00
1330	C.L.F.	Utility line signs, markers, and flags, underground tape, detectable, reinforced, aluminum foil core, 6", excludes excavation and backfill		140	0.06	\$ 56,525.00	\$ 3,910.20	\$ -	\$ 60,435.20
2	Ton	Selective demolition, dump charges, typical urban city, reclamation station, usual charge, includes tipping fees only		0	0	\$ 162.00	\$ -	\$ -	\$ 162.00
1330	S.Y.	Seeding, mechanical seeding, 44 lb/M.S.Y.	1 Equip. Oper. (light) 1 Loader-Backhoe, 40	2500	0	\$ 345.80	\$ 279.30	\$ 159.60	\$ 784.70
10	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 1,950.00	\$ 1,020.00	\$ 2,970.00
10	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 5,350.00	\$ -	\$ 5,350.00
5	Day	Environmental Engineer		1	8	\$ -	\$ 2,575.00	\$ -	\$ 2,575.00
114	\$/Day	Per Diem		1	22.06	\$ -	\$ -	\$ -	\$ 313.44
1	Job	Permitting cost		0	0	\$ -	\$ 1,511.21	\$ -	\$ 1,511.21

Total

\$ 77,071.55

OFFICIAL COPY

MAY 15 2022

**7-1 - Tap Locations
Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
200	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic 2 Laborers	1000	0.02	\$ 18.00	\$ 338.00	\$ 8.00	\$ 364.00
200	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$ 96.00	\$ 414.00	\$ 60.00	\$ 570.00
10	B.C.Y.	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering	1 Equip. Oper. (crane) 1 Laborer 1 Hyd. Excavator, .75 C.Y.	270	0.06	\$ -	\$ 36.30	\$ 28.60	\$ 64.90
2	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint		15	1.07	\$ -	\$ 144.00	\$ -	\$ 144.00
2	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$600.00	\$ 630.00	\$ -	\$ 1,230.00
5	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 33.00	\$ 44.25	\$ 77.25
1	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor	2 Laborers 1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	1.5	16	\$ -	\$ 880.00	\$ 130.00	\$ 1,010.00
0.03	M.S.F.	Seeding, mechanical seeding grass seed, 4.5 lb./M.S.F., hand push spreader		180	0.04	\$ 0.89	\$ 0.07	\$ -	\$ 0.95
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
2	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,070.00	\$ -	\$ 1,070.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	43.55	\$ -	\$ -	\$ -	\$ 618.77
1	Job	Permitting cost		0	0	\$ -	\$ 125.18	\$ -	\$ 125.18

Total

\$ 6,384.05

**8-1 - Mainline Valve Locations
Unit Cost Estimate**

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
120	L.F.	Selective demolition, miscellaneous metal fences & gates, fence, miscellaneous steel mesh, 4'-6' high	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	600	0.04	\$ -	\$ 268.80	\$ 48.00	\$ 316.80
800	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic	1000	0.02	\$ 72.00	\$ 1,352.00	\$ 32.00	\$ 1,456.00
800	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	2 Laborers 1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$ 384.00	\$ 1,656.00	\$ 240.00	\$ 2,280.00
4	Ea.	Selective demolition, parking appurtenances, pipe bollards, 6"-12" diameter	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	80	0.3	\$ -	\$ 67.20	\$ 11.88	\$ 79.08
19	B.C.Y.	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering	1 Equip. Oper. (crane) 1 Laborer 1 Hyd. Excavator, .75 C.Y.	270	0.06	\$ -	\$ 68.97	\$ 54.34	\$ 123.31
36	L.F.	Selective demolition, natural gas, steel pipe, pipe, 5" - 10", excludes excavation Gasket and bolt set, for flanges, 150 lb., 24" pipe size	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (crane) 2 Cutting Torches 2 Sets of Gases 1 Hyd. Crane, 12 Ton	360	0.09	\$ -	\$ 183.60	\$ 93.24	\$ 276.84
2	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber	1.9	4.21	\$ 600.00	\$ 630.00	\$ -	\$ 1,230.00
2	Ea.	Selective demolition, utility materials, utility valves, 14"-24", excludes excavation	1 Plumber Apprentice 1 Labor Foreman (outside) 1 Skilled Worker 1 Laborer	15	1.07	\$ -	\$ 144.00	\$ -	\$ 144.00
1	Ea.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 237.60	\$ 318.60	\$ 556.20
1	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor	2 Laborers 1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	1.5	16	\$ -	\$ 880.00	\$ 130.00	\$ 1,010.00
0.8	M.S.F.	Seeding, mechanical seeding grass seed, 4.5 lb./M.S.F., hand push spreader		180	0.04	\$ 23.60	\$ 1.82	\$ -	\$ 25.42
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
1	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 535.00	\$ -	\$ 535.00
0.5	Day	Environmental Engineer		1	8	\$ -	\$ 257.50	\$ -	\$ 257.50
114	\$/Day	Per Diem		1	57.98	\$ -	\$ -	\$ -	\$ 823.80
1	Job	Permitting cost		0	0	\$ -	\$ 211.66	\$ -	\$ 211.66

Total

\$ 10,794.61

OFFICIAL COPY

MAY 15 2022

Cardinal Pipeline Company, LLC
System Salvage Scrap Metal Calculations - Transmission

7/21/2021 Price / Ton (Nat. Ave.) = 167.00

<https://iscrapapp.com/prices/>

(A)	(B)	(C)	(D)	(E)	(F)
1.3 Pipe Removal - Transmission 24"	Length Removed (ft) 1440.48 1440.48	lb/ft 94.71	Total Weight (lb) 136427.77	Total Weight (ton) 68.21 Subtotal:	Salvage Amt. \$ (11,392) \$ (11,392)
				Total	\$ (11,392)
3.3 M&R Stations - Transmission	Weight/Site (ton)	Scrap Value	Estimated	No. of Stations	Salvage Amt.
Small M&R Station	5.00	167.00	835.00	2	\$ (1,670)
Medium M&R Station	10.00	167.00	1670.00	2	\$ (3,340)
Large M&R Station	15.00	167.00	2505.00	3	\$ (7,515)
				Subtotal:	\$ (12,525)
				Total:	\$ (12,525)
4.3 Compressor Station - Storage	Ave. No./Site	Weight/Site (ton)	Total Weight (ton)	Scrap Value (ton)	Total Stations Salvage Amt.
Compressor Engine (Ave.)	2	160.00	320.00	\$ 167.00	1 \$ (53,440)
LNG Tank	2	6091	6091	\$ 167.00	0 \$ -
Equipment (Ave.)	18	22.50	405.00	\$ 167.00	1 \$ (67,635)
Bldg (Ave.)	3	#REF!	3021.14	\$ 167.00	1 \$ (504,530)
				Subtotal:	\$ (625,605)
				Total:	\$ (625,605)
5.3 Cathodic Protection - Transmission	No.	Weight/Site (ton)	Total Weight (ton)	Scrap Value (ton)	Salvage Amt.
Rectifier	10	0.03	0.25	\$ 167.00	\$ (42)
Test Site	10	0.002	0.02	\$ 167.00	\$ (3)
				Subtotal:	\$ (45)
				Total:	\$ (45)
6.2 ROW Marker - Transmission Marker	No. 1330	Weight/Site (ton) 0.002	Total Weight (ton) 2.66	Scrap Value (ton) \$ 167.00	Salvage Amt. \$ (444)
				Subtotal:	\$ (444)
				Total:	\$ (444)
7.2 Mainline Valve Site - Transmission Typical Valve Site	No. 18	Weight/Site (ton) 2.00	Total Weight (ton) 36.00	Scrap Value (ton) \$ 167.00	Salvage Amt. \$ (6,012)
				Subtotal:	\$ (6,012)
				Total:	\$ (6,012)
7.2 Tap Site - Transmission Typical Tap Site	No. 44	Weight/Site (ton) 0.03	Total Weight (ton) 1.32	Scrap Value (ton) \$ 167.00	Salvage Amt. \$ (220)
				Subtotal:	\$ (220)
				Total:	\$ (220)
				Total Salvage Amount:	\$ (656,244)

OFFICIAL COPY

NOV 15 2022

Cardinal Pipeline Company, LLC
 City Cost Index Factor Determination

Line No.	(A) State	(B) City	(C) ¹ CCI	(D) ² Total Mi/State	(E) Weighting Factor <u>(D) / 3878.5</u>	(F) % of Weighted Ave. <u>(C) / (E)</u>
1	North Carolina	Durham	89.9	104.9	1.00	91.80
4		Greensboro	89.8			
5		Raleigh	95.7			
2		Ave.	91.8			
12						
13			<u>Average CCI</u>	<u>Total Mileage</u>		<u>Total</u>
14			92.3	104.9		<u>% Weighted Ave.*</u>
15	*	National Average = 100%				
16	(C) ¹	Data developed within cost estimating software package				

OFFICIAL COPY

MAY 16 2022

Cardinal Pipeline Company, LLC
 Per Diem Determination

Line No.	(A) State	(B) City	(C) ¹ Per Diem (\$)	(D) ² Total Mi/State	(E) Weighting Factor <u>(D) / 3878.5</u>	(F) % of Weighted Ave. <u>(C) / (E)</u>
1	North Carolina	Durham	115.0	104.9	1.00	113.67
		Greensboro	103.0			
4		Raleigh	123.0			
5		Ave.	<u>113.7</u>			
2						
9						
10			<u>Average</u>	<u>Total Mileage</u>		<u>Total</u>
11			\$ 130	104.9		<u>Weighted Ave.</u>
12						\$ 114
13	(C) ¹ https://www.gsa.gov/travel/plan-book/per-diem-rates					
14	(D) ² Cardinal Pipeline Company, LLC Provided Data					

OFFICIAL COPY

MAY 15 2022

§ 380.5

18 CFR Ch. I (4–1–13 Edition)

original facilities were installed, and no significant nonjurisdictional facilities would be constructed in association with construction of the interconnection facilities;

(25) Review of natural gas rate filings, including any curtailment plans other than those specified in § 380.5(b)(5), and establishment of rates for transportation and sale of natural gas under sections 4 and 5 of the Natural Gas Act and sections 311 and 401 through 404 of the Natural Gas Policy Act of 1978;

(26) Review of approval of oil pipeline rate filings under Parts 340 and 341 of this chapter;

(27) Sale, exchange, and transportation of natural gas under sections 4, 5 and 7 of the Natural Gas Act that require no construction of facilities;

(28) Abandonment in place of a minor natural gas pipeline (short segments of buried pipe of 6-inch inside diameter or less), or abandonment by removal of minor surface facilities such as metering stations, valves, and taps under section 7 of the Natural Gas Act so long as appropriate erosion control and site restoration takes place;

(29) Abandonment of service under any gas supply contract pursuant to section 7 of the Natural Gas Act;

(30) Approval of filing made in compliance with the requirements of a certificate for a natural gas project under section 7 of the Natural Gas Act or a preliminary permit, exemption, license, or license amendment order for a water power project under Part I of the Federal Power Act;

(31) Abandonment of facilities by sale that involves only minor or no ground disturbance to disconnect the facilities from the system;

(32) Conversion of facilities from use under the NGPA to use under the NGA;

(33) Construction or abandonment of facilities constructed entirely in Federal offshore waters that has been approved by the Minerals Management Service and the Corps of Engineers, as necessary;

(34) Abandonment or construction of facilities on an existing offshore platform;

(35) Abandonment, construction or replacement of a facility (other than compression) solely within an existing

building within a natural gas facility (other than LNG facilities), if it does not increase the noise or air emissions from the facility, as a whole; and

(36) Conversion of compression to standby use if the compressor is not moved, or abandonment of compression if the compressor station remains in operation.

(b) *Exceptions to categorical exclusions.*

(1) In accordance with 40 CFR 1508.4, the Commission and its staff will independently evaluate environmental information supplied in an application and in comments by the public. Where circumstances indicate that an action may be a major Federal action significantly affecting the quality of the human environment, the Commission:

(i) May require an environmental report or other additional environmental information, and

(ii) Will prepare an environmental assessment or an environmental impact statement.

(2) Such circumstances may exist when the action may have an effect on one of the following:

- (i) Indian lands;
- (ii) Wilderness areas;
- (iii) Wild and scenic rivers;
- (iv) Wetlands;
- (v) Units of the National Park System, National Refuges, or National Fish Hatcheries;
- (vi) Anadromous fish or endangered species; or
- (vii) Where the environmental effects are uncertain.

However, the existence of one or more of the above will not automatically require the submission of an environmental report or the preparation of an environmental assessment or an environmental impact statement.

[Order 486, 52 FR 47910, Dec. 17, 1987, as amended at 53 FR 8177, Mar. 14, 1988; Order 486-B, 53 FR 26437, July 13, 1988; 54 FR 48740, Nov. 27, 1989; Order 603, 64 FR 26611, May 14, 1999; Order 609, 64 FR 57392, Oct. 25, 1999; Order 756, 77 FR 4895, Feb. 1, 2012]

§ 380.5 Actions that require an environmental assessment.

(a) An environmental assessment will normally be prepared first for the actions identified in this section. Depending on the outcome of the environmental assessment, the Commission

Federal Energy Regulatory Commission

§ 380.6

may or may not prepare an environmental impact statement. However, depending on the location or scope of the proposed action, or the resources affected, the Commission may in specific circumstances proceed directly to prepare an environmental impact statement.

(b) The projects subject to an environmental assessment are as follows:

(1) Except as identified in §§380.4, 380.6 and 2.55 of this chapter, authorization for the site of new gas import/export facilities under DOE Delegation No. 0204-112 and authorization under section 7 of the Natural Gas Act for the construction, replacement, or abandonment of compression, processing, or interconnecting facilities, onshore and offshore pipelines, metering facilities, LNG peak-shaving facilities, or other facilities necessary for the sale, exchange, storage, or transportation of natural gas;

(2) Prior notice filings under §157.208 of this chapter for the rearrangement of any facility specified in §§157.202 (b)(3) and (6) of this chapter or the acquisition, construction, or operation of any eligible facility as specified in §§157.202 (b)(2) and (3) of this chapter;

(3) Abandonment or reduction of natural gas service under section 7 of the Natural Gas Act unless excluded under §380.4 (a)(21), (28) or (29);

(4) Except as identified in §380.6, conversion of existing depleted oil or natural gas fields to underground storage fields under section 7 of the Natural Gas Act.

(5) New natural gas curtailment plans, or any amendment to an existing curtailment plan under section 4 of the Natural Gas Act and sections 401 through 404 of the Natural Gas Policy Act of 1978 that has a major effect on an entire pipeline system;

(6) Licenses under Part I of the Federal Power Act and part 4 of this chapter for construction of any water power project—existing dam;

(7) Exemptions under section 405 of the Public Utility Regulatory Policies Act of 1978, as amended, and §§4.30(b)(29) and 4.101-4.108 of this chapter for small hydroelectric power projects of 5 MW or less;

(8) Licenses for additional project works at licensed projects under Part I

of the Federal Power Act whether or not these are styled license amendments or original licenses;

(9) Licenses under Part I of the Federal Power Act and part 4 of this chapter for transmission lines only;

(10) Applications for new licenses under section 15 of the Federal Power Act;

(11) Approval of electric interconnections and wheeling under section 202(b), 210, 211, and 212 of the Federal Power Act, unless excluded under §380.4(a)(17);

(12) Regulations or proposals for legislation not included under §380.4(a)(2);

(13) Surrender of water power licenses and exemptions where project works exist or ground disturbing activity has occurred and amendments to water power licenses and exemptions that require ground disturbing activity or changes to project works or operations; and

(14) Except as identified in §380.6, authorization to site new electric transmission facilities under section 216 of the Federal Power Act and DOE Delegation Order No. 00-004.00A.

[Order 486, 52 FR 47910, Dec. 17, 1987; Order 486, 53 FR 4817, Feb. 17, 1988, as amended by 53 FR 8177, Mar. 14, 1988; Order 486-B, 53 FR 26437, July 13, 1988; Order 689, 71 FR 69470, Dec. 1, 2006; Order 756, 77 FR 4895, Feb. 1, 2012]

§ 380.6 Actions that require an environmental impact statement.

(a) Except as provided in paragraph (b) of this section, an environmental impact statement will normally be prepared first for the following projects:

(1) Authorization under sections 3 or 7 of the Natural Gas Act and DOE Delegation Order No. 0204-112 for the siting, construction, and operation of jurisdictional liquefied natural gas import/export facilities used wholly or in part to liquefy, store, or regasify liquefied natural gas transported by water;

(2) Certificate applications under section 7 of the Natural Gas Act to develop an underground natural gas storage facility except where depleted oil or natural gas producing fields are used;

(3) Major pipeline construction projects under section 7 of the Natural Gas Act using rights-of-way in which there is no existing natural gas pipeline;

Code Compliance Guidelines		07-18-2005	Page: 117
§192.727	Abandonment or Inactivation of Facilities		

Existing Code Language:	<p>(a) Each operator shall conduct abandonment or deactivation of pipelines in accordance with the requirements of this section.</p> <p>(b) Each pipeline abandoned in place must be disconnected from all sources and supplies of gas; purged of gas; in the case of offshore pipelines, filled with water or inert materials; and sealed at the ends. However, the pipeline need not be purged when the volume of gas is so small that there is no potential hazard.</p> <p>(c) Except for service lines, each inactive pipeline that is not being maintained under this part must be disconnected from all sources and supplies of gas; purged of gas; in the case of offshore pipelines, filled with water or inert materials; and sealed at the ends. However, the pipeline need not be purged when the volume of gas is so small that there is no potential hazard.</p> <p>(d) Whenever service to a customer is discontinued, one of the following must be complied with:</p> <ul style="list-style-type: none">(1) The valve that is closed to prevent the flow of gas to the customer must be provided with a locking device or other means designed to prevent the opening of the valve by persons other than those authorized by the operator.(2) A mechanical device or fitting that will prevent the flow of gas must be installed in the service line or in the meter assembly.(3) The customer's piping must be physically disconnected from the gas supply and the open pipe ends sealed. <p>(e) If air is used for purging, the operator shall insure that a combustible mixture is not present after purging.</p> <p>(f) Each abandoned vault must be filled with a suitable compacted material.</p> <p>(g) For each abandoned offshore pipeline facility or each abandoned onshore pipeline facility that crosses over, under or through a commercially navigable waterway, the last operator of that facility must file a report upon abandonment of that facility.</p> <ul style="list-style-type: none">(1) The preferred method to submit data on pipeline facilities abandoned after October 10, 2000 is to the National Pipeline Mapping System (NPMS) in accordance with the NPMS "Standards for Pipeline and Liquefied Natural Gas Operator Submissions." To obtain a copy of the NPMS Standards, please refer to the NPMS homepage at www.npms.rspa.dot.gov or contact the NPMS National Repository at 703-317-3073. A digital data format is preferred, but hard copy submissions are acceptable if they comply with the NPMS Standards. In addition to the NPMS-required attributes, operators must submit the date of abandonment, diameter, method of abandonment, and certification that, to the best of the operator's knowledge, all of the reasonably available information requested was provided and, to the best of the operator's knowledge, the abandonment was completed in accordance with applicable laws. Refer to the NPMS Standards for details in preparing your data for submission. The NPMS Standards also include details of how to submit data. Alternatively, operators may submit reports by mail, fax or e-mail to the Information Officer, Research and Special Programs Administration, Department of Transportation, Room 7128, 400 Seventh Street, SW, Washington DC 20590; fax (202) 366-4566; e-mail, roger.little@rspa.dot.gov. The information in the report must contain all
--------------------------------	---

Code Compliance Guidelines		07-18-2005	Page: 118
§192.727	Abandonment or Inactivation of Facilities		

	<p>reasonably available information related to the facility, including information in the possession of a third party. The report must contain the location, size, date, method of abandonment, and a certification that the facility has been abandoned in accordance with all applicable laws.</p> <p>(2) Data on pipeline facilities abandoned before October 10, 2000 must be filed by before April 10, 2000. Operators may submit reports by mail, fax or e-mail to the Information Officer, Research and Special Programs Administration, Department of Transportation, Room 7128, 400 Seventh Street, SW, Washington DC 20590; fax (202) 366-4566; e-mail, roger.little@rspa.dot.gov. The information in the report must contain all reasonably available information related to the facility, including information in the possession of a third party. The report must contain the location, size, date, method of abandonment, and a certification that the facility has been abandoned in accordance with all applicable laws.</p>
Origin of Code	Original Code Document, 08-19-70
Last FR Amendment	192-89, 08-28-00
Interpretation Summary	None provided.
GPTC	Industry guidance available.
Other Ref. Material & Source	None noted
New Guidance Material	<ul style="list-style-type: none"> - An abandoned pipeline must be physically isolated (does not require an air gap) from active pipelines and disconnected from all sources of gas. (§192.3). - An inactive (idle) pipeline is a pipeline that is being maintained under Part 192 but is not presently being used to transport gas; that may or may not contain pressurized gas. - Deactivation (inactivation) is the process of making the pipeline inactive.
Examples of a Violation	<ul style="list-style-type: none"> - An offshore pipeline was abandoned in place and was not disconnected from all sources and supplies of gas; purged of gas; filled with water or inert materials, or sealed at the ends. - A customer has been inactive for an extended period of time, and its connection has not either been locked, blinded or otherwise separated (§192.727(d)). - The operator did not file a report to OPS-NPMS for each abandoned offshore facility, as required by §192.727(g). - The operator did not file a report to OPS-NPMS for each on shore over, under or through a commercially navigable waterway, as required by §192.727(g).

Code Compliance Guidelines		07-18-2005	Page: 119
§192.727	Abandonment or Inactivation of Facilities		

Evidence Guidance	<ul style="list-style-type: none">- Documentation/Photos/Statements that show the operator did not disconnect the abandoned pipeline from all sources and supplies of gas, and purged of gas.- Operator did not fill an abandoned offshore pipeline with water or inert materials; and sealed at the ends.- If air is used for purging, documentation showing that operator did not insure that a combustibile mixture was not present after purging.- Documentation/Photos/Statements that shows an abandoned vault was not filled with a suitable compacted material.
Other Special Notations	None noted

Code Compliance Guidelines		07-18-2005	Page: 92
§192.629	Purging of Pipelines		

Existing Code Language:	<p>(a) When a pipeline is being purged of air by use of gas, the gas must be released into one end of the line in a moderately rapid and continuous flow. If gas cannot be supplied in sufficient quantity to prevent the formation of a hazardous mixture of gas and air, a slug of inert gas must be released into the line before the gas.</p> <p>(b) When a pipeline is being purged of gas by use of air, the air must be released into one end of the line in a moderately rapid and continuous flow. If air cannot be supplied in sufficient quantity to prevent the formation of a hazardous mixture of gas and air, a slug of inert gas must be released into the line before the air.</p>
Origin of Code	Original Code Document, 08-19-70
Last FR Amendment	None
GPTC	Industry guidance available.
Other Ref. Material & Source	AGA XK0101, APurging Principles and Practice@
New Guidance Material	<ul style="list-style-type: none"> - The operator should determine the time required to complete the purge operation to assure that gas-air mixtures are minimized. - Instruments may be used to verify completion of purge. - Selection of gas venting location should not be near electric high voltage lines, or other overhead obstructions.
Examples of a Violation	<ul style="list-style-type: none"> - The gas/air was not released into the line in a moderately rapid and continuous flow, resulting in the formation of a hazardous mixture. - The gas/air was not supplied in sufficient quantity, resulting in the formation of a hazardous mixture.
Evidence Guidance	<ul style="list-style-type: none"> - Operator=s procedures. - Records and documentation of any pipeline purging operations. - Operator field checklists or procedures used during purging operations. - Documented statements from operator.
Other Special Notations	None noted



§ 192.5

49 CFR Ch. I (10–1–11 Edition)

Pipeline environment includes soil resistivity (high or low), soil moisture (wet or dry), soil contaminants that may promote corrosive activity, and other known conditions that could affect the probability of active corrosion.

Pipeline facility means new and existing pipelines, rights-of-way, and any equipment, facility, or building used in the transportation of gas or in the treatment of gas during the course of transportation.

Service line means a distribution line that transports gas from a common source of supply to an individual customer, to two adjacent or adjoining residential or small commercial customers, or to multiple residential or small commercial customers served through a meter header or manifold. A service line ends at the outlet of the customer meter or at the connection to a customer's piping, whichever is further downstream, or at the connection to customer piping if there is no meter.

Service regulator means the device on a service line that controls the pressure of gas delivered from a higher pressure to the pressure provided to the customer. A service regulator may serve one customer or multiple customers through a meter header or manifold.

SMYS means specified minimum yield strength is:

(1) For steel pipe manufactured in accordance with a listed specification, the yield strength specified as a minimum in that specification; or

(2) For steel pipe manufactured in accordance with an unknown or unlisted specification, the yield strength determined in accordance with §192.107(b).

State means each of the several States, the District of Columbia, and the Commonwealth of Puerto Rico.

Supervisory Control and Data Acquisition (SCADA) system means a computer-based system or systems used by a controller in a control room that collects and displays information about a pipeline facility and may have the ability to send commands back to the pipeline facility.

Transmission line means a pipeline, other than a gathering line, that: (1) Transports gas from a gathering line or storage facility to a distribution center, storage facility, or large volume

customer that is not downstream from a distribution center; (2) operates at a hoop stress of 20 percent or more of SMYS; or (3) transports gas within a storage field.

NOTE: A large volume customer may receive similar volumes of gas as a distribution center, and includes factories, power plants, and institutional users of gas.

Transportation of gas means the gathering, transmission, or distribution of gas by pipeline or the storage of gas, in or affecting interstate or foreign commerce.

[Amdt. 192-13, 38 FR 9084, Apr. 10, 1973, as amended by Amdt. 192-27, 41 FR 34605, Aug. 16, 1976; Amdt. 192-58, 53 FR 1635, Jan. 21, 1988; Amdt. 192-67, 56 FR 63771, Dec. 5, 1991; Amdt. 192-72, 59 FR 17281, Apr. 12, 1994; Amdt. 192-78, 61 FR 28783, June 6, 1996; Amdt. 192-81, 62 FR 61695, Nov. 19, 1997; Amdt. 192-85, 63 FR 37501, July 13, 1998; Amdt. 192-89, 65 FR 54443, Sept. 8, 2000; 68 FR 11749, Mar. 12, 2003; Amdt. 192-93, 68 FR 53900, Sept. 15, 2003; Amdt. 192-98, 69 FR 48406, Aug. 10, 2004; Amdt. 192-94, 69 FR 54592, Sept. 9, 2004; 70 FR 3148, Jan. 21, 2005; 70 FR 11139, Mar. 8, 2005; Amdt. 192-112, 74 FR 63326, Dec. 3, 2009; Amdt. 192-114, 75 FR 48601, Aug. 11, 2010]

§ 192.5 Class locations.

(a) This section classifies pipeline locations for purposes of this part. The following criteria apply to classifications under this section.

(1) A "class location unit" is an on-shore area that extends 220 yards (200 meters) on either side of the centerline of any continuous 1-mile (1.6 kilometers) length of pipeline.

(2) Each separate dwelling unit in a multiple dwelling unit building is counted as a separate building intended for human occupancy.

(b) Except as provided in paragraph (c) of this section, pipeline locations are classified as follows:

(1) A Class 1 location is:

(i) An offshore area; or

(ii) Any class location unit that has 10 or fewer buildings intended for human occupancy.

(2) A Class 2 location is any class location unit that has more than 10 but fewer than 46 buildings intended for human occupancy.

(3) A Class 3 location is:

(i) Any class location unit that has 46 or more buildings intended for human occupancy; or

Pipeline and Hazardous Materials Safety Admin., DOT

§ 192.7

(ii) An area where the pipeline lies within 100 yards (91 meters) of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period. (The days and weeks need not be consecutive.)

(4) A Class 4 location is any class location unit where buildings with four or more stories above ground are prevalent.

(c) The length of Class locations 2, 3, and 4 may be adjusted as follows:

(1) A Class 4 location ends 220 yards (200 meters) from the nearest building with four or more stories above ground.

(2) When a cluster of buildings intended for human occupancy requires a Class 2 or 3 location, the class location ends 220 yards (200 meters) from the nearest building in the cluster.

[Amdt. 192-78, 61 FR 28783, June 6, 1996; 61 FR 35139, July 5, 1996, as amended by Amdt. 192-85, 63 FR 37502, July 13, 1998]

§ 192.7 What documents are incorporated by reference partly or wholly in this part?

(a) Any documents or portions thereof incorporated by reference in this part are included in this part as though set out in full. When only a portion of a document is referenced, the remainder is not incorporated in this part.

(b) All incorporated materials are available for inspection in the Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, 1200 New Jersey Avenue, SE., Washington, DC, 20590-0001, 202-366-4595, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030 or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. These materials have been approved for incorporation by reference by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. In addition,

the incorporated materials are available from the respective organizations listed in paragraph (c) (1) of this section.

(c) The full titles of documents incorporated by reference, in whole or in part, are provided herein. The numbers in parentheses indicate applicable editions. For each incorporated document, citations of all affected sections are provided. Earlier editions of currently listed documents or editions of documents listed in previous editions of 49 CFR part 192 may be used for materials and components designed, manufactured, or installed in accordance with these earlier documents at the time they were listed. The user must refer to the appropriate previous edition of 49 CFR part 192 for a listing of the earlier listed editions or documents.

(1) *Incorporated by reference (IBR).*

List of Organizations and Addresses:

A. Pipeline Research Council International, Inc. (PRCI), c/o Technical Toolboxes, 3801 Kirby Drive, Suite 520, Houston, TX 77098.

B. American Petroleum Institute (API), 1220 L Street, NW., Washington, DC 20005.

C. American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428.

D. ASME International (ASME), Three Park Avenue, New York, NY 10016-5990.

E. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS), 127 Park Street, NE., Vienna, VA 22180.

F. National Fire Protection Association (NFPA), 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

G. Plastics Pipe Institute, Inc. (PPI), 1825 Connecticut Avenue, NW., Suite 680, Washington, DC 20009.

H. NACE International (NACE), 1440 South Creek Drive, Houston, TX 77084.

I. Gas Technology Institute (GTI), 1700 South Mount Prospect Road, Des Plaines, IL 60018.

(2) *Documents incorporated by reference.*

Source and name of referenced material	49 CFR reference
A. Pipeline Research Council International (PRCI):	



§ 322.2

the United States, including the territorial seas, pursuant to section 404 of the Clean Water Act (33 U.S.C. 1344; see 33 CFR part 323) and the transportation of dredged material by vessel for purposes of dumping in ocean waters, including the territorial seas, pursuant to section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended (33 U.S.C. 1413; see 33 CFR part 324). A DA permit will also be required under these additional authorities if they are applicable to structures or work in or affecting navigable waters of the United States. Applicants for DA permits under this part should refer to the other cited authorities and implementing regulations for these additional permit requirements to determine whether they also are applicable to their proposed activities.

§ 322.2 Definitions.

For the purpose of this regulation, the following terms are defined:

(a) The term *navigable waters of the United States* and all other terms relating to the geographic scope of jurisdiction are defined at 33 CFR part 329. Generally, they are those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high water mark, and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce.

(b) The term *structure* shall include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other obstacle or obstruction.

(c) The term *work* shall include, without limitation, any dredging or disposal of dredged material, excavation, filling, or other modification of a navigable water of the United States.

(d) The term *letter of permission* means a type of individual permit issued in accordance with the abbreviated procedures of 33 CFR 325.2(e).

(e) The term *individual permit* means a DA authorization that is issued following a case-by-case evaluation of a

33 CFR Ch. II (7–1–10 Edition)

specific structure or work in accordance with the procedures of this regulation and 33 CFR part 325, and a determination that the proposed structure or work is in the public interest pursuant to 33 CFR part 320.

(f) The term *general permit* means a DA authorization that is issued on a nationwide or regional basis for a category or categories of activities when:

(1) Those activities are substantially similar in nature and cause only minimal individual and cumulative environmental impacts; or

(2) The general permit would result in avoiding unnecessary duplication of the regulatory control exercised by another Federal, state, or local agency provided it has been determined that the environmental consequences of the action are individually and cumulatively minimal. (See 33 CFR 325.2(e) and 33 CFR part 330.)

(g) The term *artificial reef* means a structure which is constructed or placed in the navigable waters of the United States or in the waters overlying the outer continental shelf for the purpose of enhancing fishery resources and commercial and recreational fishing opportunities. The term does not include activities or structures such as wing deflectors, bank stabilization, grade stabilization structures, or low flow key ways, all of which may be useful to enhance fisheries resources.

§ 322.3 Activities requiring permits.

(a) *General.* DA permits are required under section 10 for structures and/or work in or affecting navigable waters of the United States except as otherwise provided in § 322.4 below. Certain activities specified in 33 CFR part 330 are permitted by that regulation (“nationwide general permits”). Other activities may be authorized by district or division engineers on a regional basis (“regional general permits”). If an activity is not exempted by section 322.4 of this part or authorized by a general permit, an individual section 10 permit will be required for the proposed activity. Structures or work are in navigable waters of the United States if they are within limits defined in 33 CFR part 329. Structures or work outside these limits are subject to the

Corps of Engineers, Dept. of the Army, DoD

§ 322.5

provisions of law cited in paragraph (a) of this section, if these structures or work affect the course, location, or condition of the waterbody in such a manner as to impact on its navigable capacity. For purposes of a section 10 permit, a tunnel or other structure or work under or over a navigable water of the United States is considered to have an impact on the navigable capacity of the waterbody.

(b) *Outer continental shelf.* DA permits are required for the construction of artificial islands, installations, and other devices on the seabed, to the seaward limit of the outer continental shelf, pursuant to section 4(f) of the Outer Continental Shelf Lands Act as amended. (See 33 CFR 320.2(b).)

(c) *Activities of Federal agencies.* (1) Except as specifically provided in this paragraph, activities of the type described in paragraphs (a) and (b) of this section, done by or on behalf of any Federal agency are subject to the authorization procedures of these regulations. Work or structures in or affecting navigable waters of the United States that are part of the civil works activities of the Corps of Engineers, unless covered by a nationwide or regional general permit issued pursuant to these regulations, are subject to the procedures of separate regulations. Agreement for construction or engineering services performed for other agencies by the Corps of Engineers does not constitute authorization under this regulation. Division and district engineers will therefore advise Federal agencies accordingly, and cooperate to the fullest extent in expediting the processing of their applications.

(2) Congress has delegated to the Secretary of the Army in section 10 the duty to authorize or prohibit certain work or structures in navigable waters of the United States, upon recommendation of the Chief of Engineers. The general legislation by which Federal agencies are empowered to act generally is not considered to be sufficient authorization by Congress to satisfy the purposes of section 10. If an agency asserts that it has Congressional authorization meeting the test of section 10 or would otherwise be exempt from the provisions of section 10, the legislative history and/or provi-

sions of the Act should clearly demonstrate that Congress was approving the exact location and plans from which Congress could have considered the effect on navigable waters of the United States or that Congress intended to exempt that agency from the requirements of section 10. Very often such legislation reserves final approval of plans or construction for the Chief of Engineers. In such cases evaluation and authorization under this regulation are limited by the intent of the statutory language involved.

(3) The policy provisions set out in 33 CFR 320.4(j) relating to state or local certifications and/or authorizations, do not apply to work or structures undertaken by Federal agencies, except where compliance with non-Federal authorization is required by Federal law or Executive policy, e.g., section 313 and section 401 of the Clean Water Act.

§ 322.4 Activities not requiring permits.

(a) Activities that were commenced or completed shoreward of established Federal harbor lines before May 27, 1970 (see 33 CFR 320.4(o)) do not require section 10 permits; however, if those activities involve the discharge of dredged or fill material into waters of the United States after October 18, 1972, a section 404 permit is required. (See 33 CFR part 323.)

(b) Pursuant to section 154 of the Water Resource Development Act of 1976 (Pub. L. 94-587), Department of the Army permits are not required under section 10 to construct wharves and piers in any waterbody, located entirely within one state, that is a navigable water of the United States solely on the basis of its historical use to transport interstate commerce.

§ 322.5 Special policies.

The Secretary of the Army has delegated to the Chief of Engineers the authority to issue or deny section 10 permits. The following additional special policies and procedures shall also be applicable to the evaluation of permit applications under this regulation.

(a) *General.* DA permits are required for structures or work in or affecting navigable waters of the United States. However, certain structures or work

DOE G 430.1-1

03-28-97

COST ESTIMATING GUIDE



U.S. DEPARTMENT OF ENERGY
Associate Deputy Secretary for Field Management

Distribution:
All Departmental Elements

Initiated By:
Associate Deputy Secretary
for Field Management

CHAPTER 11

CONTINGENCY

1. INTRODUCTION

The application of contingency for various types of cost estimates covers the entire life cycle of a project from feasibility studies through execution to closeout. The purpose of the contingency guidelines presented in this chapter is to provide for a standard approach to determining project contingency and improve the understanding of contingency in the project management process. These guidelines have been adopted by the DOE estimating community and should be incorporated into the operating procedures of DOE and operating contractor project team members.

2. CONTINGENCY DEFINITIONS

A. General Contingency

Contingency is an integral part of the total estimated costs of a project. It has been defined as—

[a] specific provision for unforeseeable elements of cost within the defined project scope. [Contingency is] particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur.

This definition has been adopted by the American Association of Cost Engineers. DOE has elected to narrow the scope of this definition and defines contingency as follows.

Covers costs that may result from incomplete design, unforeseen and unpredictable conditions, or uncertainties within the defined project scope. The amount of the contingency will depend on the status of design, procurement, and construction; and the complexity and uncertainties of the component parts of the project. Contingency is not to be used to avoid making an accurate assessment of expected cost.

It is not DOE practice to set aside contingency for major schedule changes or unknown design factors, unanticipated regulatory standards or changes, incomplete or additions to project scope definition, force majeure situations, or congressional budget cuts. Project and operations estimates will always contain contingency. Estimators should be aware that contingency is an integral part of the estimate.

B. Buried Contingencies

Some estimators have sought to hide contingency estimates in order to protect the project so that the final project does not go over budget because the contingency has been removed by outside sources. This is affectionately known as buried contingency. All internal and external estimators should refrain from burying extra contingency allowances within the estimate. A culture of honesty should be promoted so that it is not necessary to bury contingency. In addition, estimators should be aware that estimate reviews will identify buried contingency. The estimate reviewer is obligated to remove buried contingency.

3. SPECIFICATIONS FOR CONTINGENCY ANALYSIS

Considerable latitude has been reserved for estimators and managers in the following contingency analysis specifications. These guidelines are to be followed by both the operating contractor and the DOE field office cost estimators to ensure a consistent and standard approach by the project team. Each contractor and field office should incorporate these guidelines into their operating procedures.

A written contingency analysis and estimate will be performed on all cost estimates and maintained in the estimate documentation file. This analysis is mandatory.

Estimators may use the ranges provided in this chapter of the cost guide for estimating small projects; however, larger projects require a more detailed analysis, including a cost estimate basis and a written description for each contingency allowance assigned to the various parts of the estimate.

Justification must be documented in writing when guide ranges for contingency are not followed. If extraordinary conditions exist that call for higher contingencies, the rationale and basis will be documented in the estimate. Computer programs, such as Independent Cost Estimating Contingency Analyzer (ICECAN), a Monte Carlo analysis program, are available to estimators and should be used to develop contingency factors. Risk analysis may also be necessary.

A. Construction Projects

Table 11-1 presents the contingency allowances by type of construction estimate for the seven standard DOE estimate types, and Table 11-2 presents the guidelines for the major components of a construction project.

Estimate types “a” through “e” in Table 11-1 are primarily an indication of the degree of completeness of the design. Type “f,” current working estimates, found in Table 11-2, depends upon the completeness of design, procurement, and construction. Contingency is calculated on the basis of remaining costs not incurred. Type “g,” the Independent Estimate, may occur at any time, and the corresponding contingency would be used (i.e., “a,” “b,” etc.).

Table 11-1. Contingency Allowance Guide By Type of Estimate	
Type of Estimate	Overall Contingency Allowances % of Remaining Costs Not Incurred
PLANNING (Prior to CDR) Standard Experimental/Special Conditions	20% to 30% Up to 50%
BUDGET (Based upon CDR) Standard Experimental/Special Conditions	15% to 25% Up to 40%
TITLE I	10% to 20%
TITLE II DESIGN	5% to 15%
GOVERNMENT (BID CHECK)	5% to 15% adjusted to suit market conditions
CURRENT WORKING ESTIMATES	See Table 11-2
INDEPENDENT ESTIMATE	To suit status of project and estimator's judgment

The following factors need to be considered to select the contingency for specific items in the estimate while staying within the guideline ranges for each type of estimate.

1. Project Complexity

Unforeseen, uncertain, and unpredictable conditions will exist. Therefore, using the DOE cost code of accounts for construction, the following percents are provided for planning and budget estimates. They are listed in order of increasing complexity:

- Land and Land Rights 5% to 10%
- Improvements to Land/Standard Equipment 10% to 15%

11-4

DOE G 430.1-1
03-28-97

- New Buildings and Additions, Utilities, Other Structures 15% to 20%
- Engineering 15% to 25%
- Building Modifications 15% to 25%
- Special Facilities (Standard) 20% to 30%
- Experimental/Special Conditions Up to 50%

Considerations that affect the selection in the ranges are: state-of-the-art design, required reliability, equipment complexity, construction restraints due to continuity of operation, security, contamination, environmental (weather, terrain, location), scheduling, and other items unique to the project, such as nuclear and waste management permits and reviews.

2. Design Completeness or Status

Regardless of the complexity factors listed above, the degree of detailed design to support the estimate is the more important factor. This factor is the major reason that the ranges in Table 11-1 vary from the high of 20 to 30 percent in the planning estimate to 5 to 15 percent at the completion of Title II design. Again, parts of the estimate may have different degrees of design completion, and the appropriate contingency percent must be used. As can be seen from Figure 11-1, as a project progresses, the contingency range and amount of contingency decreases.

3. Market Conditions

Market condition considerations are an addition or a subtraction from the project cost that can be accounted for in contingency. Obviously, the certainty of the estimate prices will have a major impact. The closer to a firm quoted price for equipment or a position of construction work, the less the contingency can be until reaching 1 to 5 percent for the current working type estimate for fixed-price procurement contracts, 3 to 8 percent for fixed-price construction contracts, and 15 to 17.5 percent contingency for cost-plus contracts that have been awarded.

4. Special Conditions

When the technology has not been selected for a project, an optimistic-pessimistic analysis can be completed. For each competing technology, an estimate is made. The difference in these estimates of the optimistic and pessimistic alternative can be used as the contingency.

DOE G 430.1-1
 03-28-97

11-5

Table 11-2. Contingency Allowances for Current Working Estimates	
	Item Contingency On Remaining Cost Not Incurred
a. ENGINEERING Before Detailed Estimates: After Detailed Estimates:	15% to 25% 10%
b. EQUIPMENT PROCUREMENT Before Bid: Budget Title I Title II After Award: Cost Plus Award Fee (CPAF) Contract Fixed-Price Contract After Delivery to Site (if no rework)	15% to 25% 10% to 20% 5% to 15% 15% 1% to 5% 0%
c. CONSTRUCTION Prior to Award: Budget Title I Title II After Award: CPAF Contract Fixed-Price Contract	15% to 25% 10% to 20% 5% to 15% 15% to 17-1/2% 3% to 8%
d. TOTAL CONTINGENCY (CALCULATED)	Total of above item contingencies

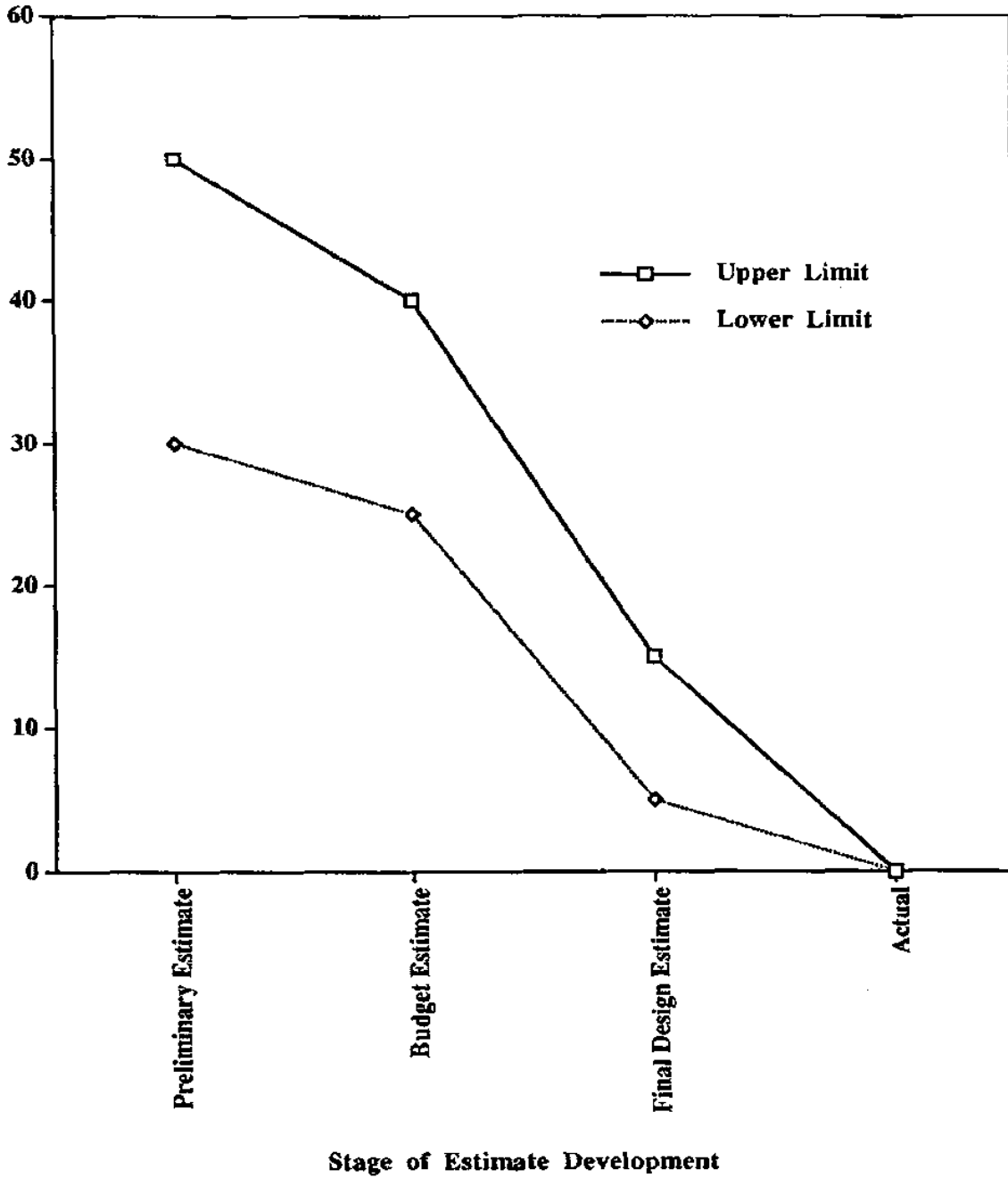


Figure 11-1. Contingency As a Function of Project Life

DOE G 430.1-1
03-28-97

11-7

B. Environmental Restoration Projects

Environmental restoration projects usually consist of an assessment phase and a remediation/cleanup phase. Contingency plays a major role in the cost estimates for both phases. Recommended contingency guidelines for each phase will be discussed below. Table 11-3 lists contingency guidelines for assessment and remediation/cleanup project phases.

1. Assessment Phase

Unlike the remediation phase, the assessment phase does not include the physical construction of a remedy. An assessment determines and evaluates the threat presented by the release and evaluates proposed remedies. As a result, the assessment encompasses such items as field investigations, data analysis, screening and evaluation studies, and the production of reports.

The degree of project definition will depend on how well the scope of the assessment is defined. Higher levels of project definition will correspond to increasing levels of work completed on the assessment. Since the assessment is one of the initial stages of the environmental restoration process, there is a high degree of uncertainty regarding the technical characteristics, legal circumstances, and level of community concern. As a result, the scope of the assessment often evolves into additional operable units, and more than one assessment may be required.

Other considerations that affect the section of contingency ranges are—

- number of alternatives screened and evaluated;
- level and extent of sampling analysis and data evaluation;
- technical and physical characteristics of a site; and
- level of planning required.

Table 11-3 shows the estimate types for the assessment phase of an environmental restoration project and their corresponding expected contingency ranges. No contingency ranges for planning estimates have been provided. The contingencies become smaller as the project progresses and becomes better defined. However, it should be noted that these are only general guidelines based on the level of project definition. A higher or lower contingency may be appropriate depending on the level of project complexity, technical innovation, market innovation, and public acceptance.

Table 11-3. Contingency Guidelines for Environmental Restoration Projects	
Activity and Estimate Type	Expected Contingency Range
Preliminary Assessment/Site Investigation Planning Estimate for All Assessment Activities	Up to 100%
Preliminary Estimate for All Assessment Activities	30% to 70%
Remedial Investigation/Feasibility Study Detailed Estimate for All Assessment Activities	15% to 55%
Planning Estimate for All Cleanup Phase Activities	20 to 100%
Contingency Guidelines for Remediation/Cleanup Phase	
Pre-Design Preliminary Estimate for All Remediation/Cleanup Phase Activities	Up to 50%
Remedial Design and Action Detailed Estimate for All Remediation/Cleanup Phase Activities	0% to 25%

2. Remediation/Cleanup Phase

For the remediation/cleanup phase, contingency factors are applied to the remaining design work. Remaining design work will use the same contingency factor as established in the ROD, permit, or current baseline for the project. This contingency percentage will depend upon the degree of uncertainty associated with the project, particularly the degree of uncertainty in the scheduled completion dates.

Table 11-3 shows the estimate types for the remediation/cleanup phase and their corresponding contingency ranges. While the ranges are relatively broad, they reflect the amount of contingency that would have been needed for a set of completed projects. The wide variance accounts for differences in project definition when the estimate was generated, project complexity, technical innovation, and other factors.

DOE G 430.1-1
03-28-97

11-9

Other considerations that affect the section of contingency ranges are:

- innovative technology;
- required reliability;
- equipment complexity;
- construction restraints due to continuity of operation security and contamination;
- environmental conditions (weather, terrain, location, etc.);
- scheduling; and
- other unique items to the project such as waste management permits and reviews.

Prior to the completion of a remedial/corrective measure design estimate, the contingency applied to remaining cleanup work will be no more than that established in the ROD, permit, or current baseline for that project. The percent contingency will depend upon the complexity of the work and the degree of uncertainties involved.

When the construction work is defined by definitive design but the cleanup contract has not yet been awarded, a 15 to 20 percent contingency will be provided on the estimated cost. Usually, the cost estimate is based on detailed drawings and bills of material. When the cleanup work is to be performed by a Cost Plus Award Fee contractor, and the contractor has prepared a detailed estimate of the cleanup cost, and it has been reviewed and approved, a contingency of 15 to 18 percent is applied to only that portion of the cost and commitments remaining to be accrued. On fixed-price cleanup contracts where no significant change orders, modifications, or potential claims are outstanding, a contingency of 3 to 8 percent of the uncompleted portion of the work is provided depending upon the type of work involved and the general status of the contract.

C. Contingency Tools - Monte Carlo Analyses Methodology

Many tools are available to assist estimators with contingency. There is no required tool or program, but Monte Carlo analyses may be performed for all major system acquisitions. Monte Carlo or risk analysis is used when establishing a baseline or baseline change during budget formulation. The contingency developed from the Monte Carlo analyses should fall within the contingency allowance ranges in Table 11-1.

Monte Carlo analyses and other risk assessment techniques use similar methodology to obtain contingency estimates; however, for illustrative purposes, the ICECAN program developed for DOE will be discussed in this section.

11-10

DOE G 430.1-1
 03-28-97

The estimator must subdivide the estimate into separate phases or tasks and assess the accuracy of the cost estimate data in each phase. After the project data have been input and checked, the computer program will calculate various contingencies for the overall project based on the probability project underrun. The random number generator accounts for the known estimate accuracy. Once the program has completed its iterations (usually 1000), it produces an overall contingency for the project with a certain accuracy.

The following information is an example project estimate that was input into the ICECAN program.

Base Cost	\$1,000,000	Fixed Price
Land Rights	40% \$100,000 to \$250,000 40% \$250,000 to \$500,000 20% \$500,000 to \$600,000	Step-Rectangular Distribution
Labor	50% Less than \$100,000 20% \$100,000 to \$200,000 30% \$200,000 to \$220,000	Discrete Distribution
Profit	Mean = \$235,000 Standard Deviation = \$25,000	Normal Distribution

The distribution of the ranges is based on the estimator's judgment. For example, the base cost is a fixed price of \$1,000,000 with no anticipated change orders. For landrights, there is a 40 percent chance the cost will be between \$100,000 and \$250,000, a 40 percent chance the cost will be between \$250,000 and \$500,000, and a 20 percent chance it will be between \$500,000 and \$600,000. A step-rectangular distribution was chosen.

The ICECAN program uses the mean cost calculated by the iterations as the base estimate. With the base estimate, there is a 50 percent probability that the project will be underrun. The results in Figure 11-2 show the contingency that should be used to achieve various probabilities overrun. For example, a contingency of 11.1 percent should be used to achieve an 85 percent probability of project underrun. Therefore, the total cost estimate would be \$1,901,842. If the worst case cost of each variable had been used, the total estimate would be \$2,080,000 or 21.5 percent contingency.

DOE G 430.1-1
 03-28-97

11-11 (and 11-12)

OFFICIAL COPY

NOV 15 2022

STIMATE FILE: EXAMPLE		ICECAN		Contingency Report	

Cost Estimate: ***\$1,711,863					

Probability of Underrun	Contingency Required		Contingency + Estimate		
0.50	*****\$0	(0.0%)	***\$1,711,863		
0.55	*****\$228	(0.0%)	***\$1,712,091		
0.60	*****\$33,137	(1.9%)	***\$1,745,000		
0.65	*****\$76,269	(4.5%)	***\$1,788,132		
0.70	*****\$111,558	(6.5%)	***\$1,823,421		
0.75	*****\$140,282	(8.2%)	***\$1,852,145		
0.80	*****\$163,372	(9.5%)	***\$1,875,235		
0.85	*****\$189,979	(11.1%)	***\$1,901,842		
0.90	*****\$224,928	(13.1%)	***\$1,936,791		
0.91	*****\$235,725	(13.8%)	***\$1,947,588		
0.92	*****\$248,795	(14.5%)	***\$1,960,658		
0.93	*****\$257,706	(15.1%)	***\$1,969,569		
0.94	*****\$266,618	(15.6%)	***\$1,978,481		
0.95	*****\$278,856	(16.3%)	***\$1,990,719		
0.96	*****\$292,907	(17.1%)	***\$2,004,770		
0.97	*****\$308,836	(18.0%)	***\$2,020,699		
0.98	*****\$321,089	(18.8%)	***\$2,032,952		
0.99	*****\$343,554	(20.1%)	***\$2,055,417		
1.00	*****\$366,427	(21.4%)	***\$2,078,290		

Figure 11-2. Contingency Data Results

2

DUPLICATE COPY

AD-A227 175

**COST-COMPETITIVE CONSTRUCTION
MANAGEMENT: A REVIEW
OF CORPS OF ENGINEERS
CONSTRUCTION MANAGEMENT COSTS**

Report AR603R3

June 1990

William B. Moore
Jeffrey A. Hawkins

ATOMIC
SELECTE
SEP 20 1990
E D
Co

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

Prepared pursuant to Department of Defense Contract MDA903-85-C-0139.
The views expressed here are those of the Logistics Management Institute at
the time of issue but not necessarily those of the Department of Defense.
Permission to quote or reproduce any part must - except for Government
purposes - be obtained from the Logistics Management Institute.

LOGISTICS MANAGEMENT INSTITUTE
6400 Goldsboro Road
Bethesda, Maryland 20817-5886

OFFICIAL COPY

Mar 16 2022

TABLE C-7
SUMMARY OF CONSTRUCTION MANAGEMENT FEE
 (As percent of construction contract)

Characteristic	Construction management fee			Number of projects	Number of companies
	25th	Median	75th		
Overall	2.9%	4.7%	7.6%	196	29
Size of company					
1 - 5	4.6	5.3	11.9	9	2
6 - 10	3.5	5.2	7.1	43	8
11 - 15	3.6	4.0	5.0	8	2
16 - 25	0.7	3.2	9.7	48	5
26 - 50	3.8	4.9	7.3	40	5
51 - 100	3.8	6.4	11.0	13	2
Over 100	2.0	4.5	6.7	35	5
Type of company					
General contractor (GC)	2.9	2.9	2.9	1	1
CM firm	2.2	4.6	8.0	113	13
Architect engineering firm (AE)	2.0	2.3	3.3	9	1
GC/CM	3.3	4.4	6.4	47	8
CM/AE	4.4	7.0	8.4	19	5
Other	3.2	4.8	11.7	7	1
Client base					
Government	2.3	4.8	7.4	71	11
Private sector	2.8	4.5	8.0	106	15
Mixed	3.6	5.0	6.7	19	3

May 1994

ADA283018

U.S. Army Corps of Engineers Military Construction Management Costs

CE309R1

Accession For	
NTIS	<input checked="" type="checkbox"/>
CRA&I	<input checked="" type="checkbox"/>
DTIC	<input type="checkbox"/>
TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

Jordan W. Cassell
Jeffrey A. Hawkins

Prepared pursuant to U.S. Army Corps of Engineers Contract DACW31-90-D-0076. The views expressed here are those of the Logistics Management Institute at the time of issue but not necessarily those of the U.S. Army Corps of Engineers. Permission to quote or reproduce any part except for Government purposes must be obtained from the Logistics Management Institute.

Logistics Management Institute
2000 Corporate Ridge
McLean, Virginia 22102-7805



Table C-6 is a summary of the CM fees for all projects by size of company, type of company, and client base. This analysis supports the earlier statement that the CM fee is not affected by the size of the company. However, this table indicates that the pure CM companies are providing CM services at the least cost regardless of the type of construction project. Also, CM companies providing services primarily for the government are doing so at lower cost than those CM companies providing services primarily for the private sector.

Table C-6.
Summary of Construction Management Fee
(as a percentage of construction contract)

	CM fee			Number of projects	Number of companies
	25 th	Median	75 th		
Overall	3.5%	5.0%	7.1%	187	33*
Size of company (number of employees)					
1 - 5	2.4	5.0	6.6	21	4
6 - 10	4.5	5.9	10.5	29	5
11 - 15	4.6	6.0	8.1	17	5
16 - 25	4.0	4.8	5.5	24	4
26 - 50	3.6	4.9	7.5	33	6
51 - 100	4.6	5.4	9.8	12	2
101 - 100	2.6	6.8	10.3	6	1
251 - 500	4.2	5.7	9.1	16	2
Over 500	1.2	2.5	6.0	29	4
Type of company					
CM firm	3.7	5.0	7.2	108	20
GC/CM firm	4.5	5.1	8.6	30	5
A-E/CM firm	2.2	4.5	6.7	49	8
Client base					
Government	2.8	4.6	6.1	92	17
Private sector	3.6	5.0	8.3	42	9
Mixed	3.8	5.7	9.9	53	7

*Two companies did not provide fee information.

Table C-7 summarizes the CM services provided during each construction project, by survey participants, for all projects. In addition, the table shows the relative weight associated with each phase of CM as it relates to the total cost of the CM contract. The results indicate that the level of services provided during the CM projects has increased from that provided during a 1989 survey. Since the level of service is a major determinant of the total CM cost, the higher level of services would account for the fact that the CM fee determined by the current survey was slightly higher than that calculated from the 1989 survey.



Debris Estimating Field Guide

FEMA 329 / September 2010



FEMA

BUILDINGS AND RESIDENCES

General Building Formula

To estimate the amount of debris generated by a building, multiply the building length, width, and height in feet by a constant of 0.33 to account for the air space in the building, and divide the resulting number by 27 to convert from cubic feet to cubic yards:

$$\frac{\text{Length} \times \text{Width} \times \text{Height} \times 0.33}{27} = \text{CY}$$

Single Family Residence Formula

FEMA conducted an empirical study following Hurricane Floyd in North Carolina in 1999, and developed a formula for estimating debris associated with demolished single family residences:

$$\text{Length} \times \text{Width} \times S \times 0.20 \times \text{VCM} = \text{CY}$$

Length and Width must be in feet

S = number of stories in the building

0.20 = a constant based on the study data

VCM = a vegetative cover multiplier

The building square footage used in the formula is the total living space at and above ground level and includes attached garages.

If buildings or residences are completely destroyed, square footage can still be calculated by measuring the length and width of the foundation and inquiring about the number of stories that were present before the disaster.

CONVERSION FACTORS

USACE has developed several conversion factors for converting between tons and cubic yards of debris that FEMA has determined are reasonable:

Construction and demolition debris:

1 ton = 2 CY

Mixed debris:

1 ton = 4 CY

Vegetative debris:

Hardwoods: 1 ton = 4 CY

Softwoods: 1 ton = 6 CY

Actual conversion values for a particular disaster may be very different; therefore, field tests coordinated with the State and applicant may be necessary to confirm an appropriate conversion factor.

AERIAL ESTIMATES

Applications where debris estimates based on aerial or satellite photography may be appropriate include:

- Rough estimates that must be developed quickly, such as for a PDA
- Validation or extrapolation of debris estimating information obtained through ground measurements or computer models

8/3/2020

"WOOO – PIG – SOOIE!" - The Business of Pipeline Integrity II | RBN Energy



"WOOO – PIG – SOOIE!" - The Business of Pipeline Integrity II

Thursday, 10/31/2013

Published by: Callie Mitchell

The oil and gas pipeline industry depends on "Pigs" (pipeline integrity gauges) to verify pipelines. They help avoid leaks, fractures and costly unscheduled service interruptions. As massive new oil and gas pipeline construction continues in the US and as existing pipelines get older the pig business is becoming more valuable. But like anything else, they aren't perfect; and pigging experts and pipeline operators are motivated to make them better. Today we continue our analysis of the pig business with a look at what some of the movers and shakers are doing to support new demands and challenges in this booming industry.

In the first part of this series, "**WOOO – PIG – SOOIE!**" – **The Business of Pipeline Integrity** (<http://www.rbnenergy.com/woo-pig-sooie-the-business-of-pipeline-integrity>)" we talked about how oil and gas products have been traveling through pipelines for about 100 years. Pigs have been responsible for keeping pipelines clean and operational since the 1940s, when WWII emergency pipelines (carrying crude and refined products overland to avoid submarine attacks) needed a way to eliminate the buildup of contaminants. Pigs are by far the most dependable pipeline integrity technology today and account for over 90% of all petroleum liquid pipeline inspections (the other 10% is hydro pressure testing and direct assessment).

Pigging is big business and while most manufacturers are enjoying the fruits of the current energy boom, they also have plenty of challenges. Companies like TD Williamson, Girard, Enduro, and Inline Services are aggressively competing to provide the best and most effective pig and/or pig support products out there.

More Big Pig Business

Included in the larger pig industry family are pipe manufacturers, pipeline construction companies, pipeline operators, pipeline service providers, state and federal regulators and pig manufacturers. In recent years, there has been increased scrutiny and regulation of the pipeline business for environmental and public safety reasons. Market players need to pay attention to these concerns at the same time as they keep a tight lid on costs.

In addition to pig cleaning and gauging service, and smart pigging or Inline Inspection (ILI) pigs also require specialty support products and services to make them work. These include pig traps (where the pig goes into and out of the pipe), launching and receiving stations, and pig trackers and signalers. Third party suppliers that are not pig manufacturers typically provide these ancillary services.

8/3/2020

"WOOO – PIG – SOOIE!" - The Business of Pipeline Integrity II | RBN Energy

Inline Services and Girard are top cleaning and gauge pig manufacturers. T.D. Williamson and Enduro Pipeline Services produce pigs that pretty much cover the gamut; cleaning, gauging, batching, and smart pigs that include varying specialized design and technologies. The latest smart pig technologies include Deformation (DEF) that is specific to finding dents, Magnetic Flux Leakage (MFL) specific to corrosion, and Multi Data Set (MDS) for multiple discoveries like dents, corrosion and seam defects. New ultrasonic tools are proving even better than traditional MFL tools for finding corrosion and cracks. Unfortunately, they can only be run in a liquid medium pipeline such as oil, water or diesel – not in a gas pipeline. TD Williamson and others have also been working on perfecting Electro Magnetic Acoustic Transducer (EMAT) technology, which can be run in gas lines. We should see these in the marketplace soon.

Top Pigging Challenges

The following are some of the industry's top challenges:

- **Pigging is not cheap:** An industry expert shared this typical example to illustrate: To chemically clean (cleaning pig) a 24" 15 mile gas pipeline would cost between \$210,000 - \$250,000 plus a disposal fee of \$25,000 - \$30,000. This cleaning is typically done before an ILI smart pig operation that costs another \$100,000. So the total pigging cost on that 15 miles of pipeline would be \$335,000 - \$380,000 or roughly \$35,000 per mile. To get an idea of how much money can be spent on pigging you can extrapolate that \$35,000/mile number to arrive at \$59 billion to run this standard pigging operation on all US pipelines one time.
- **Pigs are labor intensive:** Each pig can only handle a few miles at a time on average. Also, they can be quite messy and generate problems for downstream equipment if not filtered properly. They are generally used in "in-service" pipelines necessitating lots of careful planning for operations. Each time a pig is launched, it can take two or three man hours of preparation prior to each launch and some pigging projects require 50-60 launches or more. A typical pigging system requires the opening and/or closing of at least three major valves, the draining and venting of a barrel, and the opening and closing of a closure door. In some cases, it can take up to four hours for a single crew to load and launch a single pig (and that doesn't even include the time to receive and remove the pig). Beyond the time and labor constraints, there are also wear and safety considerations. And of course, should there be any problems with the process, all of this must be done again.
- **Pigs do not catch every glitch in every pipe:** While smart pigs do spot corrosion and potential areas of concern, they can miss pinholes and/or corrosion that is less than 1" in size. And if a cleaning pig does not clean the pipe before the smart pig does its thing, those "misses" multiply. Cleaning pigs generally go hand in hand with smart pigging programs.
- **Not all pipes are piggable:** Many pipelines or parts of pipelines out there simply can't accommodate pigs at all. These are often referred to as "unpiggable" or "not-so-piggable" pipe. There are several reasons for a pipe to be considered unpiggable, including: (1) it has no access for the pig; (2) it has multiple diameters; (3) it has impassable valves or fittings, or valve restrictions; (4) the pipe bends; (5) there are external pipe defects, and/or (6) there is a buildup of contaminants preventing the pig from moving. Of the 2.4 million miles of pipeline in the U.S., roughly 30% falls into the unpiggable category and another 10% are considered "difficult to pig".

8/3/2020

"WOOO – PIG – SOOIE!" - The Business of Pipeline Integrity II | RBN Energy

To access the remainder of "WOOO – PIG – SOOIE!" - *The Business of Pipeline Integrity II* you must be logged as a **RBN Backstage Pass™** (/subscriber/info) subscriber.

Full access to the RBN Energy blog archive which includes any posting more than 5 days old is available only to **RBN Backstage Pass™** (/subscriber/info) subscribers. In addition to blog archive access, **RBN Backstage Pass™** (/subscriber/info) resources include Drill-Down Reports, Spotlight Reports, Spotcheck Indicators, Market Fundamentals Webcasts, Get-Togethers and more. If you have already purchased a subscription, be sure you are **logged in** (/user) For additional help or information, contact us at **info@rbnenergy.com** (mailto:info@rbnenergy.com) or 888-613-8874.

©2020 RBN Energy, LLC. | **Privacy** (/privacy) | **Disclaimer** (/disclaimer)

OFFICIAL COPY

MAR 15 2022



Gas Pipes Abandonment or Deactivation of Facilities

07.16.50.05

Revision 00

Effective Date 12/14/2017

Overview & Applicability

Policy

It is Williams policy to:

1. Abandoned Pipelines in Place

- Disconnect each abandoned in place pipeline from all sources and supplies of gas.
- Purge the pipeline of gas and seal the ends.
- Fill offshore pipelines with water or inert materials and then seal the ends.

2. Inactive Pipelines

- Disconnect inactive pipelines, except service lines, that are not being maintained from all sources and supplies of gas.
- Purge the pipeline of gas and seal the ends.
- Fill offshore pipelines with water or inert materials and then seal the ends.

3. Service Disconnection

- Provide the customer a locking device or other means designed to prevent the closed valve from being opened by unauthorized persons.
- Install a mechanical device or fitting to prevent the flow of gas in the service line or in the meter assembly.
- Disconnect the customer's piping from the gas supply and then seal the open ends.

Purpose

This procedure establishes a standardized method for abandoning or deactivating a pipeline facility, which includes:

- Abandonment by Sale, Removal, or In-Place
- Retirement
- Deactivation
- Service Disconnection

The procedure to abandon or deactivate facilities affects any Williams pipeline facility that crosses over, under, or through an area on land or in a waterway.



Key Activities

Description	Frequency	OMS Activity Number ¹	Maximo Activity Number
Abandonment or Deactivation of Facilities	Varying (V)	0045	

¹ Applicable to Transco, NWP, and Gulfstream.

Qualification References – None for this Operating Requirement

Summary of Responsibilities

Title/Role	Summary of Responsibilities
Manager, Operations	Review requests for an abandonment or deactivation of pipeline facilities from Customer Services. Obtain approval from Director, Operations.
Abandonment Coordinator	Single point of contact for the abandonment process (Operations/Project Manager). Originator and Owner of WGP-0125A – Facility Abandonment Form .
Manager, Land	Report to Federal and State regulatory agencies regarding the abandonment, retirement, or deactivation of offshore facilities.
Manager, Pipeline Safety	Note all abandoned facilities for purposes of updating the DOT Annual Mileage Report and other relevant information maintained by Pipeline & Process Safety.
Manager, GIS Systems & Development	Submit data to the National Pipeline Mapping System (NPMS) for all abandoned offshore or onshore pipeline facilities.



1.0. Abandoning Pipeline (Atlantic–Gulf Operating Areas)

Responsible Party	Action	
Obtaining Authorization		
Manager, Operations	1.1	If Abandonment by Sale, follow the process described in 07.16.50.05-A – Gas Pipes Attachment A—Abandonments by Sale .
	1.2	If Abandonment in Place or by Removal, follow the process described in 07.16.50.05-B – Gas Pipes Attachment B—Abandonments In Place By Removal .
	1.3	Complete WGP-0125A – Facility Abandonment Form (Automated form in SharePoint). NOTES: <ul style="list-style-type: none"> • This form meets the required elements outlined by 09.00.00.01 – Management of Change; therefore, the form serves as an MOCR and a separate MOCR, F09-001A – Management of Change Form form is not required. • Use WGP-0125A – Facility Abandonment Form to track authorization and progress during the Abandonment approval process and the physical work.
Abandonment		
Manager, Operations	1.4	If the abandonment involves gas handling, complete a Gas Handling Plan according to 02.10.102-OG – Gas Pipes Gas Handling Plans and receive appropriate approvals. If the abandonment does not involve gas handling, complete a Work Plan according to 02.10.01.02 – Work Planning and receive appropriate approvals.
	1.5	Include contact with affected customers and landowners in the plan.
	1.6	Disconnect the pipeline to be abandoned from all delivery and receipt points.
	1.7	Purge the pipeline of gas and ensure that a combustible mixture is not present after purging.
	1.8	Fill onshore pipeline with nitrogen, unless special conditions exist.
	1.9	Fill onshore pipeline to be abandoned under roadways with concrete or grout for safety purposes, unless special conditions exist.



Responsible Party	Action	
	1.10	Mark location of abandoned onshore pipelines according to 07.16.01.03 – Installing and Maintaining Line Markers .
	1.11	Fill offshore pipeline with water or inert material and seals both ends. Seals the pipelines with the applicable method: <ul style="list-style-type: none"> • Use normal end closures (caps, plugs, and blind flanges) • Weld steel plates to pipe ends
Report Abandoned Facilities to Authorities		
Manager, Land	1.12	Report to Mineral Management Service, all abandoned facilities that cross over, under, or through offshore Federal waters.
	1.13	Report to the Army Corp. of Engineers all abandoned facilities that cross over, under, or through offshore state waters.
	1.14	Report to Coastal Zone Management all abandoned facilities that are in State waters in Louisiana.
	1.15	Report to the General Land Office all abandoned facilities that are in State waters in Texas.
Manager, Pipeline Safety	1.16	Note all abandoned facilities for the purpose of updating the DOT Annual Mileage Report and other relevant information maintained by Pipeline and Process Safety.
Manager, GIS Systems & Development	1.17	Submit data on abandoned offshore pipeline facility or each abandoned onshore pipeline facility that crosses over, under, or through a commercially navigable waterway to the National Pipeline Mapping System (NPMS).
	1.18	The data submitted to NPMS, in addition to the required attributes, shall contain all reasonably available information related to the facility. Reasonably available information consists of location, diameter, date of abandonment, and method of abandonment. Submittals to the NPMS shall be considered certification that, to the best of Williams knowledge, all of the reasonably available information requested was provided and, to the best of the operator's knowledge, the abandonment was completed in accordance with applicable laws.

2.0. Abandoning Pipeline (West Operating Areas)

Responsible Party	Action
Obtaining Authorization	



Responsible Party	Action	
Manager, Operations	2.1	Review requests for an abandonment or deactivation of pipeline facilities from Customer Services.
	2.2	Obtain approval from Director, Operations.
	2.3	Request assistance of Tactical Projects & Technical Services, if needed.
	2.4	Complete F09-001A – Management of Change Form - Standard or F09-001 – Management of Change Form – Word Version (for temporary and multi-location changes), as applicable, in accordance with 09.00.00.01 – Management of Change .
Abandonment		
Manager, Operations	2.5	If the abandonment involves gas handling, complete a Gas Handling Plan according to 02.10.102-OG – Gas Pipes Gas Handling Plans and receive appropriate approvals. If the abandonment does <u>not</u> involve gas handling, complete a Work Plan according to 02.10.01.02 – Work Planning and receive appropriate approvals.
	2.6	Include contact with affected customers and landowners in the plan.
	2.7	Disconnect the pipeline to be abandoned from all delivery and receipt points.
	2.8	Purge the pipeline of gas and ensure that a combustible mixture is not present after purging.
	2.9	Fill onshore pipeline with nitrogen, unless special conditions exist.
	2.10	Fill onshore pipeline to be abandoned under roadways with concrete or grout for safety purposes, unless special conditions exist.
	2.11	Mark location of abandoned onshore pipelines according to 07.16.01.03 – Installing and Maintaining Line Markers .
	2.12	Fill offshore pipeline with water or inert material and seal both ends. Seal the pipelines with the applicable method: <ul style="list-style-type: none"> • Use normal end closures (caps, plugs, and blind flanges) • Weld steel plates to pipe ends
	2.13	Complete G07-150 – Gas Pipes Abandonment-Deactivation Report (Word version), including an as-built drawing showing the changes. Depict abandoned lines on alignment sheets and Diagrammatic Valve Charts or System Line Diagrams.



Responsible Party	Action	
	2.14	Distribute the completed G07-150 – Gas Pipes Abandonment-Deactivation Report properly and file a copy at the local office. It is recommended that the completed form be scanned and attached to OMS Activity ID #0045.
Report Abandoned Facilities to Authorities		
Manager, Land	2.15	Report to Mineral Management Service, all abandoned facilities that cross over, under, or through offshore Federal waters.
	2.16	Report to the Army Corp of Engineers all abandoned facilities that cross over, under, or through offshore state waters.
	2.17	Report to Coastal Zone Management all abandoned facilities that are in State waters in Louisiana.
	2.18	Report to the General Land Office all abandoned facilities that are in State waters in Texas.
Manager, Pipeline Safety	2.19	Note all abandoned facilities for the purpose of updating the DOT Annual Mileage Report and other relevant information maintained by Pipeline and Process Safety.
Manager, GIS Systems & Development	2.20	Submit data on abandoned offshore pipeline facility or each abandoned onshore pipeline facility that crosses over, under, or through a commercially navigable waterway to the National Pipeline Mapping System (NPMS).
	2.21	The data submitted to NPMS, in addition to the required attributes, shall contain all reasonably available information related to the facility. Reasonably available information consists of location, diameter, date of abandonment, and method of abandonment. Submittals to the NPMS shall be considered certification that, to the best of Williams knowledge, all of the reasonably available information requested was provided and, to the best of the operator's knowledge, the abandonment was completed in accordance with applicable laws.

3.0. Deactivating a Pipeline (All Operating Areas)

The District Manager treats a temporarily deactivated pipeline using the following process:

Responsible Party	Action	
Manager, Operations	3.1	Remove residual hydrocarbons prior to filling the segment of line with water or nitrogen.
	3.2	Put corrosion inhibitor in water if a pipeline segment is offshore and filled with water.



Responsible Party	Action	
	3.3	Do not fill road crossings with grout or concrete until permanently abandoned.
	3.4	Maintain line markers as if the pipeline is in service.
	3.5	Continue DOT—49 CFR Part 192 required activities on the pipeline throughout the period of deactivation.
	3.6	Complete G07-150 – Gas Pipes Abandonment-Deactivation Report (Word version), including an as-built drawing showing the changes. Depict abandoned lines on alignment sheets and Diagrammatic Valve Charts or System Line Diagrams.
	3.7	Distribute the completed G07-150 – Gas Pipes Abandonment-Deactivation Report properly and file a copy at the local office. It is recommended that the completed form be scanned and attached to OMS Activity ID #0045.

4.0. Deactivating a Meter Station Facility (All Operating Areas)

The District Manager must comply with one of the following when temporarily deactivating a customer meter station facility:

Responsible Party	Action	
Manager, Operations	4.1	Use a locking device or other means to lock the valve that is closed to prevent the flow of gas or the opening of the valve by unauthorized personnel. NOTE: Meter station facilities must be maintained according to DOT—49 CFR Part 192 as long as the facilities are physically connected to pipelines containing gas.
	4.2	Install a mechanical device or fitting that prevents the flow of gas in the service line, lateral, or the meter assembly. The mechanical device or fitting installed has a pressure rating commensurate with the Maximum Allowable Operating Pressure (MAOP).
	4.3	Disconnect the piping from the customer’s facilities.
	4.4	Complete G07-150 – Gas Pipes Abandonment-Deactivation Report (Word version), including an as-built drawing showing the changes. Depict abandoned lines on alignment sheets and Diagrammatic Valve Charts or System Line Diagrams.
	4.5	Distribute the completed G07-150 – Gas Pipes Abandonment-Deactivation Report properly and file a copy at the local office. It is



Responsible Party	Action
	recommended that the completed form be scanned and attached to OMS Activity ID #0045.

Recordkeeping

NOTE: For more recordkeeping and retention information, refer to the [WIMS Forms Matrix](#) or the [Records & Information Management \(RIM\)](#) website.

Record	Record Location <i>(Retention requirements apply.)</i>	Retention Period	Distribution Requirements <i>(Retention does not apply.)</i>
WGP-0125A – Facility Abandonment Form (Automated form in SharePoint)	SharePoint	Life of Facility, until sold or removed*	N/A
G07-150 – Gas Pipes Abandonment-Deactivation Report (Word version)	Pipeline & Process Safety Backup: Local Office	Life of Facility, until sold or removed*	GIS Systems & Development Rates & Tariffs Asset Integrity Supervisor Land (Offshore facilities only)
F09-001A – Management of Change Form (Automated form in SharePoint)	SharePoint	Life of Facility	N/A
F09-001 – Management of Change Form (Word version)	Complete header information in SharePoint. Attach completed electronic Word form.	Life of Facility	N/A

Definitions

NOTE: For a complete list of WIMS terms and definitions, refer to the [WIMS Glossary](#).



Term	Definition
Abandoned Pipeline/Segment of Pipeline	Pipeline or segment that is physically separated from its source of gas and is no longer maintained according to DOT—49 CFR Part 192.
Abandoned in Place Meter Station	Meter station that is physically separated from its source of gas and no longer maintained according to DOT—49 CFR Part 192.
Abandoned by Removal Meter Station Facility	Meter station that has been physically removed.
Active Meter Station Facility	Meter station that is being maintained according to DOT—49 CFR Part 192 and is being used to receive or deliver gas.
Deactivation	The process of making the pipeline inactive.
Emergency Plan and Preparedness Manual (EPPM)	The manual that addresses emergency information used in the field at all types of facilities.
Inactive Pipeline	A pipeline that is being maintained according to DOT—49 CFR Part 192, but is not presently being used to transport gas.
Retirement	The permanent inactivation, removal, and closure of an asset rendering it permanently inoperable, such as pipeline abandonment or facility decommissioning.

WIMS References

- [02.10.102-OG – Gas Pipes Gas Handling Plans](#)
- [09.00.00.01 – Management of Change](#)
- [07.16.01.03 – Installing and Maintaining Line Markers](#)
- [02.10.01.02 – Work Planning](#)
- [07.16.50.05-A – Gas Pipes Attachment A—Abandonments by Sale](#)
 - [07.16.50.05-F1 – Gas Pipes Flowchart 1—Abandonments by Sale Decision Making Communication Process](#)
- [07.16.50.05-B – Gas Pipes Attachment B—Abandonments In Place By Removal](#)
 - [07.16.50.05-F2 – Gas Pipes Flowchart 2—Abandonments In Place or by Removal Decision Making Communication Process.pdf](#)
- [07.16.50.05-C – Gas Pipes Attachment C—Abandonments Job Aid](#)



Operating Requirements



Gas Pipes Abandonment or Deactivation of Facilities

Supplemental Information

- N/A

Regulatory References

- DOT 49 CFR 192.727

Change Requests

Responsible Party	Action
Employee	If areas for improvement are observed or this procedure is ineffective, please submit feedback using the Change Request Form .

Revision History

Rev Date	Rev #	Request #	Section #	Description
12/14/2017	00	N/A	N/A	WISOP port to WIMS.



Submittal Coversheet Guide

Document Titles and Numbers

(Numbers to be assigned by WIMS Team)

07.16.50.05 – Gas Pipes Abandonment or Deactivation of Facilities

WiSOP Documents to be Replaced/Archived

(Indicate if any SIP feedback requests are being addressed)

70.15.01 Abandonment or Deactivation of Facilities



Cardinal Pipeline Company, LLC
P.O. Box 1396
Houston, Texas 77251-1396

October 26, 2021

Ms. Shonta Dunston
Chief Clerk
North Carolina Utilities Commission
430 N. Salisbury Street, Dobbs Building
Raleigh, North Carolina 27603

Reference: Depreciation Study, Docket No. G-39, Sub 46

Dear Ms. Dunston:

Cardinal Pipeline Company, LLC (Cardinal or Company) hereby submits for filing its “Depreciation Rate Study” as required by the North Carolina Utilities Commission (Commission) Rule R6-80. The Rule requires each natural gas utility to submit a depreciation study for Commission approval every five years. Cardinal’s existing depreciation rates were contained in Cardinal’s 2016 Depreciation Study and were implemented in Docket No. G-39, Sub 38, Cardinal’s last general rate case effective May 1, 2017.

Cardinal’s Depreciation Rate Study recommends changes in the Company’s existing depreciation rates. The proposed depreciation rates for all accounts are provided in Schedule 1 of the workpapers. Cardinal believes that the depreciation rates reflected on Schedule 1 are reasonable, and requests that the Commission allow Cardinal to implement the proposed changes in conjunction with Cardinal’s next rate case to be filed no later than March 15, 2021.

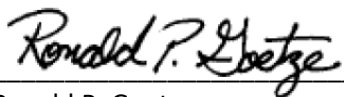
Any communications regarding this filing should be sent to:

Cardinal Pipeline Company
c/o Cardinal Operating Company, LLC
Jordan Kirwin
Director – Rates & Regulatory
Cardinal Operating Company, LLC
P.O. Box 1396
Houston, Texas 77251
Telephone: (713) 215-3723
Email: jordan.kirwin@williams.com

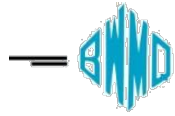
Cardinal Pipeline Company
c/o Cardinal Operating Company, LLC
Carolyn K. McCormick
Senior Counsel
Cardinal Operating Company, LLC
P.O. Box 1396
Houston, Texas 77251
Telephone: (713) 215-4197
Email: carolyn.mccormick@williams.com

Respectfully submitted,

CARDINAL PIPELINE COMPANY, LLC
By its operator,
Cardinal Operating Company, LLC

By 

Ronald P. Goetze
Manager – Rates & Regulatory
Email: ronald.p.goetze@williams.com
(713) 215-4631



BROWN, WILLIAMS, MOORHEAD & QUINN, INC.
ENERGY CONSULTANTS

CARDINAL PIPELINE COMPANY, LLC

DEPRECIATION RATE STUDY AS OF DECEMBER 31, 2020

DOCKET NO. G-39, SUB 46

CARDINAL PIPELINE COMPANY, LLC

Table of Contents

PART I INTRODUCTION AND OVERVIEW2

PART II CARDINAL PIPELINE COMPANY SYSTEM OPERATIONS3

PART III DEPRECIATION THEORY5

Definition5

Depreciation Methodology6

PART IV ECONOMIC LIFE8

PART V SURVIVOR CURVE THEORY11

Survivor Curves12

Iowa Curves13

Survivor Curve Analysis.....16

Judgment.....17

PART VI AVERAGE REMAINING LIVES.....20

PART VII TERMINAL DECOMMISSIONING28

Definition28

Overview.....28

Materials and Resources Consulted.....29

Decommissioning Costs30

TDC Estimate31

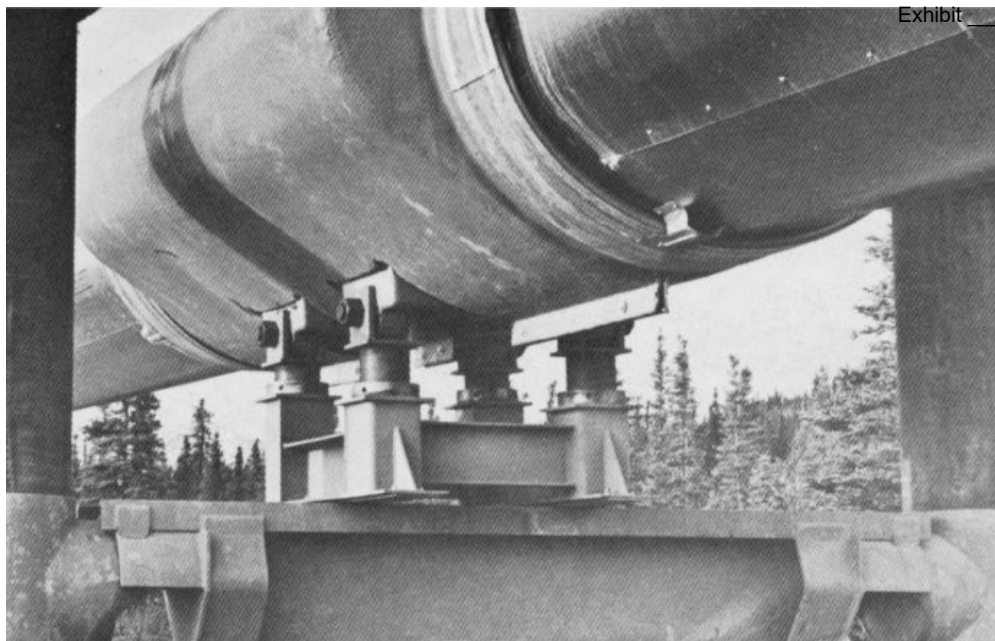
Negative Salvage Calculation.....31

PART VIII DEPRECIATION RATE RECOMMENDATIONS32

Depreciation Workpapers32

OFFICIAL COPY

MAY 15 2022



PART I INTRODUCTION AND OVERVIEW

Brown, Williams, Moorhead & Quinn (BWMQ) is an energy consulting firm providing clients with a wide range of economic and rate-making services in energy transmission industries. The firm concentrates on regulatory energy litigation matters before federal and state regulatory commissions and specializes in those areas that make up the elements of rate case litigation, including advanced depreciation analysis. BWMQ has been engaged by Cardinal Pipeline Company, LLC (Cardinal) to provide analyses, workpapers, and expert support for its planned depreciation rate filing at the North Carolina Utilities Commission (NCUC). See Attachment 4, Steven R. Fall CV for additional background information.

This depreciation study is based on a 2050 remaining economic horizon for Cardinal's trunkline function pipeline assets starting in 2021. This study calculated a set of specific depreciation rates for each property account predicated on survivor curve methodology for the Cardinal system. Our recommendation is that Cardinal adjust its depreciation rates such that the overall composite rate is 2.59%. Specific account-by-account recommendations can be found in Part VI.



PART II CARDINAL PIPELINE COMPANY SYSTEM OPERATIONS

Cardinal is an intrastate natural gas pipeline consisting of 104 miles of 24-inch-diameter pipeline extending from Transcontinental Gas Pipe Line Company, LLC's (Transco) Compressor Station 160 in Rockingham County, North Carolina to the Raleigh, North Carolina area. The Cardinal pipeline system consists of (1) the original 24-inch diameter, 37-mile Cardinal Pipeline, which originates in Rockingham County, North Carolina and extends to the southeast of Burlington, North Carolina to provide 134,550 dekatherms (Dth) per day of firm natural gas transportation capacity, (2) the 24-inch diameter Cardinal Extension, which was placed into service on November 1, 1999, and extends approximately 67-miles from Burlington, North Carolina to the area of Raleigh, North Carolina adding 144,900 Dth per day of firm natural gas transportation capacity, and (3) the 2012 Expansion Project, which was placed into service on June 1, 2012, adding 199,000 Dth per day of firm natural gas transportation capacity through the installation of a 14,205 horsepower greenfield compressor station in Guilford County, North Carolina, and upgrades at certain existing measuring and regulating stations.

The members/owners of Cardinal include subsidiaries of Transco, Public Service Company of North Carolina, Inc., and Piedmont Natural Gas Company, Inc. Cardinal provides 478,450 Dth per day of firm natural gas transportation capacity to its two North Carolina gas utility customers. Gas deliveries from Cardinal for the five years ended December 31, 2020, ranged between approximately 83,000,000 Dth and 89,000,000 Dth per year.

PART III DEPRECIATION THEORY

Definition

Depreciation is a term used in accounting, economics, and finance to convey the concept of the inherent loss of value in an entity's capital assets over time and the associated allocation of that loss in capital value over some defined period. Capital costs are those costs incurred to acquire plant and equipment that will be used over several accounting periods to facilitate the provision of an entity's goods and services. The recovery of the capital costs must occur within the economic lifespan of the asset. The tools used in depreciation analysis are the foundation for allocating capital costs over the useful life of a depreciable asset in order to provide investors the opportunity to recoup their investment in a reasonable and consistent manner during the expected service life of the asset.

Oil and gas pipeline systems are built to safely transport hydrocarbons for many years. Properly maintained, all pipeline assets have very long-life expectancies. However, what goes into the ground as a state-of-the-art industrial asset will, one day, run up against various factors that will cause the asset to be retired. First, simple usage takes its toll on any asset. Under normal usage, every asset has a range of service life expectancy that will define its maximum depreciable life. But various factors can shorten that expectation, such as extreme weather-related damage, third-party damage, or governmental regulations. These often bring an immediate end to the facilities' useful life. Other factors can shorten a life expectation not because the asset itself fails but because changes in technology, methodology, or regulations render the asset obsolete. Improvements in safety, efficiency, or usefulness can lead to the retirement/replacement of assets that might otherwise have remained in service for many years. Depreciation theory allows for the truncation of the useful life of facilities based on these considerations.

A “loss in service value” is the diminishment of the ability of an asset to provide useful service to the entity. Loss in service value occurs broadly from two sources: 1) physical causes such as wear and tear, decay, and action of the elements; and 2) what can be classified as economic causes (inadequacy, technological or economic obsolescence, changes in the art, changes in demand, requirements of public authorities, and the exhaustion of natural resources).

Depreciation Methodology

This study uses the broad group, straight line, average remaining life method of depreciation. Under this method all of the assets within a group are considered to be homogeneous units of plant used and treated alike across the system regardless of the vintage, construction techniques, or retirement rate. In practice, there are two levels of grouping – by account and by function. For natural gas pipelines generally, the accounts are combined into a larger functional group, such as storage or transmission, with one depreciation rate for the whole function.

The depreciable lives of a pipeline entity’s assets are bound by three life expectancy estimates: 1) the average physical service life expectancy of the various classes of property; 2) the estimated remaining life of the resource base supporting the need for the assets; and 3) the estimated remaining economic life of the demand for services provided by the capital assets. These three factors set the stage for calculating the average remaining depreciable life, which also takes into account the truncation date and interim retirements. The service life measures the physical life expectancy of the plant in service, absent specific economic or resource limitations. The remaining life of the resource base measures the expectations for the exhaustion of natural resources and its impact on the assets in question. The remaining economic life is the life expectancy as impacted by economic forces such as changes in regulations, alternative transportation routes, or alternative energy sources. The average remaining depreciable life takes all these factors into consideration to select a life span for use in the depreciation calculations.

Most pipelines incorporate a truncation date in their derivations of depreciation rates to reflect the fact that the average actual useful lifespan of the assets is often significantly shorter than the physical average service life. The incorporation of a truncation date is often unrelated to the physical characteristics of the asset itself but is due to reasons such as the loss of reserves supporting its use, technical obsolescence bringing about replacement, or the requirements of public authorities that may lead to economic obsolescence of certain facilities. The incorporation of a truncation date may cause the remaining life of the assets to be less than the average physical life.



PART IV ECONOMIC LIFE ¹

In an era marked by projections of oil and natural gas reserves approaching a hundred-year supply, contemplating the end-of-life for a natural gas pipeline may seem counterintuitive. Yet climate change concerns are becoming a larger driving force in the development of the future of energy infrastructure. On October 29, 2018, North Carolina Governor Roy Cooper signed Executive Order 80 calling for a “40 percent reduction in statewide greenhouse gas emissions by 2025”, and to “reduce electric power sector greenhouse gas emissions by 70% below 2005 levels by 2030, and attain carbon neutrality by 2050.”² In addition, on January 27, 2021, the United States president issued Executive Order 14008³ (“EO 14008”). Executive Order 14008, Section 201, states:

¹ The remaining economic life was developed based on the current political landscape and environmental path. Cardinal is required to file a new depreciation study within 5 years and remaining economic life will be reassessed at that time.

² https://files.nc.gov/ncdeq/climate-change/clean-energy-plan/NC_Clean_Energy_Plan_OCT_2019_.pdf

³ <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/>

Sec. 201. Policy. Even as our Nation emerges from profound public health and economic crises borne of a pandemic, we face a climate crisis that threatens our people and communities, public health and economy, and, starkly, our ability to live on planet Earth. Despite the peril that is already evident, there is promise in the solutions—opportunities to create well-paying union jobs to build a modern and sustainable infrastructure, deliver an equitable, clean energy future, and put the United States on a path to achieve net-zero emissions, economy-wide, by no later than 2050.

Section 201 of EO 14008 establishes that it is the policy of the federal government’s agencies to implement government-wide approaches to achieve net-zero emissions, economy-wide, by no later than 2050. Additionally, Section 205 of EO 14008 establishes a plan to reach a “carbon pollution-free electricity sector no later than 2035”:

Sec. 205. Federal Clean Electricity and Vehicle Procurement Strategy. (a) The Chair of the Council on Environmental Quality, the Administrator of General Services, and the Director of the Office and Management and Budget, in coordination with the Secretary of Commerce, the Secretary of Labor, the Secretary of Energy, and the heads of other relevant agencies, shall assist the National Climate Advisor, through the Task Force established in section 203 of this order, in developing a comprehensive plan to create good jobs and stimulate clean energy industries by revitalizing the Federal Government’s sustainability efforts.

(b) The plan shall aim to use, as appropriate and consistent with applicable law, all available procurement authorities to achieve or facilitate:

(i) a carbon pollution-free electricity sector no later than 2035; and

(ii) clean and zero-emission vehicles for Federal, State, local, and Tribal government fleets, including vehicles of the United States Postal Service.

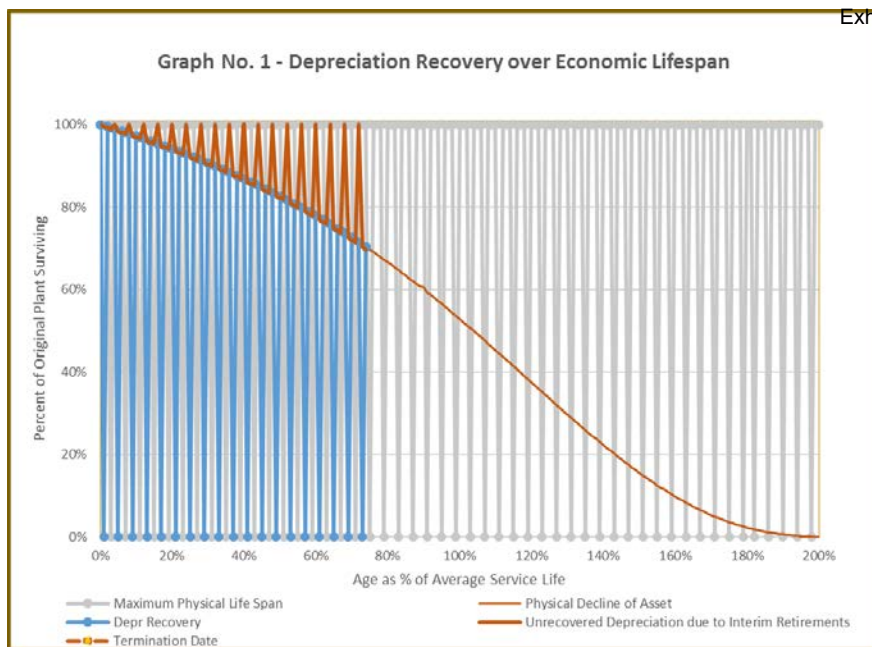
(c) If necessary, the plan shall recommend any additional legislation needed to accomplish these objectives.

(d) The plan shall also aim to ensure that the United States retains the union jobs integral to and involved in running and maintaining clean and zero-emission fleets, while spurring the creation of union jobs in the manufacture of those new vehicles. The plan shall be submitted to the Task Force within 90 days of the date of this order.

It is uncertain how the goals of these Executive Orders will be achieved, but if they do come to fruition, it is reasonable to believe that the effort to reach net-zero emissions by 2050 may result in (i) a substantial decrease in the consumption of natural gas, including the natural gas transported on Cardinal, (ii) a resulting substantial decrease in the utilization of natural gas infrastructure, and (iii) an increase in the use of alternate energy sources.

In addition, 58 percent of Cardinal’s capacity is contracted under agreements that are already in “evergreen” status, i.e., beyond expiration of their primary terms, and subject to unilateral termination by Cardinal’s shippers on short notice. The remaining 42 percent

of capacity will be in “evergreen” status in 2032. Moreover, Cardinal’s competitors are competing for both new and existing business throughout the Cardinal market area through proposed new and existing pipelines with designed expansion capabilities. As such, proposing an economic life truncated at 2050 for ratemaking purposes is reasonable given Cardinal’s shippers’ rights to terminate their agreements, the potential for development of alternative options to supply their natural gas needs, and the uncertainty of how Executive Orders’ 80 and 14008 shared goal of a 2050 net-zero horizon will affect natural gas demand.



PART V SURVIVOR CURVE THEORY

The physical plant of large industrial entities is made up of thousands of units of property. For some property accounts, the items in the account are homogeneous in nature, for example, Account No. 367 – Mains is made up of line pipe, period. Other accounts, such as Account No. 368 – Compressor Station Equipment includes mostly the same type of equipment but in a variety of sizes, manufacturers, and operational uses.

The grouping of assets requires the evaluation of lifespans in terms of averages. As with any large grouping, some individuals in the group will live longer than others. While some will drop out of service relatively early, others could physically last long beyond the economic need to use them. It is important that the recovery of investment through depreciation accruals calculates the *average* life expectancy of each grouping of assets to ensure that all the dollars are recovered over the average usefulness of the assets.

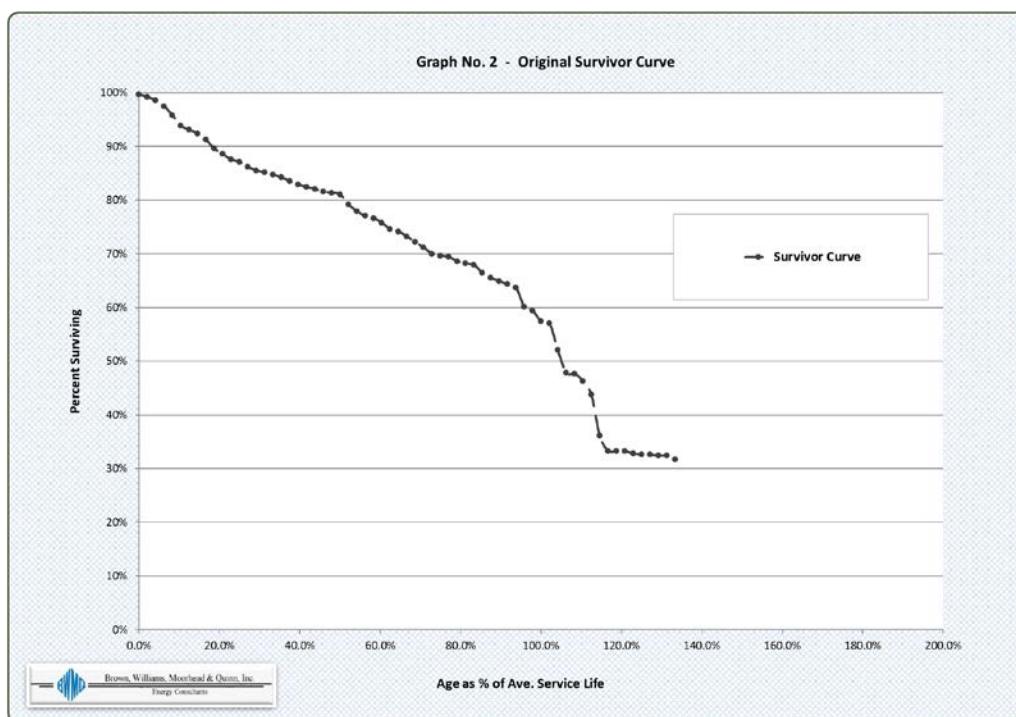
For depreciation purposes, knowing the average service life of plant and equipment allows for an accommodation in the depreciation rate derivation to reflect that plant retires over the years, causing a decline in the depreciation base and a possible shortfall in capital recovery as illustrated in Graph No. 1. A straight-line accrual rate (across the top at 100% surviving) will miss the recovery of plant retired before the termination date.

Survivor Curves

Deriving that estimated average service life is the foundation of depreciation rate development. Unfortunately, property account records often do not provide sufficient information to make a judgment of what the service life is. That assessment requires a comparison of the plant record retirement data with a set of already-identified asset survivorship decline curves. A survivor curve analysis reveals which of the 660 possible survivorship patterns best reflects the experience of the particular property account. This assessment can be made using either of two survivor curve methodologies depending on what kind of data is available. The Vintage Plant Retirement method is preferred when vintaged data is available. However, the Simulated Plant Record method is the more commonly used method because vintage data is often not available.

The Vintage Plant Retirement method starts with the development of the Original Survivor Curve, which reflects the survivorship pattern of the original plant data. Vintaged data records the matrix of both the *transaction year* of the plant retirement and the *vintage year* in which it was installed. The matrix of transaction year / vintage year data is converted into a matrix of plant exposed to retirement each year by vintage, and then converted again into a third matrix, of plant exposed to retirement each year by age group. A fourth matrix is constructed of plant retirement by age grouping. These matrices provide two data sets: plant exposed by age group and plant retired by age group. In other words, all the plant additions through the study date were at one time one-year old (actually ½ year old because some plant does retire in its first year), hence, the total of all plant additions is the starting point. But not all plant survived to become two years old and of course there is one less year (the most recent year) available to be counted among the two-year-olds. Similarly, not all plant survived to become three years old and there is now two less years

(the most recent two years) available to be counted among the three-year-olds. And so on through the history of plant activity. The aged retirement data set is used to calculate a retirement rate (retirements by age divided by plant exposed to retirement by the same age). The retirement rate is then converted into a survivorship decline rate data set. But its average service life is still not known. Once the string of aged retirements is assembled, summation of surviving aged plant and aged retirements reveals the actual experienced survival for the account, which when plotted becomes the original survivor curve for that specific account as illustrated in Graph No. 2. (The graph assumes an average service life for plotting purposes but the next step in the process determines the most likely average service life.)

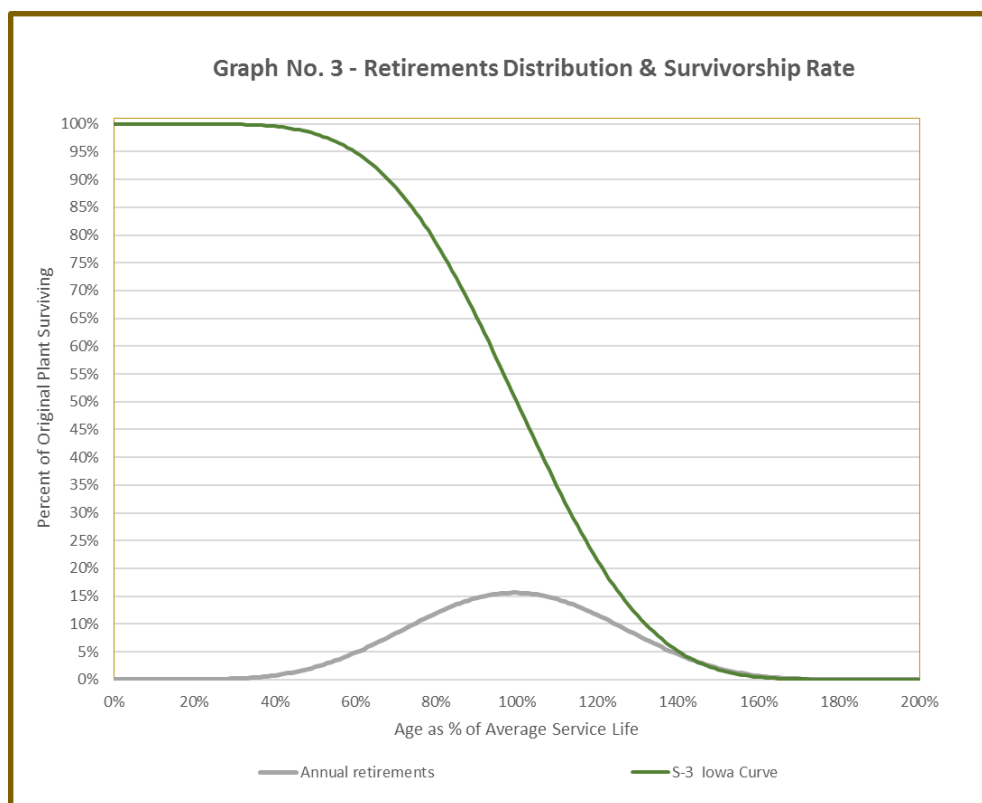


Iowa Curves

Once the original survivor curve is obtained, the question turns to what should be expected of that account in terms of future retirements. For this aspect of the study, we look to prototype curves that mimic the pattern of our original account activity. The retirement ratios that characterize the curves are applied to the surviving plant in service to generate interim retirement dollars. While there are a few options for typical curve

patterns, the Iowa Type Survivor curves are the most commonly used for depreciation purposes and are the curves used for this study.

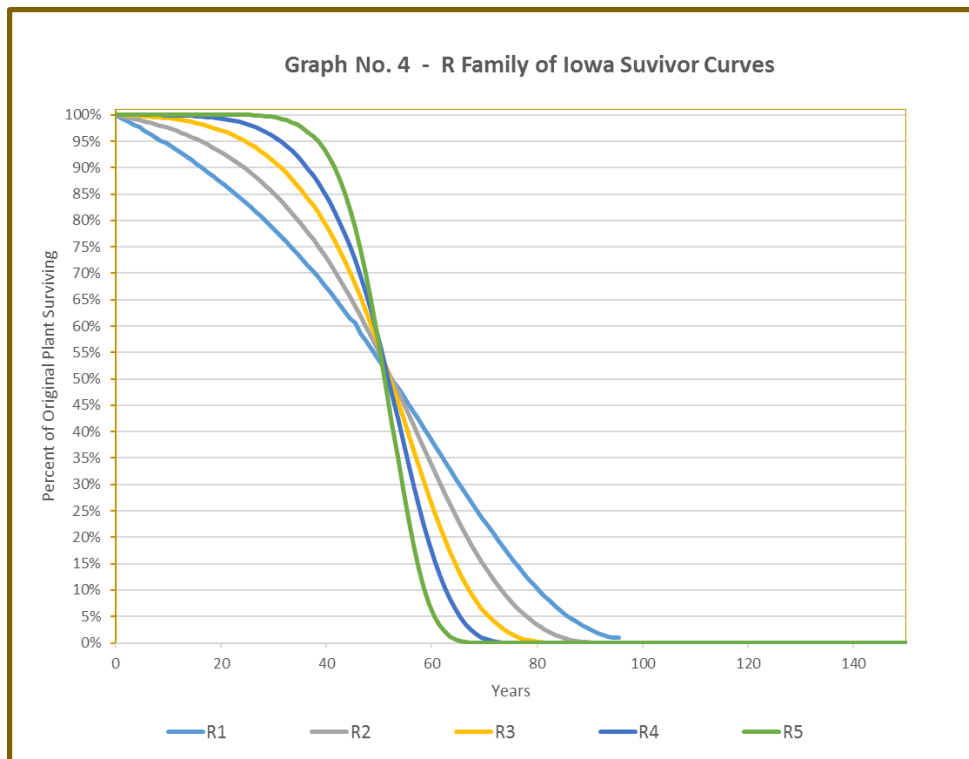
Iowa Curves represent standardized retirement patterns of industrial property developed from actuarial studies conducted in the 1930s where it was found that the retirement patterns of industrial property do not follow a straight line but rather are characterized by a complex life trajectory which includes a transition point where survivorship takes a dramatic downward turn. The retirement rate and survivorship rate are inversely related phenomena. The upside-down bell curve shape of retirement frequency distribution creates the ski-slope shape survivorship curve created by the frequency distribution of aged retirements as illustrated in Graph No. 3.

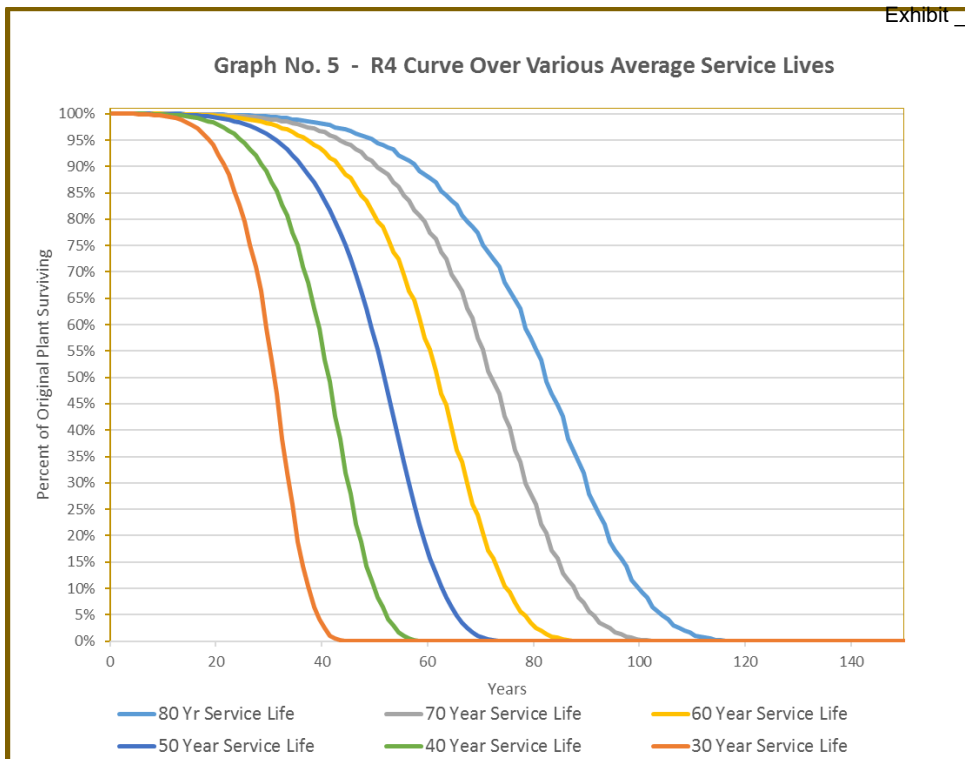


After a period of substantial retirements, the retirement pattern passes through another transition point where retirements fall off, leaving a long tail of lingering survivorship. The overall lifespan survivorship trajectory for most industrial property follows this ski slope pattern that, despite an appearance of simplicity, requires complex

mathematical formulae to replicate. The most common patterns were standardized as “the Iowa Survivorship Curves.”

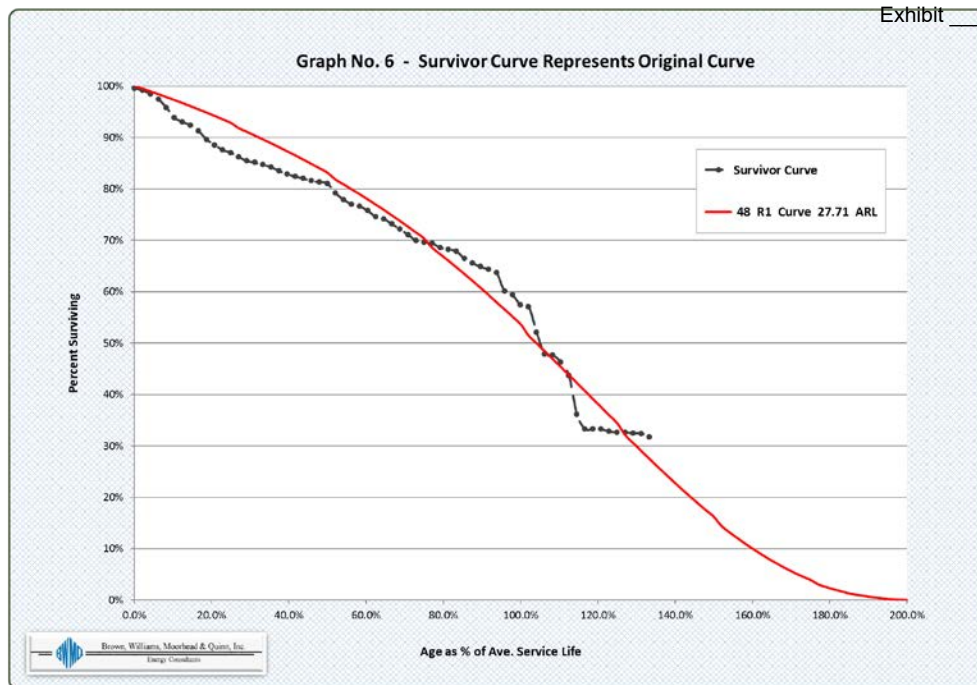
The Iowa Curves consist of families of curves that reflect left-modal, symmetrical-modal, and right-modal frequency distributions, simply called L, S, and R curves, plus a family of origin-related distribution curves, O curves. Each family of curves includes four to five curve sets within the family, labeled R₁, R₂, R₃, and so on, each with slightly different slope configurations (Graph No. 4). Further, each curve has representatives from each average service life age group from 5 years to 120 years (Graph No. 5). The modality of the curves simply reflects whether the most frequently occurring retirement age is 1) younger than the average retirement age – an L Curve (i.e., to the left of the average service life on a graph), or 2) older than the average retirement age – an R Curve (i.e., to the right of the average service life), or 3) equal to the average retirement age – an S Curve (i.e., symmetrical to the average service life).





Survivor Curve Analysis

The survivor curve analysis primarily deals with two survivor curves: one being the original curve that traces the actual surviving dollars from each vintage of plant addition and the other a prototypical Iowa Curve selected to carry the trend of the actual data out into the future for forecasting purposes. Once the original data is synthesized into an original experience survival curve (Graph No. 2 above), the curve is compared to 2,530 prototypical curves (Graph Nos. 4 & 5) to find one that will best forecast the most likely service life experience of the plant (Graph No. 6).

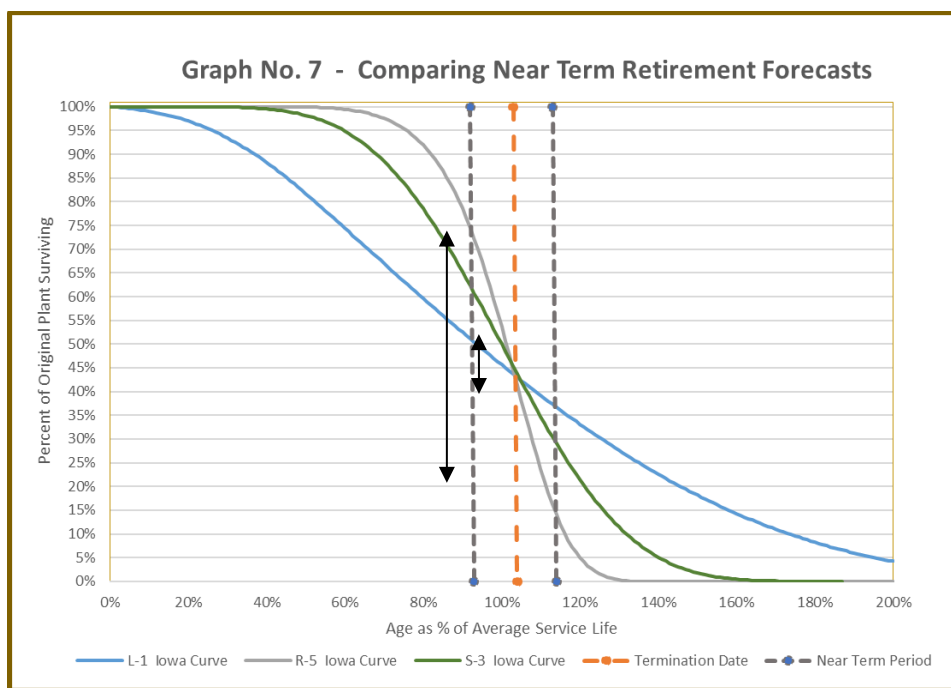


Judgment

Survivor curve models generally use a test statistic called the least sum-of-squares test to measure the accuracy of their forecasts. The sum-of-squares calculation measures the differences between the actual and forecasted curves along the entire span of the curve from 0 to 200 percent of the average service life. The differences are squared to eliminate positive and negative differences from cancelling each other out as well as to accentuate deviations. The curve with the least sum of squared difference between the actual book value of the account and the predicted value of the account is generally the best fitting curve and, unless some other factor weighs heavily in the analysis, that curve will be used to forecast future retirements.

However, the Iowa Curve with the least sum of squared differences may fit the *overall* pattern of the original survivor curve but may not fit the portion of the original life curve relevant to the timely recovery of the utility's investments. For depreciation purposes, the interim period between the study date and the termination date defines the period over which the remaining undepreciated plant investment must be recovered. The

economic lifespan may come to an end long before the physical lifespan. Tracking the retirement pattern over the interim period is more important for estimating the average remaining life relevant to recovery of these assets than tracking a long-term pattern that will not come to pass due to the truncation of the life of the assets. Hence, the selection of a curve is derived by a combination of statistical comparison and informed knowledge of the nature of the assets. There can be a significant difference in the forecasted retirements among the contending curve and average service life (ASL) pairs, and thus a significant difference in the derived depreciation rate. The slope of the retirement curve during the interim period can be a critical factor, as seen in the difference between the decline in the gray line versus the blue line in Graph No. 7.



As noted in the Survivor Curve Theory discussion earlier, the statistical “best fit” service life/survivor curve pair may reflect physical life span that is much longer than the economic lifespan within which the investment must be recovered. Together, these plant histories help inform the selection of the most appropriate survivor curves and service lives. An analysis of account-by-account retirement patterns and survivor curves is presented below.

In order to make “apples-to-apples” comparisons for best fit status, the service life of the original survivor curve is adjusted to reflect that of the prototype curve against which its being tested. In other words, we assume a 20-year service life when comparing to 20-year curves, and 25-year service life when comparing to 25-year curves, and so on. This is done by converting the age into the age as a percent of the assumed average service life. The prototype curves are also converted into age-as-percent-of-average-service-life. The BWMQ model calculates the best-fitting Iowa Curve.



PART VI AVERAGE REMAINING LIVES

Using the selected best fit service life and survivor curve pairing, the BWMQ model proceeds to estimate the average remaining life. The future annual surviving plant balance is calculated via the survivor curve decline rate given the approximate average age of the plant in service and the surviving plant balance at the time of the study. Then the future annual balances are summed and divided by the beginning balance to arrive at the average remaining life estimate. The calculations are truncated at 2050 to reflect a reasonable economic useful horizon for the assets. The results of the application of the BWMQ model to Cardinal are calculated in Attachment 1 and discussed in detail below.

Intangible Plant

Account No. 302

Account No. 302, Franchises and Consents shall include the book cost paid to the Federal Government, to a State or to a political subdivision thereof in consideration for franchises, consents, or certificates. Account No. 302, which has an average age of 22

years, does not have any recent retirements. As such, the standard goodness-of-fit test measures are not relevant. In lieu of data-driven curve indicators, we have selected the longest ASL in our study of 85 (Account No. 368) and the corresponding average remaining life (ARL) in Schedule 7 of Attachment 1 at 28.63 for a resulting depreciation rate of 0.55%. A negative salvage rate was not applied as Intangible plant does not have negative salvage.

Account No. 303

Account No. 303, Miscellaneous Intangible Plant shall include the cost of patent rights, licenses, privileges, and other intangible property necessary or valuable in the conduct of the utility's gas operations. In this account, the costs recorded were for work performed on a third-party system relating to metering facilities. Account No. 303, which has an average age of 20.40 years, does not have any recent retirements and as such, the standard goodness-of-fit test measures are not relevant. Again, in lieu of data-driven curve indicators, and based on the assets within the account, we used an ASL of 60 and ARL of 27.60 calculated in Account No. 369 for a resulting depreciation rate of 1.57%. A negative salvage rate was not applied as Intangible plant does not have negative salvage.

Account Nos. 365.11 and 365.12

Account Nos. 365.11 and 365.12 are designated for Land (365.11) which includes the cost of land purchased in fee for use in pipeline operations and limited rights to use land (Account No. 365.12). The accounts include the costs of clearing the land of vegetation and structures as needed for pipeline installation. Land is not depreciable; however, Land Rights are depreciable. Account No. 365.12, which has an average age of 22 years, does not have any recent retirements. As such, the standard goodness-of-fit test measures are not relevant. In lieu of data-driven curve indicators, we have selected an industry standard curve, the 65-R2, as a placeholder for curve selection until such time as sufficient retirements can provide better guidance. Given the average age and selected Iowa curve, Account No. 365.12 has an ARL of 26.39 resulting in a depreciation rate of

1.93%. Because, little or no removal cost is incurred and no salvage is received at the retirement of land rights, we recommend a negative salvage rate of 0.0% for this account.

Account No. 365.2

Account No. 365.2, Rights of Way, includes the cost of acquiring the rights of way, or permission, to use land for pipeline operations. Rights of Way agreements are in use for the entire life span of the facilities placed upon them, hence, the average service life often reflects that of the longest-lived asset, the pipeline itself. Cardinal's 2004-2020 Form 2A data indicated no recent retirement activity. Again, we have selected an industry standard curve, the 65-R2, as a placeholder for curve selection until such time as sufficient retirements can provide better guidance. Given the account's 16.72-year average age, we calculated an ARL of 26.84 which results in a depreciation rate of 1.90%. Adding the negative salvage rate of 0.07% brings about a composite depreciation and negative salvage rate of 1.97%.

Account No. 366.1

Account No. 366.1, Compressor Station Structures and Improvements includes the cost in place of structures and improvements used in connection with compressor station operations. Cardinal's 2004-2020 Form 2A data indicated no recent retirement activity. We selected an industry standard curve, the 45-R2, as a placeholder for curve selection until such time as sufficient retirements can provide better guidance. Given the account's average age of 9.00 years, we calculated an ARL of 25.70, which generates a depreciation rate of 3.03%. Adding the negative salvage rate of 0.48% brings about a composite total of 3.51%.

Account No. 366.2

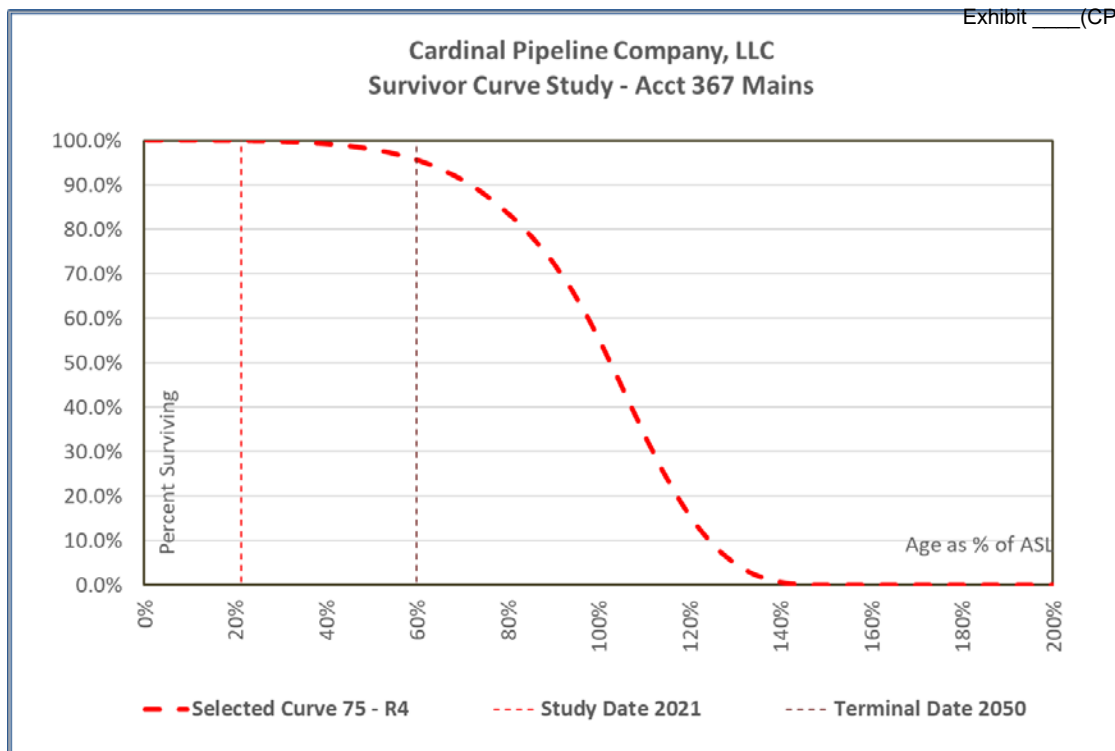
Account No. 366.2, Meter Station Structures and Improvements includes the cost in place of structures and improvements used in connection with meter station operations. Cardinal's 2004-2020 Form 2A data indicated no recent retirement activity. We again selected an industry standard curve, the 45-R2, as a placeholder for curve selection until such time as sufficient retirements can provide better guidance. Given the account's average age of 16.30, we calculated an ARL of 24.18 using an industry accepted 45-R2, which results in a depreciation rate of 2.60%. Adding the negative salvage rate of 0.25% generates a composite rate of 2.85%.

Account No. 367

Account No. 367, Mains, records the original cost of the line pipe actually installed. Line pipe is a long-lived asset that with proper corrosion maintenance can last for many decades. Cardinal's 2004-2020 Form 2A data indicated that Account No. 367 maintains a long-term stability with few incidents of retirements periods.

The Survivor Curve graph for Account 367, below, presents the best fit pair of average service life and Iowa survivor curve. The 75-R4 Curve appears to fit the data better than the other curves (see Attachment 2, Best 5-Year Retirement Predictors chart). The 75-R4 Curve will be used to estimate future retirements from current surviving plant balances. Applying the 75-R4 Curve to the current plant in service, with its average age of 16.02 years and a 2050 truncation forecast, results in a 28.63-year ARL with a 1.75% depreciation rate. Adding 0.75%⁴ for negative salvage rate brings about a 2.50% composite depreciation rate.

⁴ This rate includes the costs of Cardinal's ARO and any negative salvage recovery will be sourced to the recovery of legal obligations first.

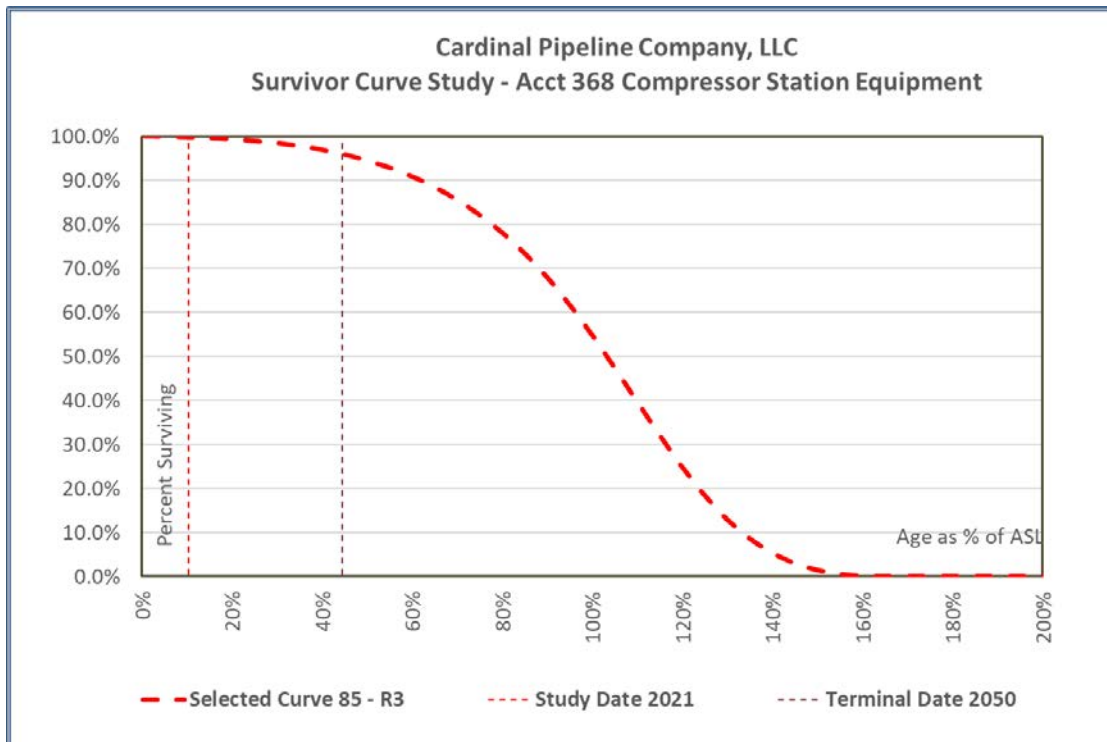


Account No. 368

Account No. 368, Compressor Station Equipment includes the cost installed of compressor station equipment and associated appliances used in connection with transmission system operations. The Account No. 368 asset list is made up of compressor air system equipment, compressors, foundations, electrical systems, firefighting equipment, gas lines, laboratory equipment, lubricating oil systems, office furniture and fixtures, shop tools and water supply systems. Cardinal's 2004-2020 Form 2A data indicates that Account No. 368 maintains a short-term stability with one recent incident of retirement in 2016.

The Net Additions and Retirements graph again reflects only one retirement in its recent history. The Survivor Curve graph for Account 368, below, presents the best fit pairs of average service life and Iowa survivor curve. The 85-R3 Curve appears to fit the data better than the other curves and will be used to estimate future retirements from current surviving plant balances (see Attachment 2, Best 5-Year Retirement Predictors). Applying the 85-R3 Curve to the current plant in service, with its average age of 8.87 years, results

in a 28.59-year ARL, which generates a 2.63% depreciation rate. Adding the negative salvage rate of 0.31% brings about a composite total of 2.94%

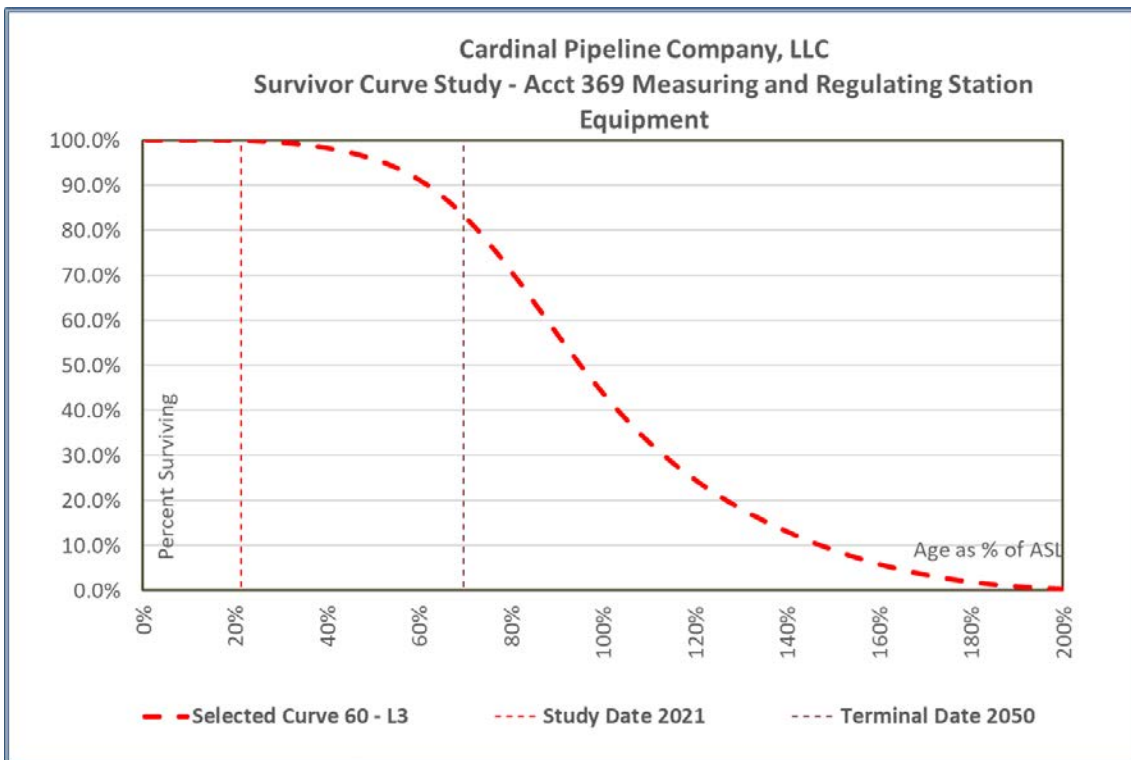


Account No. 369

Account No. 369, Meter Station Equipment includes the cost installed of meters, gauges, and other equipment used in measuring or regulating gas in connection with transmission system operations. The Account No. 369 asset list is made up of automatic control equipment, boilers, heaters, foundations, gas cleaners/scrubbers/separators/dehydrators, gauges and instruments, headers, meters, oil fogging equipment, odorizing equipment, regulators and governors, and structures. The 2004-2020 Form 2A data indicate that Account No. 369 maintains a short-term stability with two recent incidents of retirements periods, 2016 and 2019.

The Survivor Curve graph for Account 369, below, presents the best fit pairs of average service life and Iowa survivor curve. The 60-L3 Curve appears to fit the data better

than the other curves and will be used to estimate future retirements from current surviving plant balances (see Attachment 2, Best 5-Year Retirement Predictors chart). Applying the 60-L3 Curve to the current plant in service, with its average age of 12.83 years, results in a 27.60-year ARL, which generates a 2.13% depreciation rate. Adding a negative salvage rate of 0.36% brings about a 2.49% composite depreciation rate.



General Plant

The depreciation rates for general plant assets and facilities are often calculated on a basis that reflects a higher turnover and shorter lifespan. There are three common methods of developing general plant depreciation rates: whole life, vintage plant accounting, and turn-over. Whole life rates are calculated by dividing 1 by the estimated ASL. Under vintaged accounting, general plant account assets face retirement at a uniform age regardless of condition of any individual asset. For example, automobiles within a fleet might be retired at four years, regardless of miles driven or condition of the car. Under the turn-over rate model, the depreciation rate is set by the average rate at which plant retires from each account. I selected the whole life rate due to the relatively young age of

the plant resulting in limited retirement data. These calculations are shown in Schedule No. 5 of Attachment 1. The average service lives were taken from the United States Office of Management and Budget (US OMB) Useful Life and Disposal Table to calculate an appropriate placeholder depreciation rate for accounts under general plant:

General Plant

		US OMB Life Tables ¹	
390.0	Struct. & Impr. - Office Bldg	10.00	10.00%
391.0	Office Furniture & Equipment		
-	OFF001- Tower Office Furn. & Equip.	10.00	10.00%
-	DPC001-Data Process & Comp. Equip.	8.00	12.50%
-	DEV001-Developed Software	15.00	6.67%
392.1	Transportation Equipment	6.00	16.67%
394.0	Tools Shop & Garage Equipment	20.00	5.00%
396.0	Power Operated Equipment	10.00	10.00%
397.0	Communication Equipment	23.00	4.35%

¹ - Average service lives taken from United States Office of Management and Budget Useful Life and Disposal Table



PART VII TERMINAL DECOMMISSIONING

Definition

Terminal decommissioning refers to the dismantlement and removal of the entire network at the end of its useful life. Terminal decommissioning is, by definition, happening at the end of the useful life so it will not be replaced, and the full cost of retirement will be apparent and should be fully recovered. By contrast, interim retirement refers to the replacement of facilities required to maintain the system during the system's useful life captured within Cardinal's negative salvage calculation and rate determination.

Overview

A Terminal Decommissioning Cost (TDC) estimate is an assessment of the cost for Cardinal to cease system operations, remove, as appropriate, plant in service, and restore the rights of way to preconstruction condition at the end of the system's useful life. Cardinal's TDC estimate includes an estimate of the salvage value of equipment and facilities as an offset against decommissioning and associated costs.

A retirement cost analysis includes the cost of removal of all above-ground facilities and any costs associated with the restoration of the surface and sub-surface land. There are many steps involved with restoring land. All underground transmission pipe would need to be cleaned and purged, capped, and abandoned through complete removal or in place. All railroad crossings, highway and road crossings, and small stream and river crossings would be abandoned in place. Further, all remote valve sites, cathodic protection facilities, pipeline markers, measurement and regulation facilities, compressor stations and other above-ground facilities would be removed, and the sites restored.

Although there are many unknowns regarding the cost of a future decommissioning of the system, it is certain that, eventually, the services will be discontinued, and the system will be dismantled. This study reports the estimated cost to dismantle and remove today's pipeline system at today's costs so that current customers pay their fair share of abandonment costs. The retirement of plant between now and the terminal date, known as "interim retirements," generates costs of removal.

Materials and Resources Consulted

I reviewed the following materials issued by the U.S. Department of Transportation ("DOT"): (1) minimum safety regulations for abandonment of facilities; (2) guidelines to purge pipelines; and (3) line pipe Class Location Guidelines. Secondly, I reviewed 33 C.F.R. § 322.3, regarding permits from the U.S. Army Corps of Engineers for work in and around navigable waters of the United States. Third, I reviewed 49 CFR Part 192, Section 727, abandonment or deactivation of facilities. Fourth, I reviewed Chapter 11, Contingency, of the U.S. Department of Energy's ("DOE") *Cost Estimating Guide*, as well as the U.S. Army Corps of Engineers' publication, *Engineering and Design: Civil Works Cost Engineering*, relating to contingency costs. Finally, I reviewed Army Corps of Engineers publications *Cost-Competitive Construction Management: A Review of Corps of Engineers Construction Management Costs* and *U.S. Army Corps of Engineers Military Construction Management Cost* regarding construction management cost data used to develop private-sector costs for providing construction management services.

I also reviewed Cardinal plant asset data. In addition, I reviewed current labor rates and construction cost information in engineering industry publications. I also reviewed the Federal Emergency Management Agency's ("FEMA") *Debris Estimating Field Guide*,³ which provides debris measurement guidance and calculations. I utilized construction takeoff software to capture estimated material takeoff ("MTO") quantities from plot plans into a quantifiable data set. MTO refers to a list of materials with quantities (such as building volume) and types (such as specific grades of steel) that are required to build a designed structure or item (see Attachment 3, page 34-42). This list is generated by analysis of a blueprint or other design documents. For the final step in developing the TDC estimate, I incorporated the quantities generated from the MTO estimate into a proprietary project management takeoff software to generate estimates for labor, material, and equipment costs.

Decommissioning Costs

The cost estimates are based on the removal or abandonment in place of physical property. The amount of physical material to be removed or abandoned is derived by a MTO list developed from company plot plans and profiles, design drawings, and utility details throughout the Cardinal system, as shown in the Attachment No. 3, TDC Workpapers, "Material Takeoff Packet."

I broke out work into its major components, such as demolition and removal of compressor station, meter station, and line pipe. Then, in the case of removal, I estimated the cost of removing subsets of each component, *e.g.*, surface and subsurface material. I broke out abandonment work into major components related to, for example, type of crossing—road, railroad line, stream—as well as separately analyzing transmission for purposes of deriving cost estimates. These cost estimates were based on my expertise regarding crew size, and required skill sets, equipment, and time.

TDC Estimate

The Cardinal system can be summarized as having approximately 104 miles of pipeline, 455 crossings, 7 meter stations, 1 compressor station, 10 cathodic protection rectifier and test sites, 1,330 right-of-way markers, 44 taps, and 18 valves in the transmission system.

The total cost to decommission the Cardinal transmission facilities in 2021 dollars is \$27,155,857, as summarized on page 2, and detailed within pages 3-33 of Attachment 3.

Negative Salvage Calculation

Schedules 8 through 8f of Attachment 1, Cardinal Depreciation Workpapers reference the terminal costs per plant calculated within the TDC estimate, utilizing the percent of remaining plant calculated in Schedule 6, to calculate the interim retirement costs and plant subject to terminal decommissioning per account. These costs are then spread over the average remaining life for each account and calculated into an account specific composite negative salvage recovery rate (C38).



PART VIII DEPRECIATION RATE RECOMMENDATIONS

Once the groundwork of survivor curve analysis, average service life analysis, economic life analysis, remaining economic life analysis, and plant balances have been laid, the calculation of the depreciation rates is a fairly straight-forward endeavor. The basic formula for deriving depreciation rates is to divide the net plant by the remaining life to derive the annual expense, which is then divided by the gross plant to derive the depreciation rate:

$$\frac{\text{Gross Plant} - \text{Accum. Res. for Depreciation}}{\text{Remaining Life}} \div \text{Gross Plant} = \text{Depreciation Rate}$$

Depreciation Workpapers

The depreciation workpapers in Attachment 1 lay out the theoretical calculations that underlie the depreciation rate recommendations. The Workpapers are divided into nine schedules.

- Schedule 1 reports the impact of existing and recommended depreciation rates.
- Schedule 2 compares the existing and recommended depreciation rate components.
- Schedule 3 reports the plant and reserve for depreciation by property account.
- Schedule 4 reports the average plant in service.
- Schedule 5 reports the parameters that define the rate calculations.
- Schedule 6 calculates the average remaining lives.
- Schedule 7 shows the actual depreciation rate calculations and recommendations.
- Schedule 8 – 8f calculates the negative salvage rate on interim retirements.
- Schedule 9 Iowa curves sampling.

In sum, this study recommends the following composite depreciation rates:

Table No. 1 Recommended Depreciation Rates

Account No.	Account Name	Depreciation Rate
302	Intangible Plant – Franchises *	0.55%
303	Misc. Intangible Plant *	1.57%
365.11	Land	0.00%
365.12	Land Rights *	1.93%
365.2	Rights of Way *	1.97%
366.1	Compressor Station S & I	3.51%
366.2	M & R Station S & I	2.85%
367	Mains	2.50%
368	Compressor Station Equipment	2.94%
369	Meas & Reg Station Equipment	2.49%
390	Struct. & Impr. - Office Bldg *	10.00%
391	Office Furniture & Equipment	
-	OFF001- Tower Office Furn.& Equip*	10.00%
-	DPC001-Data Process & Comp. Equip.*	12.50%
-	DEV001-Developed Software*	6.67%
392.1	Transportation Equipment *	16.67%
394	Tools Shop & Garage Equipment *	5.00%
396	Power Operated Equipment *	10.00%
397	Communication Equipment *	4.35%

* - Whole Life Rate.

~ ~ ~

This concludes the Depreciation Study for Cardinal Pipeline Company, LLC.

ATTACHMENT 1

DEPRECIATION STUDY WORKPAPERS
Docket No. G-39, Sub 46

Steven R Fall
on behalf of
Cardinal Pipeline Company, LLC



Brown, Williams, Moorhead & Quinn, Inc.
Energy Consultants

Cardinal Pipeline Company, LLC
Depreciation Study
Table of Contents

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

			<u>Page</u>
Recommended Rates			
Schedule	1	Comparison of Proposed and Present Depreciation Rates (Inclusive of Negative Salvage)	3
Schedule	2	Proposed and Present Depreciation and Negative Salvage Rate Components	4
Plant Data			
Schedule	3	Gas Plant in Service	5
Schedule	4	Near Term Capital Additions	6
Schedule	5	Depreciation Model Parameters	7
Average Remaining Lives			
Schedule	6	Average Remaining Life - Transmission	8
Depreciation Rates			
Schedule	7	Depreciation Rate Calculation	11
Negative Salvage Rates			
Schedule	8	Negative Salvage	12
Iowa Curves Sample			
Schedule	9	Iowa Curves Sampling	19

OFFICIAL COPY
MAY 15 2022

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 1 - Comparison of Proposed and Present Depreciation Rates (Inclusive of Negative Salvage)
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Plant in Service December 31, 2020 (A) \$	Fully Depreciated Plant (B) \$	Depreciable Plant (C) \$	Current Rates (D) %	Current Expense (E) \$	Proposed Rates (F) %	Proposed Expense (G) \$	Expense Difference (H) \$
1		Intangible Plant								
2	302	Intangible Plant - Franchises	176,783		176,783	4.00%	7,071	0.55%	972	(6,099)
3	303	Misc. Intangible Plant	898,093		898,093	2.19%	19,668	1.57%	14,100	(5,568)
4		Subtotal Intangible Plant	1,074,876	-	1,074,876	2.49%	26,740	1.40%	15,072	(11,667)
5										
7		Transmission Plant								
8	365.11	Land	658,661		-	0.00%	-	0.00%	-	-
9	365.12	Land Rights	96,745		96,745	2.00%	1,935	1.93%	1,867	(68)
10	365.2	Rights of Way	4,011,679		4,011,679	2.00%	80,234	1.97%	79,030	(1,204)
11	366.1	Compressor Station S & I	2,673,056		2,673,056	3.00%	80,192	3.51%	93,824	13,633
12	366.2	M & R Station S & I	1,428,304		1,428,304	2.63%	37,564	2.85%	40,707	3,142
13	367	Mains	100,830,092		100,830,092	2.20%	2,218,262	2.50%	2,520,752	302,490
14	368	Compressor Station Equipment	35,393,767		35,393,767	3.03%	1,072,431	2.94%	1,040,577	(31,854)
15	369	Meas & Reg Station Equipment	8,764,591		8,764,591	3.18%	278,714	2.49%	218,238	(60,476)
16		Subtotal Transmission	153,856,895	-	153,198,234	2.46%	3,769,332	2.61%	3,994,996	225,664
17										
18		General Plant								
19	390	Struct. & Impr. - Office Bldg	5,269	5,269	-	0.00%	-	10.00%	-	-
20	391	Office Furniture & Equipment								
21		OFF001- Tower Office Furniture & Equip	32,228	-	32,228	8.33%	2,685	10.00%	3,223	538
22		DPC001-Data Process & Comp. Equip.	-	-	-	25.00%	-	12.50%	-	-
23		DEV001-Developed Software	957,123	843,871	113,252	7.69%	8,709	6.67%	7,550	(1,159)
24	392.1	Transportation Equipment	3,761	3,761	-	18.00%	-	16.67%	-	-
25	394	Tools Shop & Garage Equipment	565,711	-	565,711	8.33%	47,124	5.00%	28,286	(18,838)
26	396	Power Operated Equipment	42,559	10,649	31,910	7.92%	2,527	10.00%	3,191	664
27	397	Communication Equipment	174,033	142,401	31,632	7.14%	2,259	4.35%	1,375	(883)
28			1,780,683	1,005,951	774,732	3.55%	63,303	2.45%	43,625	(19,678)
29										
30		Total	156,712,455	1,005,951	155,047,842	2.46%	3,859,374	2.59%	4,053,693	194,318

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 2 - Proposed and Present Depreciation and Negative Salvage Rate Components
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Current Depreciation Rate (A) %	Current Negative Salvage Rate (B) %	Current Total (C) %	Proposed Depreciation Rate (D) %	Proposed Negative Salvage Rate (E) %	Proposed Total (F) %
1		Intangible Plant						
2	302	Intangible Plant - Franchises	4.00%		4.00%	0.55%		0.55%
3	303	Misc. Intangible Plant	2.00%	0.19%	2.19%	1.57%		1.57%
4								
5		Transmission Plant						
6	365.11	Land						
7	365.12	Land Rights	2.00%		2.00%	1.93%	0.00%	1.93%
8	365.2	Rights of Way	2.00%		2.00%	1.90%	0.07%	1.97%
9	366.1	Compressor Station S & I	2.86%	0.14%	3.00%	3.03%	0.48%	3.51%
10	366.2	M & R Station S & I	2.50%	0.13%	2.63%	2.60%	0.25%	2.85%
11	367	Mains	1/ 2.00%	0.20%	2.20%	1.75%	0.75%	2.50%
12	368	Compressor Station Equipment	3.03%		3.03%	2.63%	0.31%	2.94%
13	369	Meas & Reg Station Equipment	3.03%	0.15%	3.18%	2.13%	0.36%	2.49%
14								
15		General Plant						
16	390	Struct. & Impr. - Office Bldg	Various			10.00%		10.00%
17	391	Office Furniture and Equipment						
18		OFF001- Tower Office Furniture & Equip	8.33%		8.33%	10.00%		10.00%
19		DPC001-Data Process & Comp. Equip.	25.00%		25.00%	12.50%		12.50%
20		DEV001-Developed Software	7.69%		7.69%	6.67%		6.67%
21	392.1	Transportation Equipment	18.00%		18.00%	16.67%		16.67%
22	394	Tools Shop & Garage Equipment	8.33%		8.33%	5.00%		5.00%
23	396	Power Operated Equipment	7.92%		7.92%	10.00%		10.00%
24	397	Communication Equipment	7.14%		7.14%	4.35%		4.35%
25								
26		Total Composite Average Depreciation Rate			<u>2.46%</u>			<u>2.59%</u>

1/ Cardinal's negative salvage rate includes the costs of Cardinal's ARO and any negative salvage recovery will be sourced to the recovery of legal obligations first.

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 3 - Plant Balances
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Plant		
			Plant in Service December 31, 2020 (A) \$	Reserve for Negative Salvage December 31, 2020 (B) \$	Reserve for Depreciation December 31, 2020 (C) \$
1	Intangible Plant				
2	302	Intangible Plant - Franchises	176,783	-	(149,054)
3	303	Misc. Intangible Plant	898,093	(6,257)	(509,204)
4		Subtotal Intangible Plant	1,074,876	(6,257)	(658,258)
5					
7	Transmission Plant				
8	365.11	Land	658,661	-	-
9	365.12	Land Rights	96,745	-	(48,210)
10	365.2	Rights of Way	4,011,679	-	(1,990,158)
11	366.1	Compressor Station S & I	2,673,056	(13,722)	(599,867)
12	366.2	M & R Station S & I	1,428,304	(6,808)	(537,455)
13	367	Mains	100,830,092	(1,008,248)	(50,908,281)
14	368	Compressor Station Equipment	35,393,767	1,874	(8,859,071)
15	369	Meas & Reg Station Equipment	8,764,591	11,623	(3,674,653)
16		Subtotal Transmission	153,856,895	(1,015,281)	(66,617,694)
17					
18	General Plant				
19	390	Struct. & Impr. - Office Bldg	5,269		(5,269)
20	391	Office Furniture & Equipment			
21		OFF001- Tower Office Furniture & Equip	32,228		(24,197)
22		DPC001-Data Process & Comp. Equip.	-		-
23		DEV001-Developed Software	957,123		(902,108)
24	392.1	Transportation Equipment	3,761		(3,761)
25	394	Tools Shop & Garage Equipment	565,711		(345,372)
26	396	Power Operated Equipment	42,559		(35,664)
27	397	Communication Equipment	174,033		(159,868)
28		Subtotal General Plant	1,780,683	-	(1,476,239)
29					
30		Total	156,712,455	(1,021,537)	(68,752,191)

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 4 - Near Term Additions
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Current	Plant	Planned Additions 1/			Average
			Plant in Service	Balance Ratio	2022	2023	2024	Plant in Service 2/
			(A)	(B)	(C)	(D)	(E)	(F)
			\$	%	\$	\$	\$	\$
1		Intangible Plant						
2	302	Intangible Plant - Franchises	176,783	16.45%				176,783
3	303	Misc. Intangible Plant	898,093	83.55%	-	-	-	898,093
4		Subtotal Intangible Plant	1,074,876	100.00%	-	-	-	1,074,876
5								
6								
7		Transmission Plant						
8	365.11	Land	658,661	0.43%	6,432	6,432	6,432	668,309
9	365.12	Land Rights	96,745	0.06%	945	945	945	98,162
10	365.2	Rights of Way	4,011,679	2.61%	39,173	39,173	39,173	4,070,439
11	366.1	Compressor Station S & I	2,673,056	1.74%	26,102	26,102	26,102	2,712,208
12	366.2	M & R Station S & I	1,428,304	0.93%	13,947	13,947	13,947	1,449,225
13	367	Mains	100,830,092	65.53%	984,582	984,582	984,582	102,306,964
14	368	Compressor Station Equipment	35,393,767	23.00%	345,612	345,612	345,612	35,912,184
15	369	Meas & Reg Station Equipment	8,764,591	5.70%	85,584	85,584	85,584	8,892,968
16		Subtotal Transmission	153,856,895	100.00%	1,502,233	1,502,233	1,502,233	156,110,458
17								
18		General Plant						
19	390	Struct. & Impr. - Office Bldg	5,269	0.30%				5,269
20	391	Office Furniture & Equipment						
21		OFF001- Tower Office Furniture & Equip	32,228	1.81%				32,228
22		DPC001-Data Process & Comp. Equip.	-	0.00%				-
23		DEV001-Developed Software	957,123	53.75%				957,123
24	392.1	Transportation Equipment	3,761	0.21%				3,761
25	394	Tools Shop & Garage Equipment	565,711	31.77%				565,711
26	396	Power Operated Equipment	42,559	2.39%				42,559
27	397	Communication Equipment	174,033	9.77%				174,033
28		Subtotal General Plant	1,780,683	100.00%				1,780,683
29								
30								
31		Total	156,712,455		1,502,233	1,502,233	1,502,233	158,966,018

1/ Forecasted 3 years of plant additions based on previous 3 year average of plant additions

2/ Aver = [(A + 1/2C)+(A + C + 1/2D)+(A + C + D + 1/2E)]/3

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 5 - Model Parameters
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Average Age (A)	Average Service Life (B)	Iowa Survivor Curve (C)	Average Remaining Lives 29-Yr (D)
1		Intangible Plant				
2	302	Intangible Plant - Franchises	22.00	85.00		28.63
3	303	Misc. Intangible Plant	20.40	60.00		27.60
4						
5						
6		Transmission Plant				
7	365.11	Land				
8	365.12	Land Rights	22.00	65.00	R2	26.39
9	365.2	Rights of Way	16.72	65.00	R2	26.84
10	366.1	Compressor Station S & I	9.00	45.00	R2	25.70
11	366.2	M & R Station S & I	16.30	45.00	R2	24.18
12	367	Mains	16.02	75.00	R4	28.63
13	368	Compressor Station Equipment	8.87	85.00	R3	28.59
14	369	Meas & Reg Station Equipment	12.83	60.00	L3	27.60
15						
16		General Plant				
17				US OMB Life Tables 1/		
18	390	Struct. & Impr. - Office Bldg		10.00	10.00%	
19	391	Office Furniture & Equipment				
20		OFF001- Tower Office Furniture & Equip		10.00	10.00%	
21		DPC001-Data Process & Comp. Equip.		8.00	12.50%	
22		DEV001-Developed Software		15.00	6.67%	
23	392.1	Transportation Equipment		6.00	16.67%	
24	394	Tools Shop & Garage Equipment		20.00	5.00%	
25	396	Power Operated Equipment		10.00	10.00%	
26	397	Communication Equipment		23.00	4.35%	

1/ Average service lives taken from United States Office of Management and Budget Useful Life and Disposal Table

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 6 - Average Remaining Lives - Transmission
Docket No. G-39, Sub 46

How to read this chart

Yrs	Year	Acct #	Acct Name		365.12	Land Rights		365.2	Rights of Way	
		Ave Age Plt	Original Investment L109	Curve column	22.00	\$96,745	9	16.72	\$4,070,439	9
		Ave Serv Life	Curve Type		65.00	R2	\$ 1,669	65.00	R2	\$ 56,281
		Age % ASL	Ave Rem Life	Interim Retires	33.8%	26.39	\$ 20,414	25.7%	26.84	\$ 709,768
		Age	% Surviving	Plant Balance	Age	% Surviving	Plant Balance	Age	% Surviving	Plant Balance
		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
		%	%	\$	%	%	\$	%	%	\$
-	2021	61.57%	83.88%	35,023	33.85%	94.40%	98,162	25.72%	96.29%	4,070,439
1	2022	Plant average	83.88%	35,023	35.38%	94.00%	97,776	27.26%	95.97%	4,057,481
2	2023	age as a	83.88%	35,023	36.92%	93.56%	97,348	28.80%	95.64%	4,043,961
3	2024	percent of	Reference to Iowa Curve Table for % Surviving at each age interval	34,279	38.46%	93.12%	96,929	30.34%	95.27%	4,028,899
4	2025	proposed		34,279	40.00%	92.67%	96,493	31.88%	94.90%	4,014,158
5	2026	service life		34,279	41.54%	92.17%	96,009	33.42%	94.50%	3,997,750
6	2027	45.07%			43.08%	91.68%	95,537	34.95%	94.11%	3,981,704
7	2028	46.73%			44.62%	91.14%	95,012	36.49%	93.70%	3,964,996
8	2029	48.40%			46.15%	90.61%	94,501	38.03%	93.24%	3,946,421
9	2030	50.07%	91.04%		47.69%	90.06%	93,970	39.57%	92.79%	3,928,277
10	2031	51.73%	91.00%	3,664,263	49.23%	89.46%	93,381	41.11%	92.30%	3,908,122
11	2032	53.40%	90.96%	3,662,794	50.77%	88.86%	92,807	42.65%	91.82%	3,888,449
12	2033	55.07%	90.93%	3,661,325	52.31%	88.21%	92,172	44.18%	91.31%	3,868,003
13	2034	56.73%	90.89%	3,659,856	53.85%	87.57%	91,553	45.72%	90.76%	3,845,314
14	2035	58.40%	90.86%	3,658,387	55.38%	86.90%	90,912	47.26%	90.21%	3,823,194
15	2036	60.07%	90.82%	3,656,918	56.92%	86.17%	90,202	48.80%	89.65%	3,800,228
16	2037	61.73%	90.78%	3,655,449	58.46%	85.46%	89,512	50.34%	89.02%	3,774,770
17	2038	63.40%	90.75%	3,653,980	60.00%	84.72%	88,797	51.88%	88.41%	3,749,977
18	2039	65.07%	90.71%	3,652,511	61.54%	83.90%	88,007	53.42%	87.74%	3,722,515
19	2040	66.73%	90.67%	3,651,042	63.08%	83.11%	87,240	54.95%	87.08%	3,695,791
20	2041	68.40%	90.64%	3,649,573	64.62%	82.23%	86,393	56.49%	86.40%	3,668,092
21	2042	70.07%	90.60%	3,648,076	66.15%	81.38%	85,571	58.03%	85.65%	3,637,446
22	2043	71.73%	90.56%	3,646,593	67.69%	80.50%	84,721	59.57%	84.92%	3,607,656
23	2044	73.40%	90.53%	3,645,110	69.23%	79.53%	83,783	61.11%	84.11%	3,574,722
24	2045	75.07%	90.49%	3,643,627	70.77%	78.60%	82,875	62.65%	83.32%	3,542,733
25	2046	76.73%	90.45%	3,643,627	72.31%	77.56%	81,874	64.18%	82.51%	3,509,642
26	2047	78.40%	90.42%	3,643,627	73.85%	76.56%	80,906	65.72%	81.61%	3,473,104
27	2048	80.07%	90.42%	3,640,661	75.38%	75.53%	79,907	67.26%	80.74%	3,437,661
28	2049	81.73%	90.42%	3,639,178	76.92%	74.39%	78,809	68.80%	79.84%	3,401,045
29	2050	83.40%	90.34%	3,637,695	78.46%	73.30%	77,747	70.34%	78.85%	3,360,670
					29-Yr Life	26.39	\$2,590,745	29-Yr Life	26.84	\$109,252,781
							\$20,414			\$709,768
							79%			83%

OFFICIAL COPY
MAY 15 2022

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 6 - Average Remaining Lives - Transmission
Docket No. G-39, Sub 46

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

OFFICIAL COPY
MAY 15 2022

		366.1 Compressor Station S & I			366.2 M & R Station S & I			367 Mains		
		9.00	\$2,712,208	9	16.30	\$1,449,225	9	16.02	\$102,429,201	11
		45.00	R2	\$ 48,339	45.00	R2	\$ 40,350	75.00	R4	\$ 89,742
		20.0%	25.70	\$ 781,278	36.2%	24.18	\$ 583,979	21.4%	28.63	\$ 4,398,742
Yrs	Year	Age	% Surviving	Plant Balance	Age	% Surviving	Plant Balance	Age	% Surviving	Plant Balance
		(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)
		%	%	\$	%	%	\$	%	%	\$
-	2021	20.00%	97.40%	2,712,208	36.22%	93.75%	1,449,225	21.36%	99.91%	102,306,964
1	2022	22.22%	96.98%	2,700,884	38.44%	93.12%	1,440,107	22.69%	99.89%	102,289,451
2	2023	24.44%	96.55%	2,689,316	40.67%	92.46%	1,430,443	24.03%	99.87%	102,267,588
3	2024	26.67%	96.10%	2,676,990	42.89%	91.75%	1,420,210	25.36%	99.84%	102,244,126
4	2025	28.89%	95.61%	2,663,870	45.11%	90.97%	1,408,874	26.69%	99.82%	102,217,222
5	2026	31.11%	95.07%	2,649,260	47.33%	90.18%	1,397,395	28.03%	99.79%	102,183,906
6	2027	33.33%	94.53%	2,634,390	49.56%	89.34%	1,385,267	29.36%	99.75%	102,148,433
7	2028	35.56%	93.94%	2,618,602	51.78%	88.45%	1,372,462	30.69%	99.71%	102,108,059
8	2029	37.78%	93.33%	2,601,852	54.00%	87.52%	1,358,952	32.03%	99.66%	102,058,444
9	2030	40.00%	92.67%	2,584,097	56.22%	86.49%	1,344,044	33.36%	99.61%	102,006,012
10	2031	42.22%	91.95%	2,564,409	58.44%	85.46%	1,329,006	34.69%	99.55%	101,946,758
11	2032	44.44%	91.21%	2,544,452	60.67%	84.36%	1,313,177	36.03%	99.48%	101,874,470
12	2033	46.67%	90.43%	2,523,345	62.89%	83.22%	1,296,529	37.36%	99.41%	101,798,622
13	2034	48.89%	89.61%	2,501,039	65.11%	81.95%	1,278,219	38.69%	99.33%	101,713,487
14	2035	51.11%	88.70%	2,476,382	67.33%	80.68%	1,259,811	40.03%	99.23%	101,610,346
15	2036	53.33%	87.78%	2,451,463	69.56%	79.35%	1,240,504	41.36%	99.12%	101,502,866
16	2037	55.56%	86.81%	2,425,188	71.78%	77.95%	1,220,274	42.69%	99.00%	101,383,010
17	2038	57.78%	85.79%	2,397,503	74.00%	76.49%	1,199,100	44.03%	98.86%	101,238,778
18	2039	60.00%	84.72%	2,368,355	76.22%	74.89%	1,175,933	45.36%	98.72%	101,089,470
19	2040	62.22%	83.53%	2,336,261	78.44%	73.30%	1,152,773	46.69%	98.56%	100,924,019
20	2041	64.44%	82.34%	2,303,958	80.67%	71.63%	1,128,624	48.03%	98.36%	100,726,207
21	2042	66.67%	81.09%	2,270,034	82.89%	69.89%	1,103,480	49.36%	98.16%	100,522,744
22	2043	68.89%	79.78%	2,234,442	85.11%	68.01%	1,076,131	50.69%	97.95%	100,298,663
23	2044	71.11%	78.34%	2,195,399	87.33%	66.13%	1,048,962	52.03%	97.69%	100,032,445
24	2045	73.33%	76.90%	2,156,257	89.56%	64.19%	1,020,822	53.36%	97.42%	99,760,332
25	2046	75.56%	75.39%	2,115,322	91.78%	62.18%	991,735	54.69%	97.13%	99,462,437
26	2047	77.78%	73.81%	2,072,563	94.00%	60.11%	961,734	56.03%	96.79%	99,110,712
27	2048	80.00%	72.17%	2,027,959	96.22%	57.88%	929,439	57.36%	96.44%	98,753,405
28	2049	82.22%	70.37%	1,979,340	98.44%	55.70%	897,716	58.69%	96.06%	98,364,548
29	2050	84.44%	68.59%	1,930,930	100.67%	53.46%	865,246	60.03%	95.61%	97,908,223
		29-Yr Life	25.70	\$69,693,860	29-Yr Life	24.18	\$35,046,969	29-Yr Life	28.63	\$2,929,544,782
				\$781,278			\$583,979			\$4,398,742
				71%			60%			96%

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 6 - Average Remaining Lives - Transmission
Docket No. G-39, Sub 46

		368 Compressor Station Equipment			369 Meas & Reg Station Equipment		
		8.87	\$36,000,883	10	12.83	\$8,957,044	5
		85.00	R3	\$ 67,474	60.00	L3	\$ 26,469
		10.4%	28.59	\$ 1,373,541	21.4%	27.60	\$ 1,484,032
Yrs	Year	Age	% Surviving	Plant Balance	Age	% Surviving	Plant Balance
		(S)	(T)	(U)	(V)	(W)	(X)
		%	%	\$	%	%	\$
-	2021	10.44%	99.76%	35,912,184	21.38%	99.88%	8,892,968
1	2022	11.61%	99.72%	35,897,025	23.05%	99.83%	8,888,323
2	2023	12.79%	99.68%	35,881,939	24.72%	99.76%	8,882,373
3	2024	13.96%	99.63%	35,864,095	26.38%	99.68%	8,875,436
4	2025	15.14%	99.57%	35,844,710	28.05%	99.58%	8,866,498
5	2026	16.32%	99.51%	35,823,683	29.72%	99.46%	8,855,803
6	2027	17.49%	99.46%	35,802,873	31.38%	99.33%	8,844,002
7	2028	18.67%	99.39%	35,778,395	33.05%	99.17%	8,829,489
8	2029	19.85%	99.31%	35,751,953	34.72%	98.98%	8,812,807
9	2030	21.02%	99.23%	35,723,426	36.38%	98.78%	8,794,993
10	2031	22.20%	99.16%	35,695,341	38.05%	98.55%	8,773,669
11	2032	23.38%	99.07%	35,662,473	39.72%	98.28%	8,749,696
12	2033	24.55%	98.97%	35,627,150	41.38%	98.00%	8,724,513
13	2034	25.73%	98.86%	35,589,236	43.05%	97.66%	8,694,715
14	2035	26.91%	98.75%	35,548,593	44.72%	97.29%	8,661,460
15	2036	28.08%	98.64%	35,508,815	46.38%	96.90%	8,626,646
16	2037	29.26%	98.51%	35,462,533	48.05%	96.44%	8,585,470
17	2038	30.44%	98.37%	35,413,091	49.72%	95.93%	8,539,444
18	2039	31.61%	98.23%	35,360,332	51.38%	95.39%	8,491,142
19	2040	32.79%	98.08%	35,308,922	53.05%	94.75%	8,433,882
20	2041	33.96%	97.92%	35,249,359	54.72%	94.04%	8,369,802
21	2042	35.14%	97.74%	35,186,006	56.38%	93.29%	8,302,601
22	2043	36.32%	97.56%	35,118,693	58.05%	92.40%	8,223,187
23	2044	37.49%	97.37%	35,053,361	59.72%	91.41%	8,134,837
24	2045	38.67%	97.16%	34,977,969	61.38%	90.39%	8,042,962
25	2046	39.85%	96.94%	34,898,100	63.05%	89.19%	7,935,577
26	2047	41.02%	96.71%	34,813,571	64.72%	87.87%	7,817,733
27	2048	42.20%	96.48%	34,731,833	66.38%	86.53%	7,697,041
28	2049	43.38%	96.22%	34,637,846	68.05%	84.98%	7,558,334
29	2050	44.55%	95.94%	34,538,643	69.72%	83.31%	7,408,936
		29-Yr Life	28.59	\$1,026,749,967	29-Yr Life	27.60	\$245,421,369
				\$1,373,541			\$1,484,032
				96%			83%

OFFICIAL COPY

MAY 15 2022

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule No. 7 - Depreciation Rate Calculations

/A

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 7 - Depreciation Rate Calculations
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Average Plant	Fully Depreciated	Depreciable	Depreciation	Net Plant	Average	Depreciation	
			in Service	Plant	Plant	Reserve	2021-2024	Remaining	Expense 1/	Rate
			2021-2024	(B)	(C)	December 31, 2020	(E)	(F)	(G)	(H)
			(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
			\$	\$	\$	\$	\$		\$	%
			Sch 4	Sch. 1	c = a - b	Sch. 3	e = a + d	Sch. 6	g = e / f	h = g / a
1		Intangible Plant								
2	302	Intangible Plant - Franchises	176,783		176,783	(149,054)	27,729	28.63	968	0.55%
3	303	Misc. Intangible Plant	898,093		898,093	(509,204)	388,889	27.60	14,092	1.57%
4		Subtotal Intangible Plant	1,074,876		1,074,876	(658,258)	416,618	27.66	15,060	1.40%
5										
6		Transmission Plant								
7	365.11	Land	668,309			-	668,309	0.00	-	0.00%
8	365.12	Land Rights	98,162		98,162	(48,210)	49,952	26.39	1,893	1.93%
9	365.2	Rights of Way	4,070,439		4,070,439	(1,990,158)	2,080,281	26.84	77,505	1.90%
10	366.1	Compressor Station S & I	2,712,208		2,712,208	(599,867)	2,112,342	25.70	82,204	3.03%
11	366.2	M & R Station S & I	1,449,225		1,449,225	(537,455)	911,770	24.18	37,703	2.60%
12	367.0	Mains	102,306,964		102,306,964	(50,908,281)	51,398,683	28.63	1,794,969	1.75%
13	368.0	Compressor Station Equipment	35,912,184		35,912,184	(8,859,071)	27,053,113	28.59	946,225	2.63%
14	369.0	Meas & Reg Station Equipment	8,892,968		8,892,968	(3,674,653)	5,218,315	27.60	189,088	2.13%
15		Subtotal Transmission	156,110,458		155,442,150	(66,617,694)	88,824,456	28.38	3,129,587	2.01%
16										
17		General Plant								
18	390	Struct. & Impr. - Office Bldg	5,269	5,269	-	(5,269)	-		-	10.00%
19	391	Office Furniture and Equipment								
20		OFF001- Tower Office Furniture & Equip	32,228	-	32,228	(24,197)	8,031		3,223	10.00%
21		DPC001-Data Process & Comp. Equip.	-	-	-	-	-		-	12.50%
22		DEV001-Developed Software	957,123	843,871	113,252	(902,108)	55,015		7,550	6.67%
23	392.1	Transportation Equipment	3,761	3,761	-	(3,761)	-		-	16.67%
24	394	Tools Shop & Garage Equipment	565,711	-	565,711	(345,372)	220,339		28,286	5.00%
25	396	Power Operated Equipment	42,559	10,649	31,910	(35,664)	6,894		3,191	10.00%
26	397	Communication Equipment	174,033	142,401	31,632	(159,868)	14,165		1,375	4.35%
27		Subtotal General Plant	1,780,683	1,005,951	774,732	(1,476,239)	304,444	6.98	43,625	2.45%
28										
29										
30		Total	158,966,018	1,005,951	157,291,758	(68,752,191)	89,545,519	28.09	3,188,272	2.01%

1/ The expense calculation for General Plant is g = c * h

OFFICIAL COPY
MAY 15 2022

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8 - Negative Salvage Cost Estimate - Total
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim Retirement Cost	Terminal Decommissioning
			Decommissioning	Remaining		Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1	<u>Direct Cost Estimates</u>					
2						
3	367	Line Pipe Removal	4,098,783	79%	852,412	3,246,370
4						
5	367	Crossings Abandonment	16,170,093	96%	695,242	15,474,852
6						
7	366.2 / 369	Meter Station Removal	846,264	80%	169,218	677,046
8						
9	366.1 / 368	Compressor Station Removal	3,009,260	94%	167,884	2,841,376
10						
11	365	Right of Way Markers	70,737	83%	12,334	58,402
12						
13	367	Cathodic Protection	35,680	96%	1,534	34,146
14						
15	367	Taps	257,865	96%	11,087	246,778
16						
17	367	Valves	178,370	96%	7,669	170,701
18						
19		Subtotal	24,667,052		1,917,380	22,749,672
20						
21		Construction Management Costs	616,676		47,935	568,742
22						
23		10% Contingency Fees	2,528,373		196,531	2,331,841
24						
25		Salvage	(656,244)			(656,244)
26						
27		Grand Total	27,155,857		2,161,846	24,994,011
28						
29		Reserve for Negative Salvage	(1,015,281)			(1,015,281)
30						
31		Net to Recover	26,140,576		2,161,846	23,978,730
32						
33		Average Remaining Life (Years)	28.53		21.07	29.47
34						
35		Annual Requirement	916,258		102,598	813,660
36						
37		Recovery Rate	0.60%		0.07%	0.53%
38						
39		Depreciable Base	153,101,489			

OFFICIAL COPY
MAY 15 2022

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8a - Negative Salvage Cost Estimate - Account 365.2
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim Retirement Cost	Terminal Decommissioning
			Decommissioning	Remaining		Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1	<u>Direct Cost Estimates - Acct 365</u>					
2						
3	367	Line Pipe Removal	-	79%	-	-
4						
5	367	Crossings Abandonment	-	96%	-	-
6						
7	366.2 / 369	Meter Station Removal	-	81%	-	-
8						
9	366.1 / 368	Compressor Station Removal	-	94%	-	-
10						
11	365	Right of Way Markers	70,737	83%	12,334	58,402
12						
13	367	Cathodic Protection	-	96%	-	-
14						
15	367	Taps	-	96%	-	-
16						
17	367	Valves	-	96%	-	-
18						
19		Subtotal	70,737		12,334	58,402
20						
21		Construction Management Costs	1,768		308	1,460
22						
23		10% Contingency Fees	7,251		1,264	5,986
24						
25		Salvage				
26						
27		Grand Total	79,756		13,907	65,849
28						
29		Reserve for Negative Salvage	-			-
30						
31		Net to Recover	79,756		13,907	65,849
32						
33		Average Remaining Life (Years)	26.84		26.84	26.84
34						
35		Annual Requirement	2,971		518	2,453
36						
37		Recovery Rate	0.07%		0.01%	0.06%
38						
39		Depreciable Base	4,011,679			

OFFICIAL COPY
MAY 15 2022

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8b - Negative Salvage Cost Estimate - Account 366.1
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim Retirement Cost	Terminal Decommissioning
			Decommissioning	Remaining		Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1	<u>Direct Cost Estimates - Acct 366.1</u>					
2						
3	367	Line Pipe Removal	-	79%	-	-
4						
5	367	Crossings Abandonment	-	96%	-	-
6						
7	366.2	Meter Station Removal	-	81%	-	-
8						
9	366.1	Compressor Station Removal	300,926	9%	272,512	28,414
10						
11	365	Right of Way Markers	-	83%	-	-
12						
13	367	Cathodic Protection	-	96%	-	-
14						
15	367	Taps	-	96%	-	-
16						
17	367	Valves	-	96%	-	-
18						
19		Subtotal	300,926		272,512	28,414
20						
21		Construction Management Costs	7,523		6,813	710
22						
23		10% Contingency Fees	30,845		27,933	2,912
24						
25		Salvage				
26						
27		Grand Total	339,294		307,258	32,037
28						
29		Reserve for Negative Salvage	(13,722)			(13,722)
30						
31		Net to Recover	325,572		307,258	18,315
32						
33		Average Remaining Life (Years)	25.70		25.70	25.70
34						
35		Annual Requirement	12,670		11,957	713
36						
37		Recovery Rate	0.48%		0.45%	0.03%
38						
39		Depreciable Base	2,673,056			

OFFICIAL COPY
MAY 15 2022

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8c - Negative Salvage Cost Estimate - Account 366.2
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim	Terminal
			Decommissioning	Remaining	Retirement Cost	Decommissioning Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1	<u>Direct Cost Estimates - Acct. 366.2</u>					
2						
3	367	Line Pipe Removal	-	79%	-	-
4						
5	367	Crossings Abandonment	-	96%	-	-
6						
7	366.2 / 369	Meter Station Removal	84,626	8%	77,856	6,770
8						
9	366.1 / 368	Compressor Station Removal	-	94%	-	-
10						
11	365	Right of Way Markers	-	83%	-	-
12						
13	367	Cathodic Protection	-	96%	-	-
14						
15	367	Taps	-	96%	-	-
16						
17	367	Valves	-	96%	-	-
18						
19		Subtotal	84,626		77,856	6,770
20						
21		Construction Management Costs	2,116		1,946	169
22						
23		10% Contingency Fees	8,674		7,980	694
24						
25		Salvage				
26						
27		Grand Total	95,416		87,783	7,634
28						
29		Reserve for Negative Salvage	(6,808)			(6,808)
30						
31		Net to Recover	88,608		87,783	826
32						
33		Average Remaining Life (Years)	24.18		24.18	24.18
34						
35		Annual Requirement	3,664		3,630	34
36						
37		Recovery Rate	0.25%		0.25%	0.00%
38						
39		Depreciable Base	1,428,304			

OFFICIAL COPY
MAY 15 2022

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8d - Negative Salvage Cost Estimate - Account 367
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim	Terminal
			Decommissioning	Remaining	Retirement Cost	Decommissioning Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1	<u>Direct Cost Estimates - Acct. 367</u>					
2						
3	367	Line Pipe Removal	4,098,783	79%	852,412	3,246,370
4						
5	367	Crossings Abandonment	16,170,093	96%	695,242	15,474,852
6						
7	366.2 / 369	Meter Station Removal	-	81%	-	-
8						
9	366.1 / 368	Compressor Station Removal	-	94%	-	-
10						
11	365	Right of Way Markers	-	83%	-	-
12						
13	367	Cathodic Protection	35,680	96%	1,534	34,146
14						
15	367	Taps	257,865	96%	11,087	246,778
16						
17	367	Valves	178,370	96%	7,669	170,701
18						
19		Subtotal	20,740,791		1,567,944	19,172,847
20						
21		Construction Management Costs	518,520		39,199	479,321
22						
23		10% Contingency Fees	2,125,931		160,714	1,965,217
24						
25		Salvage	(656,244)			(656,244)
26						
27		Grand Total	22,728,998		1,767,857	20,961,141
28						
29		Reserve for Negative Salvage	(1,008,248)			(1,008,248)
30						
31		Net to Recover	21,720,750		1,767,857	19,952,894
32						
33		Average Remaining Life (Years)	28.63		28.63	28.63
34						
35		Annual Requirement	758,542		61,738	696,804
36						
37		Recovery Rate	0.75%		0.06%	0.69%
38						
39		Depreciable Base	100,830,092			

OFFICIAL COPY
MAY 15 2022

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8e - Negative Salvage Cost Estimate - Account 368
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim	Terminal
			Decommissioning	Remaining	Retirement Cost	Decommissioning Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1	<u>Direct Cost Estimates - Acct. 368</u>					
2						
3	367	Line Pipe Removal	-	79%	-	-
4						
5	367	Crossings Abandonment	-	96%	-	-
6						
7	369	Meter Station Removal	-	81%	-	-
8						
9	368	Compressor Station Removal	2,708,334	85%	406,819	2,301,515
10						
11	365	Right of Way Markers	-	83%	-	-
12						
13	367	Cathodic Protection	-	96%	-	-
14						
15	367	Taps	-	96%	-	-
16						
17	367	Valves	-	96%	-	-
18						
19		Subtotal	2,708,334		406,819	2,301,515
20						
21		Construction Management Costs	67,708		10,170	57,538
22						
23		10% Contingency Fees	277,604		41,699	235,905
24						
25		Salvage				
26						
27		Grand Total	3,053,647		458,689	2,594,958
28						
29		Reserve for Negative Salvage	1,874			1,874
30						
31		Net to Recover	3,055,521		458,689	2,596,832
32						
33		Average Remaining Life (Years)	28.59		28.59	28.59
34						
35		Annual Requirement	106,872		16,043	90,828
36						
37		Recovery Rate	0.31%		0.05%	0.26%
38						
39		Depreciable Base	35,393,767			

OFFICIAL COPY
MAY 15 2022

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 8f - Negative Salvage Cost Estimate - Account 369
Docket No. G-39, Sub 46

Line No.	Account No.	Parameter	Total Terminal	Percent Plant	Interim Retirement Cost	Terminal Decommissioning
			Decommissioning	Remaining		Interim Retirement Cost
			(A)	(B)	(C)	(D)
			\$	%	\$	\$
1	<u>Direct Cost Estimates - Acct. 369</u>					
2						
3	367	Line Pipe Removal	-	79%	-	-
4						
5	367	Crossings Abandonment	-	96%	-	-
6						
7	369	Meter Station Removal	761,637	72%	213,230	548,407
8						
9	366.1 / 368	Compressor Station Removal	-	94%	-	-
10						
11	365	Right of Way Markers	-	83%	-	-
12						
13	367	Cathodic Protection	-	96%	-	-
14						
15	367	Taps	-	96%	-	-
16						
17	367	Valves	-	96%	-	-
18						
19		Subtotal	761,637		213,230	548,407
20						
21		Construction Management Costs	19,041		5,331	13,710
22						
23		10% Contingency Fees	78,068		21,856	56,212
24						
25		Salvage				
26						
27		Grand Total	858,746		240,417	618,329
28						
29		Reserve for Negative Salvage	11,623			11,623
30						
31		Net to Recover	870,369		240,417	629,952
32						
33		Average Remaining Life (Years)	27.60		27.60	27.60
34						
35		Annual Requirement	31,538		8,712	22,827
36						
37		Recovery Rate	0.36%		0.10%	0.26%
38						
39		Depreciable Base	8,764,591			

OFFICIAL COPY
MAY 15 2022

Cardinal Pipeline Company, LLC
Depreciation Study
Schedule 9 - Iowa Curves
Docket No. G-39, Sub 46

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Age	L0	L1	L2	L3	L4	L5
0.10%	0.99992	0.99995	1.00000	0.99996	1.00000	1.00000
0.20%	0.99983	0.99989	1.00000	0.99993	1.00000	1.00000
0.30%	0.99973	0.99983	1.00000	0.99990	1.00000	1.00000
0.40%	0.99962	0.99978	1.00000	0.99986	1.00000	1.00000
0.50%	0.99950	0.99972	1.00000	0.99984	1.00000	1.00000
0.60%	0.99937	0.99966	1.00000	0.99981	1.00000	1.00000
0.70%	0.99923	0.99960	1.00000	0.99979	1.00000	1.00000
0.80%	0.99909	0.99954	1.00000	0.99976	1.00000	1.00000
0.90%	0.99894	0.99948	1.00000	0.99974	1.00000	1.00000
1.00%	0.99878	0.99942	1.00000	0.99972	1.00000	1.00000
1.10%	0.99862	0.99936	1.00000	0.99970	1.00000	1.00000
1.20%	0.99845	0.99930	1.00000	0.99968	1.00000	1.00000
1.30%	0.99827	0.99924	1.00000	0.99967	1.00000	1.00000
1.40%	0.99809	0.99917	1.00000	0.99965	1.00000	1.00000
1.50%	0.99791	0.99911	1.00000	0.99964	1.00000	1.00000
1.60%	0.99772	0.99905	1.00000	0.99963	1.00000	1.00000
1.70%	0.99752	0.99898	0.99999	0.99961	1.00000	1.00000
1.80%	0.99732	0.99891	0.99999	0.99960	1.00000	1.00000
1.90%	0.99712	0.99885	0.99999	0.99959	1.00000	1.00000
2.00%	0.99691	0.99878	0.99999	0.99958	1.00000	1.00000
2.10%	0.99670	0.99871	0.99999	0.99957	1.00000	1.00000
2.20%	0.99648	0.99864	0.99999	0.99956	1.00000	1.00000
2.30%	0.99626	0.99857	0.99999	0.99956	1.00000	1.00000
2.40%	0.99604	0.99850	0.99998	0.99955	1.00000	1.00000
2.50%	0.99581	0.99843	0.99998	0.99954	1.00000	1.00000
2.60%	0.99558	0.99836	0.99998	0.99954	1.00000	1.00000
2.70%	0.99534	0.99829	0.99998	0.99953	1.00000	1.00000
2.80%	0.99510	0.99821	0.99998	0.99952	1.00000	1.00000
2.90%	0.99486	0.99814	0.99997	0.99952	1.00000	1.00000

OFFICIAL COPY
MAY 16 2022

ATTACHMENT 2

DEPRECIATION SURVIVOR CURVE WORKPAPERS

Steven R Fall
on behalf of
Cardinal Pipeline Company, LLC

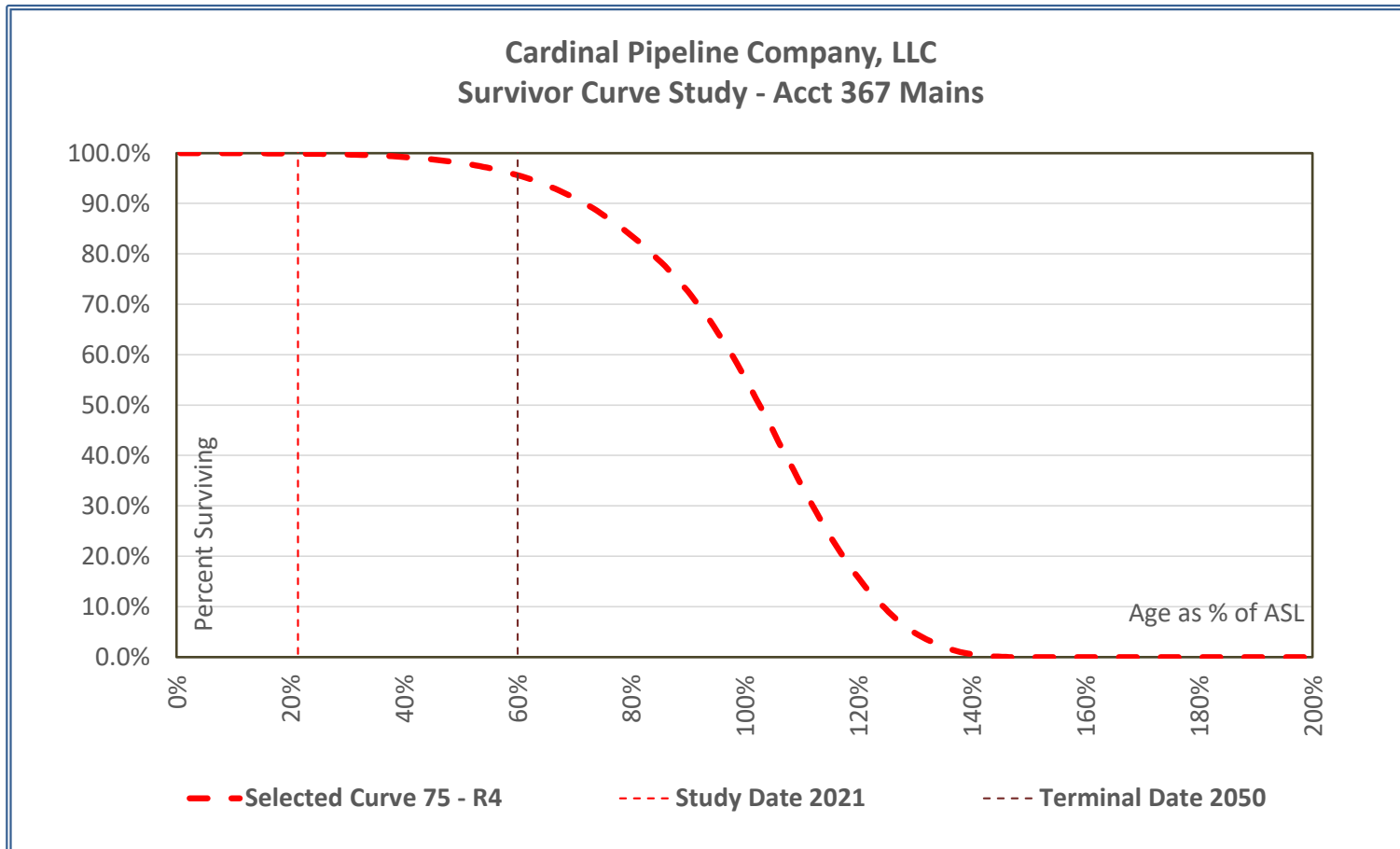


Brown, Williams, Moorhead & Quinn, Inc.
Energy Consultants

Cardinal Pipeline Company, LLC Survivor Curve Study - Acct 367 Mains

Salient Statistical Results

Economic Life	Ave Age at Study Date:	Average Service Life	Age as % of ASL	Iowa Curve	Conformance Index	Retirement Index	Average Remaining Life
2050	16.02	75	21.4%	R4	1	98%	28.63



Historical Plant Balances

Year	BOY Balance	Additions	Retirements	Adjustments	Transfers	EOY Balance
1990	-	-	-	-	-	-
1991	-	-	-	-	-	-
1992	-	-	-	-	-	-
1993	-	-	-	-	-	-
1994	-	-	-	-	-	-
1995	-	-	-	-	-	-
1996	-	-	-	-	-	-
1997	-	-	-	-	-	-
1998	-	-	-	-	-	-
1999	-	-	-	-	-	-
2000	-	-	-	-	-	-
2001	-	-	-	-	-	-
2002	-	-	-	-	-	-
2003	-	-	-	-	-	-
2004	-	-	-	-	95,319,992	95,319,992
2005	95,319,992	-	-	-	-	95,319,992
2006	95,319,992	554,762	-	-	-	95,874,754
2007	95,874,754	(51,789)	-	-	-	95,822,965
2008	95,822,965	-	-	-	-	95,822,965
2009	95,822,965	95,339	-	-	-	95,918,304
2010	95,918,304	11,823	-	-	-	95,930,127
2011	95,930,127	-	-	-	-	95,930,127
2012	95,930,127	335,866	1,081	-	-	96,264,912
2013	96,264,912	36,710	-	-	-	96,301,622
2014	96,301,622	243,384	-	-	-	96,545,006
2015	96,545,006	2,057	-	-	-	96,547,063
2016	96,547,063	35,320	-	-	-	96,582,383
2017	96,582,383	-	-	-	-	96,582,383
2018	96,582,383	(26,593)	-	-	-	96,555,790
2019	96,555,790	742,236	5,451	-	-	97,292,575
2020	97,292,575	3,653,221	115,705	-	-	100,830,091
		4,404,184	121,156	Σ of last 5 years:		
		880,837	24,231	Ave last 5 yrs		

Goodness of Fit Test Statistics

Best 5-Year Retirement Predictors					
<u>Ranking</u>	<u>ASL / Curve</u>	<u>Average Remaining Life</u>	<u>Annual Retirements</u>	<u>Retirement Index</u>	<u>Conformance Index</u>
1	75 - R4	28.63	24,612	98.4%	1.07
2	55 - L4	27.54	22,634	93.4%	1.07
3	10 - R3	28.96	26,420	91.0%	182.99
4	100 - S2	28.67	21,797	90.0%	1.07
5	150 - R3	28.84	26,863	89.1%	1.07
6	90 - L3	28.61	26,863	89.1%	1.07
7	95 - S2	28.60	27,284	87.4%	1.07
8	145 - R3	28.83	27,631	86.0%	1.07
9	10 - L5	28.97	20,413	84.2%	211.82
10	40 - R5	23.20	19,538	80.6%	1.07

Best Conformance Indices					
<u>Ranking</u>	<u>ASL / Curve</u>	<u>Average Remaining Life</u>	<u>Annual Retirements</u>	<u>Retirement Index</u>	<u>Conformance Index</u>
L Curves 1	10 - L4	28.66	245,497	-813.1%	655.56
L Curves 2	10 - L5	28.97	20,413	84.2%	211.82
L Curves 3	5 - L0	29.00	-	0.0%	104.05
S Curves 1	10 - S3	28.87	89,047	-167.5%	269.75
S Curves 2	10 - S6	29.00	-	0.0%	208.79
S Curves 3	10 - S5	29.00	0	0.0%	201.07
R Curves 1	10 - R5	29.00	-	0.0%	196.46
R Curves 2	10 - R4	29.00	-	0.0%	185.63
R Curves 3	10 - R3	28.96	26,420	91.0%	182.99

Selected Survivor Curve					
	<u>ASL / Curve</u>	<u>Average Remaining Life</u>	<u>Annual Retirements</u>	<u>Retirement Index</u>	<u>Conformance Index</u>
Selected	75 - R4	28.63	24,612	98.4%	1.07

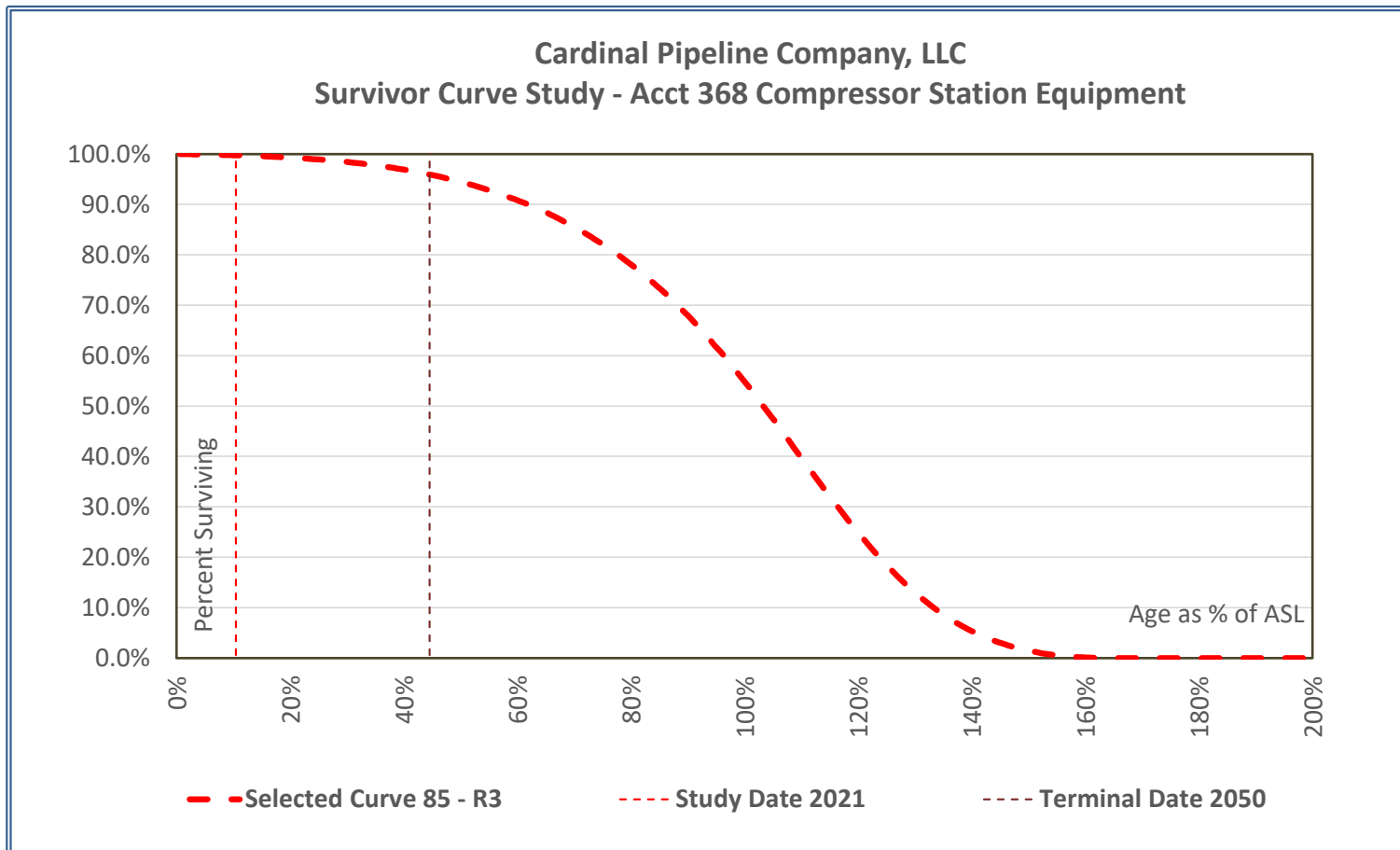


Selected Curve		Selected Curve Forecasted Survivorship & Interim Retirements					
75 - R4	Year	Age	Age as % of ASL	Percent Surviving	Surviving Plant	Interim Retirements	
Original Installations					102,429,201		
Surviving Balance	2021	16.0	21.36%	99.9063%	102,306,964		
1st Forecast Year	2022	17.0	22.69%	99.8892%	102,289,451	17,513	
2	2023	18.0	24.03%	99.8678%	102,267,588	21,863	
3	2024	19.0	25.36%	99.8449%	102,244,126	23,462	
4	2025	20.0	26.69%	99.8186%	102,217,222	26,904	
5	2026	21.0	28.03%	99.7861%	102,183,906	33,316	
6	2027	22.0	29.36%	99.7515%	102,148,433	35,473	
7	2028	23.0	30.69%	99.7121%	102,108,059	40,374	
8	2029	24.0	32.03%	99.6636%	102,058,444	49,615	
9	2030	25.0	33.36%	99.6124%	102,006,012	52,432	
10	2031	26.0	34.69%	99.5546%	101,946,758	59,254	
11	2032	27.0	36.03%	99.4840%	101,874,470	72,288	
12	2033	28.0	37.36%	99.4100%	101,798,622	75,848	
13	2034	29.0	38.69%	99.3269%	101,713,487	85,135	
14	2035	30.0	40.03%	99.2262%	101,610,346	103,141	
15	2036	31.0	41.36%	99.1212%	101,502,866	107,480	
16	2037	32.0	42.69%	99.0042%	101,383,010	119,855	
17	2038	33.0	44.03%	98.8634%	101,238,778	144,232	
18	2039	34.0	45.36%	98.7176%	101,089,470	149,308	
19	2040	35.0	46.69%	98.5561%	100,924,019	165,451	
20	2041	36.0	48.03%	98.3630%	100,726,207	197,812	
21	2042	37.0	49.36%	98.1644%	100,522,744	203,463	
22	2043	38.0	50.69%	97.9456%	100,298,663	224,081	
23	2044	39.0	52.03%	97.6857%	100,032,445	266,218	
24	2045	40.0	53.36%	97.4200%	99,760,332	272,113	
25	2046	41.0	54.69%	97.1292%	99,462,437	297,895	
26	2047	42.0	56.03%	96.7858%	99,110,712	351,725	
27	2048	43.0	57.36%	96.4370%	98,753,405	357,307	
28	2049	44.0	58.69%	96.0573%	98,364,548	388,857	
29	2050	45.0	60.03%	95.6118%	97,908,223	456,326	
					2,929,544,782	4,398,742 Total Interm Retires	
Average Remaining Life					28.6	24,612 5 Yr Ave Ann Retires	

Cardinal Pipeline Company, LLC Survivor Curve Study - Acct 368 Compressor Station Equipment

Salient Statistical Results

Economic Life	Ave Age at Study Date:	Average Service Life	Age as % of ASL	Iowa Curve	Conformance Index	Retirement Index	Average Remaining Life
2050	8.87	85	10.4%	R3	3916	100%	28.59



Historical Plant Balances

Year	BOY Balance	Additions	Retirements	Adjustments	Transfers	EOY Balance
1990	-	-	-	-	-	-
1991	-	-	-	-	-	-
1992	-	-	-	-	-	-
1993	-	-	-	-	-	-
1994	-	-	-	-	-	-
1995	-	-	-	-	-	-
1996	-	-	-	-	-	-
1997	-	-	-	-	-	-
1998	-	-	-	-	-	-
1999	-	-	-	-	-	-
2000	-	-	-	-	-	-
2001	-	-	-	-	-	-
2002	-	-	-	-	-	-
2003	-	-	-	-	-	-
2004	-	-	-	-	-	-
2005	-	-	-	-	-	-
2006	-	-	-	-	-	-
2007	-	-	-	-	-	-
2008	-	-	-	-	-	-
2009	-	-	-	-	-	-
2010	-	-	-	-	-	-
2011	-	-	-	-	-	-
2012	-	35,807,448	-	-	(414,452)	35,392,996
2013	35,392,996	38,129	-	-	-	35,431,125
2014	35,431,125	1,307	-	-	-	35,432,432
2015	35,432,432	(41,089)	-	-	-	35,391,343
2016	35,391,343	89,390	88,699	-	-	35,392,034
2017	35,392,034	-	-	-	-	35,392,034
2018	35,392,034	-	-	-	-	35,392,034
2019	35,392,034	-	-	-	-	35,392,034
2020	35,392,034	1,733	-	-	-	35,393,767
		91,123	88,699	Σ of last 5 years:		
		18,225	17,740	Ave last 5 yrs		



Goodness of Fit Test Statistics

Best 5-Year Retirement Predictors					
<u>Ranking</u>	<u>ASL / Curve</u>	<u>Average Remaining Life</u>	<u>Annual Retirements</u>	<u>Retirement Index</u>	<u>Conformance Index</u>
1	85 - R3	28.59	17,700	99.8%	3915.74
2	105 - S1	28.49	17,232	97.1%	608.28
3	95 - L2	28.48	16,913	95.3%	584.78
4	100 - S1	28.43	19,407	90.6%	656.35
5	90 - R3	28.64	15,934	89.8%	2425.90
6	90 - L2	28.40	19,684	89.0%	633.53
7	45 - R4	27.51	15,741	88.7%	553.07
8	80 - R3	28.52	19,988	87.3%	38887.97
9	5 - S2	28.94	15,382	86.7%	1.02
10	110 - S1	28.55	15,214	85.8%	578.84

Best Conformance Indices					
<u>Ranking</u>	<u>ASL / Curve</u>	<u>Average Remaining Life</u>	<u>Annual Retirements</u>	<u>Retirement Index</u>	<u>Conformance Index</u>
L Curves 1	15 - L5	5.68	2,234,094	-12393.7%	988.47
L Curves 2	80 - L2	28.17	27,303	46.1%	829.76
L Curves 3	40 - L3	24.67	61,964	-149.3%	779.58
S Curves 1	25 - S3	15.67	219,511	-1037.4%	993.85
S Curves 2	90 - S1	28.25	26,205	52.3%	850.45
S Curves 3	45 - S2	26.08	48,136	-71.3%	646.84
R Curves 1	80 - R3	28.52	19,988	87.3%	38887.97
R Curves 2	35 - R4	24.38	42,390	-39.0%	882.10
R Curves 3	20 - R5	10.61	160,009	-702.0%	409.60

Selected Survivor Curve					
	<u>ASL / Curve</u>	<u>Average Remaining Life</u>	<u>Annual Retirements</u>	<u>Retirement Index</u>	<u>Conformance Index</u>
Selected	85 - R3	28.59	17,700	99.8%	3915.74

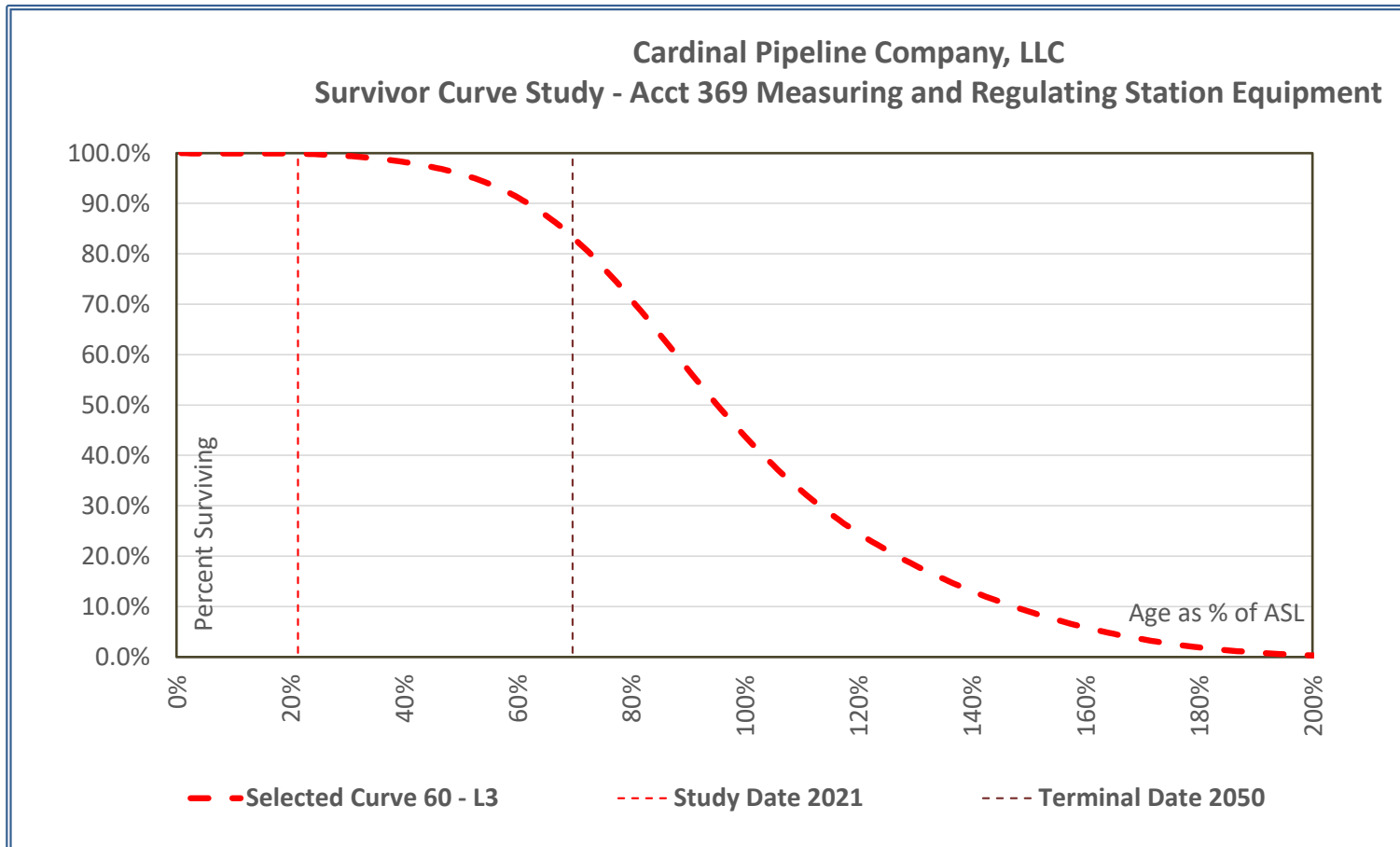


Selected Curve		Selected Curve Forecasted Survivorship & Interim Retirements					
85 - R3	Year	Age	Age as % of ASL	Percent Surviving	Surviving Plant	Interim Retirements	
Original Installations					36,000,883		
Surviving Balance	2021	8.9	10.44%	99.7592%	35,912,184		
1st Forecast Year	2022	9.9	11.62%	99.7170%	35,897,025	15,159	
2	2023	10.9	12.79%	99.6751%	35,881,939	15,086	
3	2024	11.9	13.97%	99.6256%	35,864,095	17,844	
4	2025	12.9	15.15%	99.5717%	35,844,710	19,385	
5	2026	13.9	16.32%	99.5133%	35,823,683	21,028	
6	2027	14.9	17.50%	99.4555%	35,802,873	20,810	
7	2028	15.9	18.68%	99.3875%	35,778,395	24,478	
8	2029	16.9	19.85%	99.3141%	35,751,953	26,443	
9	2030	17.9	21.03%	99.2348%	35,723,426	28,526	
10	2031	18.9	22.21%	99.1495%	35,692,693	30,733	
11	2032	19.9	23.38%	99.0655%	35,662,473	30,220	
12	2033	20.9	24.56%	98.9674%	35,627,150	35,323	
13	2034	21.9	25.73%	98.8621%	35,589,236	37,914	
14	2035	22.9	26.91%	98.7492%	35,548,593	40,644	
15	2036	23.9	28.09%	98.6387%	35,508,815	39,778	
16	2037	24.9	29.26%	98.5102%	35,462,533	46,282	
17	2038	25.9	30.44%	98.3728%	35,413,091	49,442	
18	2039	26.9	31.62%	98.2263%	35,360,332	52,758	
19	2040	27.9	32.79%	98.0835%	35,308,922	51,411	
20	2041	28.9	33.97%	97.9180%	35,249,359	59,562	
21	2042	29.9	35.15%	97.7420%	35,186,006	63,353	
22	2043	30.9	36.32%	97.5551%	35,118,693	67,314	
23	2044	31.9	37.50%	97.3736%	35,053,361	65,331	
24	2045	32.9	38.68%	97.1642%	34,977,969	75,393	
25	2046	33.9	39.85%	96.9423%	34,898,100	79,869	
26	2047	34.9	41.03%	96.7075%	34,813,571	84,529	
27	2048	35.9	42.21%	96.4593%	34,724,195	89,376	
28	2049	36.9	43.38%	96.2194%	34,637,846	86,349	
29	2050	37.9	44.56%	95.9439%	34,538,643	99,203	
					1,026,739,681		
Average Remaining Life					28.6		
					1,373,541	Total Interm Retires	
					17,700	5 Yr Ave Ann Retires	

Cardinal Pipeline Company, LLC Survivor Curve Study - Acct 369 Measuring and Regulating Station Equipment

Salient Statistical Results

Economic Life	Ave Age at Study Date:	Average Service Life	Age as % of ASL	Iowa Curve	Conformance Index	Retirement Index	Average Remaining Life
2050	12.83	60	21.4%	L3	2	99%	27.60



Historical Plant Balances

Year	BOY Balance	Additions	Retirements	Adjustments	Transfers	EOY Balance
1990	-	-	-	-	-	-
1991	-	-	-	-	-	-
1992	-	-	-	-	-	-
1993	-	-	-	-	-	-
1994	-	-	-	-	-	-
1995	-	-	-	-	-	-
1996	-	-	-	-	-	-
1997	-	-	-	-	-	-
1998	-	-	-	-	-	-
1999	-	-	-	-	-	-
2000	-	-	-	-	-	-
2001	-	-	-	-	-	-
2002	-	-	-	-	-	-
2003	-	-	-	-	-	-
2004	-	-	-	-	4,545,451	4,545,451
2005	4,545,451	20,781	-	-	-	4,566,232
2006	4,566,232	11,443	-	-	-	4,577,675
2007	4,577,675	-	-	-	-	4,577,675
2008	4,577,675	-	-	-	-	4,577,675
2009	4,577,675	-	-	-	-	4,577,675
2010	4,577,675	-	-	-	-	4,577,675
2011	4,577,675	-	-	-	-	4,577,675
2012	4,577,675	3,974,722	27,371	-	-	8,525,026
2013	8,525,026	(1,611)	-	-	-	8,523,415
2014	8,523,415	40,392	-	-	-	8,563,807
2015	8,563,807	16,270	-	-	-	8,580,077
2016	8,580,077	131,734	25,262	-	-	8,686,549
2017	8,686,549	16,566	-	-	-	8,703,115
2018	8,703,115	5,411	-	-	-	8,708,526
2019	8,708,526	67,508	11,443	-	-	8,764,591
2020	8,764,591	-	-	-	-	8,764,591
		221,219	36,705	Σ of last 5 years:		
		44,244	7,341	Ave last 5 yrs		

Goodness of Fit Test Statistics

Best 5-Year Retirement Predictors					
<u>Ranking</u>	<u>ASL / Curve</u>	<u>Average Remaining Life</u>	<u>Annual Retirements</u>	<u>Retirement Index</u>	<u>Conformance Index</u>
1	60 - L3	27.60	7,433	98.7%	1.94
2	95 - L2	28.30	7,021	95.6%	1.94
3	150 - R2	28.55	7,690	95.2%	1.96
4	105 - S1	28.32	6,959	94.8%	1.94
5	75 - R3	28.25	7,848	93.1%	1.95
6	80 - R3	28.37	6,788	92.5%	1.95
7	40 - L4	24.00	7,929	92.0%	1.93
8	30 - R5	16.61	7,983	91.3%	1.93
9	145 - R2	28.53	8,011	90.9%	1.96
10	100 - S1	28.23	8,059	90.2%	1.94

Best Conformance Indices					
<u>Ranking</u>	<u>ASL / Curve</u>	<u>Average Remaining Life</u>	<u>Annual Retirements</u>	<u>Retirement Index</u>	<u>Conformance Index</u>
L Curves 1	10 - L5	27.37	101,668	-1184.9%	15.04
L Curves 2	15 - L0	18.18	323,073	-4200.9%	13.84
L Curves 3	15 - L1	16.79	391,409	-5131.8%	9.93
S Curves 1	10 - S6	29.00	93	1.3%	161.62
S Curves 2	10 - S5	28.78	13,474	16.5%	23.94
S Curves 3	10 - S4	27.49	93,775	-1077.4%	11.86
R Curves 1	10 - R5	28.82	10,775	53.2%	17.96
R Curves 2	10 - R4	27.21	110,409	-1304.0%	10.87
R Curves 3	10 - R3	24.79	263,351	-3387.4%	8.60

Selected Survivor Curve					
	<u>ASL / Curve</u>	<u>Average Remaining Life</u>	<u>Annual Retirements</u>	<u>Retirement Index</u>	<u>Conformance Index</u>
Selected	60 - L3	27.60	7,433	98.7%	1.94

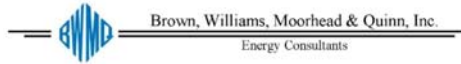


Selected Curve		Selected Curve Forecasted Survivorship & Interim Retirements					
60 - L3	Year	Age	Age as % of ASL	Percent Surviving	Surviving Plant	Interim Retirements	
Original Installations					8,957,044		
Surviving Balance	2021	12.8	21.38%	99.8775%	8,892,968		
1st Forecast Year	2022	13.8	23.05%	99.8257%	8,888,323	4,644	
2	2023	14.8	24.72%	99.7592%	8,882,373	5,951	
3	2024	15.8	26.38%	99.6818%	8,875,436	6,937	
4	2025	16.8	28.05%	99.5820%	8,866,498	8,937	
5	2026	17.8	29.72%	99.4626%	8,855,803	10,696	
6	2027	18.8	31.38%	99.3308%	8,844,002	11,801	
7	2028	19.8	33.05%	99.1688%	8,829,489	14,513	
8	2029	20.8	34.72%	98.9826%	8,812,807	16,683	
9	2030	21.8	36.38%	98.7837%	8,794,993	17,814	
10	2031	22.8	38.05%	98.5456%	8,773,669	21,323	
11	2032	23.8	39.72%	98.2780%	8,749,696	23,974	
12	2033	24.8	41.38%	97.9968%	8,724,513	25,183	
13	2034	25.8	43.05%	97.6641%	8,694,715	29,798	
14	2035	26.8	44.72%	97.2929%	8,661,460	33,255	
15	2036	27.8	46.38%	96.9042%	8,626,646	34,814	
16	2037	28.8	48.05%	96.4445%	8,585,470	41,176	
17	2038	29.8	49.72%	95.9306%	8,539,444	46,026	
18	2039	30.8	51.38%	95.3914%	8,491,142	48,302	
19	2040	31.8	53.05%	94.7521%	8,433,882	57,259	
20	2041	32.8	54.72%	94.0367%	8,369,802	64,080	
21	2042	33.8	56.38%	93.2864%	8,302,601	67,201	
22	2043	34.8	58.05%	92.3998%	8,223,187	79,415	
23	2044	35.8	59.72%	91.4134%	8,134,837	88,350	
24	2045	36.8	61.38%	90.3877%	8,042,962	91,875	
25	2046	37.8	63.05%	89.1888%	7,935,577	107,386	
26	2047	38.8	64.72%	87.8732%	7,817,733	117,844	
27	2048	39.8	66.38%	86.5257%	7,697,041	120,692	
28	2049	40.8	68.05%	84.9771%	7,558,334	138,707	
29	2050	41.8	69.72%	83.3092%	7,408,936	149,399	
					245,421,369		
Average Remaining Life					27.6		
					1,484,032	Total Interm Retires	
					7,433	5 Yr Ave Ann Retires	

ATTACHMENT 3

TERMINAL DECOMMISSIONING WORKPAPERS

Steven R Fall
on behalf of
Cardinal Pipeline Company, LLC



Cardinal Pipeline Company, LLC
Summary of Terminal Decommissioning Cost Estimate - Transmission

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit (CPC-0007)

Line No.	Particular (A)	Cost (\$) (B)	Item (C)	Total TDC Estimate (\$) (D)	Total Adjusted (*) Cost Estimate (\$) (E)
1	A. DECOMMISSIONING COSTS				
2	Transmission Line				
		Cost / Mile	Total Miles	Total	
3	1-1 - <24" Pipeline Clean and Purge	\$ 41,443	104.9	\$ 4,348,608	
4	1-2 - Trench Excavation	\$ 96,404	0.3	\$ 26,301	
5	1-3 - Pipe Removal	\$ 201,377	0.3	\$ 54,939	
6	1-4 - Trench Backfill	\$ 117,728	0.3	\$ 32,118	
7	1-5 - Trench Restoration	\$ 10,769	0.3	\$ 2,938	
8				*	\$ 4,098,783
10	Abandonment				
		Cost /	Total Crossing	Total	
12	2-2 - Road Crossing Abandonment	\$ 26,565	155	\$ 4,117,508	
13	2-4 - Highway Crossing Abandonment	\$ 29,324	2	\$ 58,648	
14	2-5 - RR Line Crossing Abandonment	\$ 45,573	4	\$ 182,291	
16	2-7 - Water Crossing Abandonment	\$ 45,089	294	\$ 13,256,034	
17				*	\$ 16,170,093
19	Meter Station				
		Cost / Station	Total Stations	Total	
20	3-1 - Small Meter Station Removal	\$ 11,144	2	\$ 22,288	
21	3-2 - Small Meter Station Sub Material Removal	\$ 13,974	2	\$ 27,949	
22	3-3 - Small Meter Station Backfill and Restoration	\$ 12,524	2	\$ 25,048	
23				*	\$ 69,111
24	3-4 - Medium Meter Station Removal	\$ 42,966	2	\$ 85,933	
25	3-5 - Medium Meter Station Sub Material Removal	\$ 45,977	2	\$ 91,954	
26	3-6 - Medium Meter Station Backfill and Restoration	\$ 71,288	2	\$ 142,576	
27				*	\$ 294,185
28	3-7 - Large Meter Station Removal	\$ 42,422	3	\$ 127,267	
29	3-8 - Large Meter Station Sub Material Removal	\$ 54,792	3	\$ 164,375	
30	3-9 - Large Meter Station Backfill and Restoration	\$ 78,155	3	\$ 234,466	
31				*	\$ 482,968
33	Compressor Station				
		Ave. Cost / Station	Total Stations	Total	
34	Compressor Station Removal	\$ 3,278,061	1	\$ 3,278,061	
35				*	\$ 3,009,260
37	Cathodic Protection				
		Cost / CP	Total CP	Total	
38	5-1 - Cathodic Protection - Rectifier Removal	\$ 3,541	10	\$ 35,410	
39	5-2 - Cathodic Protection - Test Site Removal	\$ 346	10	\$ 3,457	
40				*	\$ 35,680
42	Right of Way Markers				
		Cost / ROW	Total ROW	Total	
43	6-1 - ROW Marker Removal	\$ 58	1330	\$ 77,055	
44				*	\$ 70,737
46	Tap Removal				
		Cost / Tap	Total Taps	Total	
47	7-1 - Tap Locations	\$ 6,384	44	\$ 280,898	
48				*	\$ 257,865
58	Mainline Valve				
		Cost / Location	Total Valves	Total	
59	8-1 - Mainline Valve Site	\$ 10,795	18	\$ 194,303	
60				*	\$ 178,370
50				Base Total:	\$ 24,667,052
51			C.M. Expense	\$ 616,676	\$ 25,283,728
52			10% Contingency Fees	\$ 2,528,373	\$ 27,812,101
53	B. CONTINGENCY				
54				Subtotal:	\$ 27,812,101
55	C. SALVAGE				
56			Salvage Material - Scrap Metal:	\$ (656,244)	
58					
59					
60				Grand Total:	\$ 27,155,857
61	* City Cost Index Adjustment Factor Used = 0.9180 0.9409 is the Average City Cost Index Adjustment Factor of locations found within CPC's Geographic Locations				



**1-1 - Pipeline Clean and Purge
Unit Cost Estimate**

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for small equipment, placed in rear of, or towed by pickup truck	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton	4	2	\$ -	\$ 130.00	\$ 48.50	\$ 178.50
16588	C.F.	Gas Pipelines, Nitrogen purge method, lengths 1000' to 10,000'		0	0	\$1,824.68	\$ 2,156.44	\$ 1,824.68	\$ 5,805.80
5280	L.F.	Sewer pipelines, cleaning, pig method, lengths 1000' to 10,000', 4" diameter through 24" diameter, minimum		0	0	\$ -	\$ -	\$ -	\$ 21,859.20
15	Ton	Hazardous waste cleanup/pickup/disposal, dumpsite disposal charge, maximum		0	0	\$ -	\$ -	\$ -	\$ 6,825.00
0.8	Week	Field personnel, general purpose laborer, average		0.2	40	\$ -	\$ 1,640.00	\$ -	\$ 1,640.00
0.4	Week	Field personnel, general purpose laborer, average		0.2	40	\$ -	\$ 820.00	\$ -	\$ 820.00
0.2	Week	Field personnel, field engineer, engineer,		0	0	\$ -	\$ 555.00	\$ -	\$ 555.00
0.2	Week	Field personnel, field engineer, engineer,		0	0	\$ -	\$ 555.00	\$ -	\$ 555.00
1	Ea.	Mobilization or demobilization, delivery charge for small equipment, placed in rear of, or towed by pickup truck	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton	4	2	\$ -	\$ 130.00	\$ 48.50	\$ 178.50
1	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 535.00	\$ -	\$ 535.00
0.5	Day	Environmental Engineer		1	8	\$ -	\$ 257.50	\$ -	\$ 257.50
114	\$/Day	Per Diem		1	100	\$ -	\$ -	\$ -	\$ 1,420.83
1	Job	Permitting cost		0	0	\$ -	\$ 812.61	\$ -	\$ 812.61

Total

\$ 41,442.94

OFFICIAL COPY

NOV 15 2022



1-2 - Trench Excavation Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 515.00	\$ 380.00	\$ 895.00
5280	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic	1000	0.02	\$ 475.20	\$ 8,923.20	\$ 211.20	\$ 9,609.60
10560	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	2 Laborers 1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$5,068.80	\$ 21,859.20	\$ 3,168.00	\$ 30,096.00
391	C.Y.	Topsoil stripping and stockpiling, topsoil, sandy loam, ideal conditions, 200 HP dozer	1 Equip. Oper. (medium) .5 Laborer 1 Dozer, 200 H.P.	2300	0	\$ -	\$ 93.84	\$ 285.43	\$ 379.27
2124	B.C.Y.	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering	1 Equip. Oper. (crane) 1 Laborer 1 Hyd. Excavator, .75 C.Y.	270	0.06	\$ -	\$ 7,709.56	\$ 6,074.20	\$ 13,783.75
17	Day	Rent truck pickup 3/4 ton 4 wheel drive, Incl. Hourly		0	0	\$ -	\$ -	\$ 4,559.06	\$ 4,559.06
3	Week	Field personnel, field engineer, senior engineer,		0	0	\$ -	\$ 10,875.00	\$ -	\$ 10,875.00
3	Week	Field personnel, superintendent, maximum		0	0	\$ -	\$ 9,750.00	\$ -	\$ 9,750.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 515.00	\$ 380.00	\$ 895.00
17	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 9,095.00	\$ -	\$ 9,095.00
8	Day	Environmental Engineer		1	8	\$ -	\$ 4,120.00	\$ -	\$ 4,120.00
114	\$/Day	Per Diem		1	32.12	\$ -	\$ -	\$ -	\$ 456.37
1	Job	Permitting cost		0	0	\$ -	\$ 1,890.28	\$ -	\$ 1,890.28

Total

\$ 96,404.33

**1-3 - Pipe Removal
Unit Cost Estimate**

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 515.00	\$ 380.00	\$ 895.00
5280	L.F.	Selective demolition, natural gas, steel pipe, pipe, 18" - 24", excludes excavation	1 Equip. Oper. (crane) 1 Hyd. Crane, 25 Ton (Daily)	160	0.2	\$ -	\$ 60,456.00	\$ 30,888.00	\$ 91,344.00
33	Ea.	Delivery charge for pipe, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 16,995.00	\$ 12,540.00	\$ 29,535.00
33	Day	Crane crew, daily use for small jobs, 25-ton truck-mounted hydraulic crane,	1 Equip. Oper. (crane) 1 Hyd. Crane, 25 Ton (Daily)	1	8	\$ -	\$ 18,810.00	\$ 29,370.00	\$ 48,180.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 515.00	\$ 380.00	\$ 895.00
33	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 17,655.00	\$ -	\$ 17,655.00
16	Day	Environmental Engineer		1	8	\$ -	\$ 8,240.00	\$ -	\$ 8,240.00
114	\$/Day	Per Diem		1	48.2	\$ -	\$ -	\$ -	\$ 684.84
1	Job	Permitting cost		0	0	\$ -	\$ 3,948.58	\$ -	\$ 3,948.58

Total

\$ 201,377.42

OFFICIAL COPY

NOV 15 2022



**1-4 - Trench Backfill
Unit Cost Estimate**

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 515.00	\$ 380.00	\$ 895.00
22	M.S.F.	Soil preparation, structural soil mixing, scarify subsoil, municipal, 50 HP skid steer loader w/scarifiers	1 Equip. Oper. (light) 1 Loader-Backhoe, 40 H.P.	120	0.07	\$ -	\$ 95.48	\$ 53.90	\$ 149.38
614	L.C.Y.	Cycle hauling (wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 4,052.69	\$ 5,434.29	\$ 9,486.99
614	C.Y.	Soils for earthwork, common borrow, spread with 200 HP dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	1 Equipment Oper. (med.) .5 Laborer 2 Truck Drivers (heavy) 2 Dump Trucks, 12 C.Y., 400 H.P. 1 Dozer, 200 H.P.	600	0.05	\$ 9,118.56	\$ 1,750.03	\$ 3,014.96	\$ 13,883.54
3129	C.Y.	Topsoil stripping and stockpiling, topsoil, sandy loam, ideal conditions, 200 HP dozer	1 Equip. Oper. (medium) .5 Laborer 1 Dozer, 200 H.P.	2300	0	\$ -	\$ 750.96	\$ 2,284.17	\$ 3,035.13
3129	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$ 36,452.85	\$ 18,461.10	\$ 54,913.95
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 40-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (medium) 1 Truck Tractor, 6x4, 380 H.P. 1 Flatbed Trailer, 40 Ton	2	8	\$ -	\$ 515.00	\$ 380.00	\$ 895.00
40	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 21,400.00	\$ -	\$ 21,400.00
20	Day	Environmental Engineer		1	8	\$ -	\$ 10,300.00	\$ -	\$ 10,300.00
114	\$/Day	Per Diem		1	32.43	\$ -	\$ -	\$ -	\$ 460.78
1	Job	Permitting cost		0	0	\$ -	\$ 2,308.40	\$ -	\$ 2,308.40

Total

\$117,728.17

OFFICIAL COPY

NOV 15 2022



**1-5 - Trench Restoration
Unit Cost Estimate**

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for small equipment, placed in rear of, or towed by pickup truck		4	2	\$ -	\$ 130.00	\$ 48.50	\$ 178.50
5	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor		1.5	16	\$ -	\$ 4,475.00	\$ 660.00	\$ 5,135.00
2347	S.Y.	Seeding, mechanical seeding, 44 lb/M.S.Y.		2500	0	\$610.22	\$ 492.87	\$ 281.64	\$ 1,384.73
1	Ea.	Mobilization or demobilization, delivery charge for small equipment, placed in rear of, or towed by pickup truck		4	2	\$ -	\$ 130.00	\$ 48.50	\$ 178.50
4	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 2,140.00	\$ -	\$ 2,140.00
2	Day	Environmental Engineer		1	8	\$ -	\$ 1,030.00	\$ -	\$ 1,030.00
114	\$/Day	Per Diem		1	36	\$ -	\$ -	\$ -	\$ 511.50
1	Job	Permitting cost		0	0	\$ -	\$ 211.16	\$ -	\$ 211.16

Total

\$ 10,769.39

OFFICIAL COPY

NOV 15 2022



2-2 - Road Crossing Abandonment Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
800	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic 2 Laborers	1000	0.02	\$ 72.00	\$ 1,352.00	\$ 32.00	\$ 1,456.00
800	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$ 384.00	\$ 1,656.00	\$ 240.00	\$ 2,280.00
8	Ea.	8'x16' 3-Ply Temp. Matting, Includes Install/Remove, 6" Mulch		0	0	\$14,256.00	\$ -	\$ -	\$ 14,256.00
10	C.Y.	Subsurface investigation, test pits, loader/backhoe, light soil	1 Equipment Oper. (med.) 1 Laborer 1 Backhoe Loader, 80 H.P.	28	0.57	\$ -	\$ 345.00	\$ 92.50	\$ 437.50
30	L.F.	Sewer pipelines, cleaning, pig method, lengths 1000' to 10,000', 4" diameter through 24" diameter, minimum		0	0	\$ -	\$ -	\$ -	\$ 124.20
0.4	Week	Field personnel, general purpose laborer, average		0.2	40	\$ -	\$ 820.00	\$ -	\$ 820.00
0.2	Week	Field personnel, field engineer, engineer, average		0	0	\$ -	\$ 555.00	\$ -	\$ 555.00
95	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 11.40	\$ 15.20	\$ 11.40	\$ 38.00
4	C.Y.	Structural concrete, ready mix, flowable fill, 40-80 psi, includes ash, Portland cement Type I, sand and water, delivered, excludes all additives and treatments		0	0	\$ 338.00	\$ -	\$ -	\$ 338.00
4	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 288.00	\$ -	\$ 288.00
4	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,200.00	\$ 1,260.00	\$ -	\$ 2,460.00
10	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$ 116.50	\$ 59.00	\$ 175.50
14.22	S.Y.	Seeding, mechanical seeding, 44 lb/M.S.Y.	1 Equip. Oper. (light) 1 Loader-Backhoe, 40 H.P.	2500	0	\$ 3.70	\$ 2.99	\$ 1.71	\$ 8.39
2	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,070.00	\$ -	\$ 1,070.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	65.11	\$ -	\$ -	\$ -	\$ 925.10
1	Job	Permitting cost		0	0	\$ -	\$ 520.87	\$ -	\$ 520.87

Total

\$ 26,564.56

OFFICIAL COPY

NOV 15 2022

2-4 - Highway Crossing Abandonment Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
800	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic 2 Laborers	1000	0.02	\$ 72.00	\$ 1,352.00	\$ 32.00	\$ 1,456.00
800	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$ 384.00	\$ 1,656.00	\$ 240.00	\$ 2,280.00
10	C.Y.	Subsurface investigation, test pits, loader/backhoe, light soil	1 Equipment Oper. (med.) 1 Laborer 1 Backhoe Loader, 80 H.P.	28	0.57	\$ -	\$ 345.00	\$ 92.50	\$ 437.50
8	Ea.	8'x16' 3-Ply Temp. Matting, Includes Install/Remove, 6" Mulch		0	0	\$14,256.00	\$ -	\$ -	\$ 14,256.00
150	L.F.	Sewer pipelines, cleaning, pig method, lengths 1000' to 10,000', 4" diameter through 24" diameter, minimum		0	0	\$ -	\$ -	\$ -	\$ 621.00
0.4	Week	Field personnel, general purpose laborer, average		0.2	40	\$ -	\$ 820.00	\$ -	\$ 820.00
0.2	Week	Field personnel, field engineer, engineer, average		0	0	\$ -	\$ 555.00	\$ -	\$ 555.00
472	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 56.64	\$ 75.52	\$ 56.64	\$ 188.80
18	C.Y.	Structural concrete, ready mix, flowable fill, 40-80 psi, includes ash, Portland cement Type I, sand and water, delivered, excludes all additives and treatments		0	0	\$ 1,521.00	\$ -	\$ -	\$ 1,521.00
4	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 288.00	\$ -	\$ 288.00
4	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,200.00	\$ 1,260.00	\$ -	\$ 2,460.00
10	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$ 116.50	\$ 59.00	\$ 175.50
14.22	S.Y.	Seeding, mechanical seeding, 44 lb/M.S.Y.	1 Equip. Oper. (light) 1 Loader-Backhoe, 40 H.P.	2500	0	\$ 3.70	\$ 2.99	\$ 1.71	\$ 8.39
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	68.11	\$ -	\$ -	\$ -	\$ 967.73
1	Job	Permitting cost		0	0	\$ -	\$ 574.98	\$ -	\$ 574.98

Total

\$ 29,323.90

OFFICIAL COPY

NOV 15 2022

2-5 - Railroad Crossing Abandonment Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
800	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman	1000	0.02	\$ 72.00	\$ 1,352.00	\$ 32.00	\$ 1,456.00
800	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	2 Laborers 1 Equip. Oper. (light)	650	0.04	\$ 384.00	\$ 1,656.00	\$ 240.00	\$ 2,280.00
16	Ea.	8'x16' 3-Ply Temp. Matting, Includes Install/Remove, 6" Mulch		0	0	\$ 28,512.00	\$ -	\$ -	\$ 28,512.00
10	C.Y.	Subsurface investigation, test pits, loader/backhoe, light soil	1 Equipment Oper. (med.) 1 Laborer 1 Backhoe Loader, 80 H.P.	28	0.57	\$ -	\$ 345.00	\$ 92.50	\$ 437.50
200	L.F.	Sewer pipelines, cleaning, pig method, lengths 1000' to 10,000', 4" diameter through 24" diameter, minimum		0	0	\$ -	\$ -	\$ -	\$ 828.00
0.4	Week	Field personnel, general purpose laborer, average		0.2	40	\$ -	\$ 820.00	\$ -	\$ 820.00
0.2	Week	Field personnel, field engineer, engineer, average		0	0	\$ -	\$ 555.00	\$ -	\$ 555.00
629	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 75.48	\$ 100.64	\$ 75.48	\$ 251.60
24	C.Y.	Structural concrete, ready mix, flowable fill, 40-80 psi, includes ash, Portland cement Type I, sand and water, delivered, excludes all additives and treatments		0	0	\$ 2,028.00	\$ -	\$ -	\$ 2,028.00
4	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 288.00	\$ -	\$ 288.00
4	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,200.00	\$ 1,260.00	\$ -	\$ 2,460.00
1	Day	Rent tractor with A frame boom and winch 225 HP, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 545.95	\$ 545.95
1	Day	Rent crane, flatbed mounted, 3 ton capacity, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 351.60	\$ 351.60
10	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$ 116.50	\$ 59.00	\$ 175.50
14.22	S.Y.	Seeding, mechanical seeding, 44 lb/M.S.Y.	1 Equip. Oper. (light) 1 Loader-Backhoe, 40 H.P.	2500	0	\$ 3.70	\$ 2.99	\$ 1.71	\$ 8.39
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	68.11	\$ -	\$ -	\$ -	\$ 967.73
1	Job	Permitting cost		0	0	\$ -	\$ 893.59	\$ -	\$ 893.59

Total

\$45,572.86

2-7 - Water Crossing Abandonment Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
2	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 390.00	\$ 204.00	\$ 594.00
800	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic 2 Laborers	1000	0.02	\$ 72.00	\$ 1,352.00	\$ 32.00	\$ 1,456.00
800	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$ 384.00	\$ 1,656.00	\$ 240.00	\$ 2,280.00
16	Ea.	8'x16' 3-Ply Temp. Matting, Includes Install/Remove, 6" Mulch		0	0	\$28,512.00	\$ -	\$ -	\$ 28,512.00
10	C.Y.	Subsurface investigation, test pits, loader/backhoe, light soil	1 Equipment Oper. (med.) 1 Laborer 1 Backhoe Loader, 80 H.P.	28	0.57	\$ -	\$ 345.00	\$ 92.50	\$ 437.50
150	L.F.	Sewer pipelines, cleaning, pig method, lengths 1000' to 10,000', 4" diameter through 24" diameter, minimum		0	0	\$ -	\$ -	\$ -	\$ 621.00
0.4	Week	Field personnel, general purpose laborer, average		0.2	40	\$ -	\$ 820.00	\$ -	\$ 820.00
0.2	Week	Field personnel, field engineer, engineer, average		0	0	\$ -	\$ 555.00	\$ -	\$ 555.00
472	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 56.64	\$ 75.52	\$ 56.64	\$ 188.80
18	C.Y.	Structural concrete, ready mix, flowable fill, 40-80 psi, includes ash, Portland cement Type I, sand and water, delivered, excludes all additives and treatments		0	0	\$ 1,521.00	\$ -	\$ -	\$ 1,521.00
4	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint		15	1.07	\$ -	\$ 288.00	\$ -	\$ 288.00
4	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,200.00	\$ 1,260.00	\$ -	\$ 2,460.00
1	Day	Rent tractor with A frame boom and winch 225 HP, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 545.95	\$ 545.95
1	Day	Rent crane, flatbed mounted, 3 ton capacity, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 351.60	\$ 351.60
14.22	S.Y.	Seeding, mechanical seeding, 44 lb/M.S.Y.	1 Equip. Oper. (light) 1 Loader-Backhoe, 40 H.P.	2500	0	\$ 3.70	\$ 2.99	\$ 1.71	\$ 8.39
2	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 390.00	\$ 204.00	\$ 594.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	59.91	\$ -	\$ -	\$ -	\$ 851.22
1	Job	Permitting cost		0	0	\$ -	\$ 884.09	\$ -	\$ 884.09

Total

\$ 45,088.55

OFFICIAL COPY

MAY 15 2022

3-1 - Small Meter Station Removal
Unit Cost Estimate

Testimony of Steven R. Fall
 Docket No. G-39, Sub 47
 Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
92	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic	1000	0.02	\$ 8.28	\$ 155.48	\$ 3.68	\$ 167.44
92	L.F.	Fencing demolition, remove chain link posts & fabric, 8' to 10' high	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	445	0.05	\$ -	\$ 277.84	\$ 48.76	\$ 326.60
1	Ea.	Steel tank, single wall, above ground, 15,000 thru 30,000 gallon, selective demolition, excluding foundation, pumps or piping	2 Pipe Fitters 1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Flatbed Trailer, 40 Ton 1 Truck Tractor, 6x4, 380 H.P. 1 Hyd. Crane, 80 Ton 1 Hyd. Excavator, 2 C.Y.	2	16	\$ -	\$ 1,150.00	\$ 1,700.00	\$ 2,850.00
2	Ea.	Selective demolition, parking appurtenances, pipe bollards, 6"-12" diameter	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	80	0.3	\$ -	\$ 33.60	\$ 5.94	\$ 39.54
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
1	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 535.00	\$ -	\$ 535.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	80.37	\$ -	\$ -	\$ -	\$ 1,141.92
1	Job	Permitting cost		0	0	\$ -	\$ 218.51	\$ -	\$ 218.51

Total

\$ 11,144.01

OFFICIAL COPY

NOV 15 2022

**3-2 - Small Meter Station Sub Material Removal
Unit Cost Estimate**

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
92	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high		650	0.04	\$ 44.16	\$ 190.44	\$ 27.60	\$ 262.20
58	B.C.Y.	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering		270	0.06	\$ -	\$ 210.54	\$ 165.88	\$ 376.42
58	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment		72	0.11	\$ -	\$ 382.80	\$ 513.30	\$ 896.10
4	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 288.00	\$ -	\$ 288.00
4	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,200.00	\$ 1,260.00	\$ -	\$ 2,460.00
1	Ea.	Selective demolition, utility materials, utility valves, 14"-24", excludes excavation		2	14	\$ -	\$ 770.00	\$ 105.00	\$ 875.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		0	0	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	75.49	\$ -	\$ -	\$ -	\$ 1,072.59
1	Job	Permitting cost		0	0	\$ -	\$ 274.01	\$ -	\$ 274.01

Total

\$ 13,974.32

OFFICIAL COPY

NOV 15 2022



3-3 - Small Meter Station Backfill and Restoration Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
92	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment		72	0.11	\$ -	\$ 607.20	\$ 814.20	\$ 1,421.40
2	M.S.F.	Soil preparation, structural soil mixing, scarify subsoil, municipal, 50 HP skid steer loader w/scarifiers		120	0.07	\$ -	\$ 8.68	\$ 4.90	\$ 13.58
1	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor		1.5	16	\$ -	\$ 895.00	\$ 132.00	\$ 1,027.00
92	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$ 1,071.80	\$ 542.80	\$ 1,614.60
92	S.Y.	Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed with wood fiber mulch added		8900	0	\$ 222.64	\$ 9.20	\$ 6.44	\$ 238.28
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
2	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,070.00	\$ -	\$ 1,070.00
1	Day	Environmental Engineer		0	0	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	72.38	\$ -	\$ -	\$ -	\$ 1,028.40
1	Job	Permitting cost		0	0	\$ -	\$ 245.57	\$ -	\$ 245.57

Total

\$ 12,523.83

**3-4 - Medium Meter Station Removal
Unit Cost Estimate**

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
489	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic 2 Laborers	1000	0.02	\$ 44.01	\$ 826.41	\$ 19.56	\$ 889.98
489	L.F.	Fencing demolition, remove chain link posts & fabric, 8' to 10' high	1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	445	0.05	\$ -	\$ 1,476.78	\$ 259.17	\$ 1,735.95
22529	C.F.	Building demolition, small buildings or single buildings, steel, includes 20 mile haul, excludes salvage, foundation demolition or dump fees	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (medium) 2 Truck Drivers (heavy) 1 Crawler Loader, 3 C.Y. 2 Dump Trucks, 12 C.Y., 400 H.P.	14800	0	\$ -	\$ 4,280.51	\$ 3,829.93	\$ 8,110.44
3	Ea.	Steel tank, single wall, above ground, 15,000 thru 30,000 gallon, selective demolition, excluding foundation, pumps or piping	2 Pipe Fitters 1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Flatbed Trailer, 40 Ton 1 Truck Tractor, 6x4, 380 H.P. 1 Hyd. Crane, 80 Ton 1 Hyd. Excavator, 2 C.Y.	2	16	\$ -	\$ 3,450.00	\$ 5,100.00	\$ 8,550.00
1119	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 111.90	\$ 134.28	\$ 111.90	\$ 358.08
356	L.F.	Selective demolition, natural gas, steel pipe, pipe, 18" - 24", excludes excavation	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (crane) 2 Cutting Torches 2 Sets of Gases 1 Hyd. Crane, 12 Ton	160	0.2	\$ -	\$ 4,076.20	\$ 2,082.60	\$ 6,158.80
4	Day	Rented truck, flatbed, GVW = 20,000 Lbs, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 1,133.08	\$ 1,133.08
4	Day	Crane crew, daily use for small jobs, 25-ton truck-mounted hydraulic crane, portal to portal	1 Equip. Oper. (crane) 1 Hyd. Crane, 25 Ton (Daily)	1	8	\$ -	\$ 2,280.00	\$ 3,560.00	\$ 5,840.00
2	Ea.	Selective demolition, utility poles & cross arms, utility poles, wood, 20'-30' high	1 Electrician Foreman 1 Electrician .5 Equip. Oper. (crane) .5 S.P. Crane, 4x4, 5 Ton	6	3.33	\$ -	\$ 506.00	\$ 70.00	\$ 576.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	91.6	\$ -	\$ -	\$ -	\$ 1,301.48
1	Job	Permitting cost		0	0	\$ -	\$ 842.48	\$ -	\$ 842.48

Total

\$ 42,966.29

OFFICIAL COPY

NOV 15 2022



3-5 - Medium Meter Station Sub Material Removal
Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

OFFICIAL COPY

MAY 15 2022

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
489	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high		650	0.04	\$ 234.72	\$ 1,012.23	\$ 146.70	\$ 1,393.65
72	S.Y.	Demolish, remove pavement & curb, remove concrete, rod reinforced, to 6" thick, excludes hauling and disposal fees	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (light) 1 Equip. Oper. (medium) 1 Backhoe Loader, 48 H.P. 1 Hyd. Hammer (1200 lb.) 1 F.E. Loader, W.M., 4 C.Y. 1 Pvm. Rem. Bucket	200	0.12	\$ -	\$ 482.40	\$ 482.40	\$ 964.80
12	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 79.20	\$ 106.20	\$ 185.40
1333	B.C.Y.	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering		270	0.06	\$ -	\$ 4,838.79	\$ 3,812.38	\$ 8,651.17
1333	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment		72	0.11	\$ -	\$ 8,797.80	\$11,797.05	\$ 20,594.85
6	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 432.00	\$ -	\$ 432.00
6	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,800.00	\$ 1,890.00	\$ -	\$ 3,690.00
1	Ea.	Selective demolition, septic tanks and related components, precast septic tanks, 1000-1250 gal., excludes excavation	1 Labor Foreman (outside) 1 Skilled Worker 1 Laborer .5 Equip. Oper. (crane) .5 S.P. Crane, 4x4, 5 Ton	8	3.5	\$ -	\$ 193.00	\$ 26.50	\$ 219.50
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
7	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 3,745.00	\$ -	\$ 3,745.00
3	Day	Environmental Engineer		0	0	\$ -	\$ 1,545.00	\$ -	\$ 1,545.00
114	\$/Day	Per Diem		1	65.22	\$ -	\$ -	\$ -	\$ 926.67
1	Job	Permitting cost		0	0	\$ -	\$ 953.96	\$ -	\$ 953.96

Total

\$ 45,977.00



3-6 - Medium Meter Station Backfill and Restoration
Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
1333	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment		72	0.11	\$ -	\$ 8,797.80	\$11,797.05	\$ 20,594.85
12	M.S.F.	Soil preparation, structural soil mixing, scarify subsoil, municipal, 50 HP skid steer loader w/scarifiers		120	0.07	\$ -	\$ 52.08	\$ 29.40	\$ 81.48
12	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor		1.5	16	\$ -	\$10,740.00	\$ 1,584.00	\$ 12,324.00
1333	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$15,529.45	\$ 7,864.70	\$ 23,394.15
1333	S.Y.	Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed with wood fiber mulch added		8900	0	\$ 3,225.86	\$ 133.30	\$ 93.31	\$ 3,452.47
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
8	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 4,280.00	\$ -	\$ 4,280.00
4	Day	Environmental Engineer		0	0	\$ -	\$ 2,060.00	\$ -	\$ 2,060.00
114	\$/Day	Per Diem		1	72.38	\$ -	\$ -	\$ -	\$ 1,028.40
1	Job	Permitting cost		0	0	\$ -	\$ 1,397.81	\$ -	\$ 1,397.81

Total

\$ 71,288.16

OFFICIAL COPY

NOV 15 2022



3-7 - Large Meter Station Removal
Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
439	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic	1000	0.02	\$ 39.51	\$ 741.91	\$ 17.56	\$ 798.98
439	L.F.	Fencing demolition, remove chain link posts & fabric, 8' to 10' high	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	445	0.05	\$ -	\$ 1,325.78	\$ 232.67	\$ 1,558.45
13	Ea.	Selective demolition, parking appurtenances, pipe bollards, 6"-12" diameter	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	80	0.3	\$ -	\$ 218.40	\$ 38.61	\$ 257.01
40079	C.F.	Building demolition, small buildings or single buildings, steel, includes 20 mile haul, excludes salvage, foundation demolition or dump fees	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (medium) 2 Truck Drivers (heavy) 1 Crawler Loader, 3 C.Y. 2 Dump Trucks, 12 C.Y., 400 H.P.	14800	0	\$ -	\$ 7,615.01	\$ 6,813.43	\$ 14,428.44
2	Ea.	Steel tank, single wall, above ground, 15,000 thru 30,000 gallon, selective demolition, excluding foundation, pumps or piping	2 Pipe Fitters 1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Flatbed Trailer, 40 Ton 1 Truck Tractor, 6x4, 380 H.P. 1 Hyd. Crane, 80 Ton 1 Hyd. Excavator, 2 C.Y.	2	16	\$ -	\$ 2,300.00	\$ 3,400.00	\$ 5,700.00
1348	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 134.80	\$ 161.76	\$ 134.80	\$ 431.36
429	L.F.	Selective demolition, natural gas, steel pipe, pipe, 18" - 24", excludes excavation	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (crane) 2 Cutting Torches 2 Sets of Gases 1 Hyd. Crane, 12 Ton	160	0.2	\$ -	\$ 4,912.05	\$ 2,509.65	\$ 7,421.70
3	Day	Rented truck, flatbed, GVW = 20,000 Lbs, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 849.81	\$ 849.81
3	Day	Crane crew, daily use for small jobs, 25-ton truck-mounted hydraulic crane, portal to portal	1 Equip. Oper. (crane) 1 Hyd. Crane, 25 Ton (Daily)	1	8	\$ -	\$ 1,710.00	\$ 2,670.00	\$ 4,380.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	64.57	\$ -	\$ -	\$ -	\$ 917.43
1	Job	Permitting cost		0	0	\$ -	\$ 884.26	\$ -	\$ 884.26

Total

\$ 42,422.44

OFFICIAL COPY

NOV 15 2022



**3-8 - Large Meter Station Sub Material Removal
Unit Cost Estimate**

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
439	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high		650	0.04	\$ 210.72	\$ 908.73	\$ 131.70	\$ 1,251.15
128	S.Y.	Demolish, remove pavement & curb, remove concrete, rod reinforced, to 6" thick, excludes hauling and disposal fees	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (light) 1 Equip. Oper. (medium) 1 Backhoe Loader, 48 H.P. 1 Hyd. Hammer (1200 lb.) 1 F.E. Loader, W.M., 4 C.Y. 1 Pvm. Rem. Bucket	200	0.12	\$ -	\$ 857.60	\$ 857.60	\$ 1,715.20
22	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 145.20	\$ 194.70	\$ 339.90
1329	B.C.Y.	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering		270	0.06	\$ -	\$ 4,824.27	\$ 3,800.94	\$ 8,625.21
1329	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment		72	0.11	\$ -	\$ 8,771.40	\$11,761.65	\$ 20,533.05
6	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 432.00	\$ -	\$ 432.00
6	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 1,800.00	\$ 1,890.00	\$ -	\$ 3,690.00
8	Ea.	Selective demolition, utility materials, utility valves, 14"-24", excludes excavation		2	14	\$ -	\$ 6,160.00	\$ 840.00	\$ 7,000.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
5	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 2,675.00	\$ -	\$ 2,675.00
2	Day	Environmental Engineer		0	0	\$ -	\$ 1,030.00	\$ -	\$ 1,030.00
114	\$/Day	Per Diem		1	75.72	\$ -	\$ -	\$ -	\$ 1,075.86
1	Job	Permitting cost		0	0	\$ -	\$ 1,074.35	\$ -	\$ 1,074.35

Total

\$ 54,791.72

OFFICIAL COPY

NOV 15 2022

3-9 - Large Meter Station Backfill and Restoration Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
1329	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment		72	0.11	\$ -	\$ 8,771.40	\$11,761.65	\$ 20,533.05
12	M.S.F.	Soil preparation, structural soil mixing, scarify subsoil, municipal, 50 HP skid steer loader w/scarifiers		120	0.07	\$ -	\$ 52.08	\$ 29.40	\$ 81.48
12	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor		1.5	16	\$ -	\$10,740.00	\$ 1,584.00	\$ 12,324.00
1329	E.C.Y.	Backfill, bulk, air tamped compaction, add	1 Equipment Oper. (light) 1 Laborer 1 Air Powered Tamper 1 Air Compressor, 365 cfm 2 -50' Air Hoses, 1.5	80	0.2	\$ -	\$15,482.85	\$ 7,841.10	\$ 23,323.95
1329	S.Y.	Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed with wood fiber mulch added		8900	0	\$ 3,216.18	\$ 132.90	\$ 93.03	\$ 3,442.11
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
17	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 9,095.00	\$ -	\$ 9,095.00
8	Day	Environmental Engineer		0	0	\$ -	\$ 4,120.00	\$ -	\$ 4,120.00
114	\$/Day	Per Diem		1	72.38	\$ -	\$ -	\$ -	\$ 1,028.40
1	Job	Permitting cost		0	0	\$ -	\$ 1,532.46	\$ -	\$ 1,532.46

Total

\$ 78,155.45

OFFICIAL COPY

NOV 15 2022



Cardinal Pipeline Company, LLC
Compressor Station Summary Report

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Line No.	Particular (A)	Cost (\$) (B)	Total Cost (\$)
1	1 Clayton	<u>Cost / Phase</u>	
2	4-1 - Compressor Station Removal	\$ 453,588	
3	4-2 - Compressor Station Sub Material Removal	\$ 1,988,334	
4	4-3 - Compressor Station Backfill and Restoration	\$ 836,139	
5		Total	<u>\$3,278,061</u>

OFFICIAL COPY

NOV 15 2022

4-1 - Clayton Compressor Station Removal
Unit Cost Estimate

Testimony of Steven R. Fall
 Docket No. G-39, Sub 47
 Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
2014	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic	1000	0.02	\$ 181.26	\$ 3,403.66	\$ 80.56	\$ 3,665.48
2014	L.F.	Fencing demolition, remove chain link posts & fabric, 8' to 10' high	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	445	0.05	\$ -	\$ 6,082.28	\$ 1,067.42	\$ 7,149.70
2639	C.F.	Gas pipelines, nitrogen purge method		0	0	\$ 263.90	\$ 316.68	\$ 263.90	\$ 844.48
840	L.F.	Selective demolition, natural gas, steel pipe, pipe, 18" - 24", excludes excavation	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (crane) 2 Cutting Torches 2 Sets of Gases 1 Hyd. Crane, 12 Ton	160	0.2	\$ -	\$ 9,618.00	\$ 4,914.00	\$ 14,532.00
494369	C.F.	Building demolition, small buildings or single buildings, steel, includes 20 mile haul, excludes salvage, foundation demolition or dump fees	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (medium) 2 Truck Drivers (heavy) 1 Crawler Loader, 3 C.Y., 2 Dump Trucks, 12 C.Y., 400 H.P.	14800	0	\$ -	\$ 93,930.11	\$84,042.73	\$ 177,972.84
3	Ea.	Boiler, gas and or oil or solid, 12,200 thru 25,000 MBH, selective demolition	1 Steamfitter Foreman (inside) 2 Steamfitters 1 Steamfitter Apprentice	0.12	267	\$ -	\$ 56,100.00	\$ -	\$ 56,100.00
11	Ea.	Air conditioner, split unit air conditioner, package unit, 3 ton, selective demolition	2 Steamfitters 1 Steamfitter Apprentice	3	8	\$ -	\$ 5,940.00	\$ -	\$ 5,940.00
27	Ea.	Steel tank, single wall, above ground, 15,000 thru 30,000 gallon, selective demolition, excluding foundation, pumps or piping	2 Pipe Fitters 1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Flatbed Trailer, 40 Ton 1 Truck Tractor, 6x4, 380 H.P. 1 Hyd. Crane, 80 Ton 1 Hyd. Excavator, 2 C.Y.	2	16	\$ -	\$ 31,050.00	\$45,900.00	\$ 76,950.00
9	Ea.	Selective demolition, utility poles & cross arms, utility poles, wood, 20'-30' high	1 Electrician Foreman 1 Electrician .5 Equip. Oper. (crane) .5 S.P. Crane, 4x4, 5 Ton	6	3.33	\$ -	\$ 2,277.00	\$ 315.00	\$ 2,592.00
1	Ea.	Selective demolition, radio towers, guyed, 200' high, 70 lb section	1 Struc. Steel Foreman (outside) 1 Struc. Steel Worker 1 Truck Driver (light) 1 Flatbed Truck, Gas, 3 Ton	0.7	34.29	\$ -	\$ 2,350.00	\$ 1,325.00	\$ 3,675.00
42	Day	Crane crew, daily use for small jobs, 25-ton truck-mounted hydraulic crane, portal to portal	1 Equip. Oper. (crane) 1 Hyd. Crane, 25 Ton (Daily)	1	8	\$ -	\$ 23,940.00	\$37,380.00	\$ 61,320.00
42	Day	Rent trailer, platform, flush deck 2 axle, 25 ton, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 9,031.26	\$ 9,031.26
40	Ton	Selective demolition, dump charges, typical urban city, rubbish only, includes tipping fees only		0	0	\$2,780.00	\$ -	\$ -	\$ 2,780.00

OFFICIAL COPY

MAY 15 2022



								Testimony of Steven R. Fall	
								Docket No.	G-39, Sub 47
								Exhibit	(CPC-0007)
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
14	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 7,490.00	\$ -	\$ 7,490.00
7	Day	Environmental Engineer		1	8	\$ -	\$ 3,605.00	\$ -	\$ 3,605.00
114	\$/Day	Per Diem		1	400.9	\$ -	\$ -	\$ -	\$ 5,695.98
1	Job	Permitting cost		0	0	\$ -	\$ 8,893.87	\$ -	\$ 8,893.87

Total**\$ 453,587.61**

OFFICIAL COPY

MAY 15 2022



4-2 - Clayton Compressor Station Sub Material Removal Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton 2 Laborers	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
2014	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$ 966.72	\$ 4,168.98	\$ 604.20	\$ 5,739.90
26529	C.F.	Selective demolition, cutout, concrete, elevated slab, bar reinforced, over 6 C.F., excludes loading and disposal	1 Labor Foreman (outside) 4 Laborers 1 Air Compressor, 250 cfm 2 Breakers, Pavement, 60 lb. 2 -50' Air Hoses, 1.5	50	0.8	\$ -	\$ 1,100,953.50	\$ 206,926.20	\$ 1,307,879.70
5263	S.Y.	Demolish, remove pavement & curb, remove concrete, rod reinforced, to 6" thick, excludes hauling and disposal fees	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (light) 1 Equip. Oper. (medium) 1 Backhoe Loader, 48 H.P. 1 Hyd. Hammer (1200 lb.) 1 F.E. Loader, W.M., 4 C.Y. 1 Pvm. Rem. Bucket	200	0.12	\$ -	\$ 35,262.10	\$ 35,262.10	\$ 70,524.20
1860	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 12,276.00	\$ 16,461.00	\$ 28,737.00
15280	B.C.Y.	Excavating, bulk, dozer, open site, bank measure, sand and gravel, 200 HP dozer, 300' haul	1 Equip. Oper. (medium) .5 Laborer 1 Dozer, 200 H.P.	310	0.03	\$ -	\$ 27,351.20	\$ 82,512.00	\$ 109,863.20
15280	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 100,848.00	\$ 135,228.00	\$ 236,076.00
2	Month	Rent front end loader, 4WD, art. frame, diesel, 7 - 9 CY 475 HP, Incl. Hourly Oper. Cost.		0	0	\$ -	\$ -	\$ 83,420.48	\$ 83,420.48
8	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber 1 Plumber Apprentice	15	1.07	\$ -	\$ 576.00	\$ -	\$ 576.00
8	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$ 2,400.00	\$ 2,520.00	\$ -	\$ 4,920.00
40	Ton	Selective demolition, dump charges, typical urban city, rubbish only, includes tipping fees only		0	0	\$ 2,780.00	\$ -	\$ -	\$ 2,780.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,575.00	\$ 1,100.00	\$ 2,675.00
117	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 62,595.00	\$ -	\$ 62,595.00
58	Day	Environmental Engineer		1	9	\$ -	\$ 29,870.00	\$ -	\$ 29,870.00
114	\$/Day	Per Diem		1	71.49	\$ -	\$ -	\$ -	\$ 1,015.75
1	Job	Permitting cost		0	0	\$ -	\$ 38,986.94	\$ -	\$ 38,986.94

Total

\$ 1,988,334.17



**4-3 - Albany Compressor Station Backfill and Restoration
Unit Cost Estimate**

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

OFFICIAL COPY

MAY 15 2022

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,525.00	\$ 1,000.00	\$ 2,525.00
138	M.S.F.	Soil preparation, structural soil mixing, scarify subsoil, municipal, 50 HP skid steer loader w/scarifiers	1 Equip. Oper. (light) 1 Loader-Backhoe, 40 H.P.	120	0.07	\$ -	\$ 590.64	\$ 304.98	\$ 895.62
15280	C.Y.	Soils for earthwork, common borrow, spread with 200 HP dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	1 Equipment Oper. (med.) .5 Laborer 2 Truck Drivers (heavy) 2 Dump Trucks, 12 C.Y., 400 H.P. 1 Dozer, 200 H.P.	600	0.05	\$211,628.00	\$ 42,784.00	\$ 74,260.80	\$ 328,672.80
15280	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 99,320.00	\$133,700.00	\$ 233,020.00
138	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor	2 Laborers 1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	1.5	16	\$ -	\$121,440.00	\$ 17,940.00	\$ 139,380.00
15280	E.C.Y.	Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	1 Equip. Oper. (medium) .5 Laborer 1 Dozer, 200 H.P. 1 Vibratory Roller, Towed, 23 Ton	800	0.01	\$ -	\$ 10,543.20	\$ 42,936.80	\$ 53,480.00
15280	S.Y.	Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed with wood fiber mulch added	1 Laborer 1 Equip. Oper. (medium) 1 Truck Driver (heavy) 1 Hydromulcher, T.M., 3000 Gal. 1 Truck Tractor, 220 H.P.	8900	0	\$ 34,838.40	\$ 1,528.00	\$ 1,069.60	\$ 37,436.00
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 50-ton capacity towed trailer	1 Truck Driver (heavy) 1 Equip. Oper. (crane) 1 Equip. Oper. (light) 1 Truck Tractor, 6x4, 450 H.P. 1 Equipment Trailer, 50 Ton 1 Pickup Truck, 4x4, 3/4 Ton	1	24	\$ -	\$ 1,525.00	\$ 1,000.00	\$ 2,525.00
26	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 13,780.00	\$ -	\$ 13,780.00
13	Day	Environmental Engineer		1	8	\$ -	\$ 6,890.00	\$ -	\$ 6,890.00
114	\$/Day	Per Diem		1	80.24	\$ -	\$ -	\$ -	\$ 1,140.08
1	Job	Permitting cost		0	0	\$ -	\$ 16,394.89	\$ -	\$ 16,394.89

Total

\$ 836,139.39



5-1 - Cathodic Protection - Rectifier Removal
Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
3	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (right) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 585.00	\$ 306.00	\$ 891.00
10	Ea.	Cathodic protection, rectifiers, silicon type, air cooled, 28 V/10 A, underground storage tanks	.5 Electrician Foreman 2 Electricians	3.5	5.71	#####	\$ 4,400.00	\$ -	\$ 30,400.00
0.25	Ton	Selective demolition, dump charges, typical urban city, reclamation station, usual charge, includes tipping fees only		0	0	\$ 20.25	\$ -	\$ -	\$ 20.25
3	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (right) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 585.00	\$ 306.00	\$ 891.00
3	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,605.00	\$ -	\$ 1,605.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	27.71	\$ -	\$ -	\$ -	\$ 393.71
1	Job	Permitting cost		0	0	\$ -	\$ 694.32	\$ -	\$ 694.32

Total

\$ 35,410.28

OFFICIAL COPY

NOV 15 2022



5-2 - Cathodic Protection - Test Site Removal
Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
10	Ea.	Signs, traffic sign removal, to 10 S.F., including supports	1 Equip. Oper. (light) 1 Crane, Flatbed Mounted, 3 Ton	16	2	\$ -	\$ 1,100.00	\$ 164.00	\$ 1,264.00
0.25	Ton	Selective demolition, dump charges, typical urban city, reclamation station, usual charge, includes tipping fees only		0	0	\$ 20.25	\$ -	\$ -	\$ 20.25
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
1	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 535.00	\$ -	\$ 535.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 635.00	\$ -	\$ 635.00
114	\$/Day	Per Diem		1	24	\$ -	\$ -	\$ -	\$ 341.00
1	Job	Permitting cost		0	0	\$ -	\$ 67.79	\$ -	\$ 67.79

Total

\$ 3,457.04

OFFICIAL COPY

NOV 15 2022

6-1 - ROW Marker Removal
Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
10	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 1,950.00	\$ 1,020.00	\$ 2,970.00
1330	C.L.F.	Utility line signs, markers, and flags, underground tape, detectable, reinforced, aluminum foil core, 6", excludes excavation and backfill		140	0.06	\$ 56,525.00	\$ 3,910.20	\$ -	\$ 60,435.20
2	Ton	Selective demolition, dump charges, typical urban city, reclamation station, usual charge, includes tipping fees only		0	0	\$ 162.00	\$ -	\$ -	\$ 162.00
1330	S.Y.	Seeding, mechanical seeding, 44 lb/M.S.Y.	1 Equip. Oper. (light) 1 Loader-Backhoe, 40	2500	0	\$ 345.80	\$ 279.30	\$ 159.60	\$ 784.70
10	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 1,950.00	\$ 1,020.00	\$ 2,970.00
10	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 5,350.00	\$ -	\$ 5,350.00
5	Day	Environmental Engineer		1	8	\$ -	\$ 2,575.00	\$ -	\$ 2,575.00
114	\$/Day	Per Diem		1	22.06	\$ -	\$ -	\$ -	\$ 313.44
1	Job	Permitting cost		0	0	\$ -	\$ 1,511.21	\$ -	\$ 1,511.21

Total

\$ 77,071.55

OFFICIAL COPY

NOV 15 2022



**7-1 - Tap Locations
Unit Cost Estimate**

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
200	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic 2 Laborers	1000	0.02	\$ 18.00	\$ 338.00	\$ 8.00	\$ 364.00
200	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$ 96.00	\$ 414.00	\$ 60.00	\$ 570.00
10	B.C.Y.	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering	1 Equip. Oper. (crane) 1 Laborer 1 Hyd. Excavator, .75 C.Y.	270	0.06	\$ -	\$ 36.30	\$ 28.60	\$ 64.90
2	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint		15	1.07	\$ -	\$ 144.00	\$ -	\$ 144.00
2	Ea.	Gasket and bolt set, for flanges, 150 lb., 24" pipe size		1.9	4.21	\$600.00	\$ 630.00	\$ -	\$ 1,230.00
5	L.C.Y.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 33.00	\$ 44.25	\$ 77.25
1	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor	2 Laborers 1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	1.5	16	\$ -	\$ 880.00	\$ 130.00	\$ 1,010.00
0.03	M.S.F.	Seeding, mechanical seeding grass seed, 4.5 lb./M.S.F., hand push spreader		180	0.04	\$ 0.89	\$ 0.07	\$ -	\$ 0.95
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
2	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 1,070.00	\$ -	\$ 1,070.00
1	Day	Environmental Engineer		1	8	\$ -	\$ 515.00	\$ -	\$ 515.00
114	\$/Day	Per Diem		1	43.55	\$ -	\$ -	\$ -	\$ 618.77
1	Job	Permitting cost		0	0	\$ -	\$ 125.18	\$ -	\$ 125.18

Total

\$ 6,384.05

OFFICIAL COPY

NOV 15 2022

8-1 - Mainline Valve Locations Unit Cost Estimate

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Quantity	Unit	Description	Crew Description	Daily Output	Labor Hours	Ext. Mat. O&P	Ext. Labor O&P	Ext. Equip. O&P	Ext. Total O&P
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
120	L.F.	Selective demolition, miscellaneous metal fences & gates, fence, miscellaneous steel mesh, 4'-6' high	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	600	0.04	\$ -	\$ 268.80	\$ 48.00	\$ 316.80
800	L.F.	Boundary & survey markers, property lines, perimeter, cleared land	1 Chief of Party 1 Instrument Man 1 Rodman/Chainman 1 Level, Electronic	1000	0.02	\$ 72.00	\$ 1,352.00	\$ 32.00	\$ 1,456.00
800	L.F.	Synthetic erosion control, silt fence, install and remove, 3' high	2 Laborers 1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	650	0.04	\$ 384.00	\$ 1,656.00	\$ 240.00	\$ 2,280.00
4	Ea.	Selective demolition, parking appurtenances, pipe bollards, 6"-12" diameter	2 Laborers 1 Equip. Oper. (light) 1 Backhoe Loader, 48 H.P.	80	0.3	\$ -	\$ 67.20	\$ 11.88	\$ 79.08
19	B.C.Y.	Excavating, trench or continuous footing, common earth, 3/4 C.Y. excavator, 1' to 4' deep, excludes sheeting or dewatering	1 Equip. Oper. (crane) 1 Laborer 1 Hyd. Excavator, .75 C.Y.	270	0.06	\$ -	\$ 68.97	\$ 54.34	\$ 123.31
36	L.F.	Selective demolition, natural gas, steel pipe, pipe, 5" - 10", excludes excavation Gasket and bolt set, for flanges, 150 lb., 24" pipe size	1 Labor Foreman (outside) 2 Laborers 1 Equip. Oper. (crane) 2 Cutting Torches 2 Sets of Gases 1 Hyd. Crane, 12 Ton	360	0.09	\$ -	\$ 183.60	\$ 93.24	\$ 276.84
2	Ea.	Pipe, cut one groove, labor only, 24" pipe size, grooved-joint	1 Plumber	1.9	4.21	\$ 600.00	\$ 630.00	\$ -	\$ 1,230.00
2	Ea.	Selective demolition, utility materials, utility valves, 14"-24", excludes excavation	1 Plumber Apprentice 1 Labor Foreman (outside) 1 Skilled Worker 1 Laborer	15	1.07	\$ -	\$ 144.00	\$ -	\$ 144.00
1	Ea.	Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 50 miles, 50 MPH, excludes loading equipment	1 Truck Driver (heavy) 1 Dump Truck, 12 C.Y., 400 H.P.	72	0.11	\$ -	\$ 237.60	\$ 318.60	\$ 556.20
1	Ea.	Rough grading sites, 1,100-3,000 S.F., skid steer & labor	2 Laborers 1 Equip. Oper. (light) 1 Loader, Skid Steer, 30 H.P.	1.5	16	\$ -	\$ 880.00	\$ 130.00	\$ 1,010.00
0.8	M.S.F.	Seeding, mechanical seeding grass seed, 4.5 lb./M.S.F., hand push spreader		180	0.04	\$ 23.60	\$ 1.82	\$ -	\$ 25.42
1	Ea.	Mobilization or demobilization, delivery charge for equipment, hauled on 3-ton capacity towed trailer	1 Equip. Oper. (light) 1 Pickup Truck, 4x4, 3/4 Ton 1 Flatbed Trailer, 3 Ton	2.67	3	\$ -	\$ 195.00	\$ 102.00	\$ 297.00
1	Day	Testing and inspecting, supervision of earthwork		1	8	\$ -	\$ 535.00	\$ -	\$ 535.00
0.5	Day	Environmental Engineer		1	8	\$ -	\$ 257.50	\$ -	\$ 257.50
114	\$/Day	Per Diem		1	57.98	\$ -	\$ -	\$ -	\$ 823.80
1	Job	Permitting cost		0	0	\$ -	\$ 211.66	\$ -	\$ 211.66

Total

\$ 10,794.61

OFFICIAL COPY

NOV 15 2022



Cardinal Pipeline Company, LLC
System Salvage Scrap Metal Calculations - Transmission

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

7/21/2021 Price / Ton (Nat. Ave.) https://iscrapapp.com/prices/	=	167.00					
(A)	(B)	(C)	(D)	(E)	(F)		
1.3 Pipe Removal - Transmission 24"	Length Removed (ft) 1440.48 1440.48	lb/ft 94.71	Total Weight (lb) 136427.77	Total Weight (ton) 68.21		Salvage Amt. \$ (11,392) \$ (11,392)	
				Subtotal:		\$ (11,392)	
				Total		\$ (11,392)	
3.3 M&R Stations - Transmission	Weight/Site (ton)	Scrap Value	Estimated	No. of Stations		Salvage Amt.	
Small M&R Station	5.00	167.00	835.00	2		\$ (1,670)	
Medium M&R Station	10.00	167.00	1670.00	2		\$ (3,340)	
Large M&R Station	15.00	167.00	2505.00	3		\$ (7,515)	
				Subtotal:		\$ (12,525)	
				Total:		\$ (12,525)	
4.3 Compressor Station - Storage	Ave. No./Site	Weight/Site (ton)	Total Weight (ton)	Scrap Value (ton)	Total Stations	Salvage Amt.	
Compressor Engine (Ave.)	2	160.00	320.00	\$ 167.00	1	\$ (53,440)	
LNG Tank	2	6091	6091	\$ 167.00	0	\$ -	
Equipment (Ave.)	18	22.50	405.00	\$ 167.00	1	\$ (67,635)	
Bldg (Ave.)	3	#REF!	3021.14	\$ 167.00	1	\$ (504,530)	
				Subtotal:		\$ (625,605)	
				Total:		\$ (625,605)	
5.3 Cathodic Protection - Transmission	No.	Weight/Site (ton)	Total Weight (ton)	Scrap Value (ton)		Salvage Amt.	
Rectifier	10	0.03	0.25	\$ 167.00		\$ (42)	
Test Site	10	0.002	0.02	\$ 167.00		\$ (3)	
				Subtotal:		\$ (45)	
				Total:		\$ (45)	
6.2 ROW Marker - Transmission Marker	No. 1330	Weight/Site (ton) 0.002	Total Weight (ton) 2.66	Scrap Value (ton) \$ 167.00		Salvage Amt. \$ (444) \$ (444)	
				Subtotal:		\$ (444)	
				Total:		\$ (444)	
7.2 Mainline Valve Site - Transmission Typical Valve Site	No. 18	Weight/Site (ton) 2.00	Total Weight (ton) 36.00	Scrap Value (ton) \$ 167.00		Salvage Amt. \$ (6,012) \$ (6,012)	
				Subtotal:		\$ (6,012)	
				Total:		\$ (6,012)	
7.2 Tap Site - Transmission Typical Tap Site	No. 44	Weight/Site (ton) 0.03	Total Weight (ton) 1.32	Scrap Value (ton) \$ 167.00		Salvage Amt. \$ (220) \$ (220)	
				Subtotal:		\$ (220)	
				Total:		\$ (220)	
				Total Salvage Amount:		\$ (656,244)	

OFFICIAL COPY

MAY 16 2022



Northwest Pipeline LP
City Cost Index Factor Determination

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Line No.	(A) State	(B) City	(C) ¹ CCI	(D) ² Total Mi/State	(E) Weighting Factor <u>(D) / 3878.5</u>	(F) % of Weighted Ave. <u>(C) / (E)</u>
1	North Carolina	Durham	89.9	104.9	1.00	91.80
		Greensboro	89.8			
4		Raleigh	95.7			
5		Ave.	91.8			
2						
12						Total
13			<u>Average CCI</u>	<u>Total Mileage</u>		<u>% Weighted Ave.*</u>
14			92.3	104.9		91.80
15	* National Average = 100%					
16	(C) ¹ Data developed within cost estimating software package					



Texas Eastern Transmission, LP
Per Diem Determination

Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit ____ (CPC-0007)

Line No.	(A) State	(B) City	(C) ¹ Per Diem (\$)	(D) ² Total Mi/State	(E) Weighting Factor <u>(D) / 3878.5</u>	(F) % of Weighted Ave. <u>(C) / (E)</u>
1	North Carolina	Durham	115.0	104.9	1.00	113.67
		Greensboro	103.0			
4		Raleigh	123.0			
5		Ave.	<u>113.7</u>			
2						
9						
10			<u>Average</u>	<u>Total Mileage</u>		<u>Total</u>
11			\$ 130	104.9		<u>Weighted Ave.</u>
12						\$ 114
13	(C) ¹ https://www.gsa.gov/travel/plan-book/per-diem-rates					
14	(D) ² Cardinal Pipeline Company, LLC Provided Data					



CARDINAL PIPELINE COMPANY, LLC
MATERIAL TAKEOFF PACKET

Clayton Compressor Station

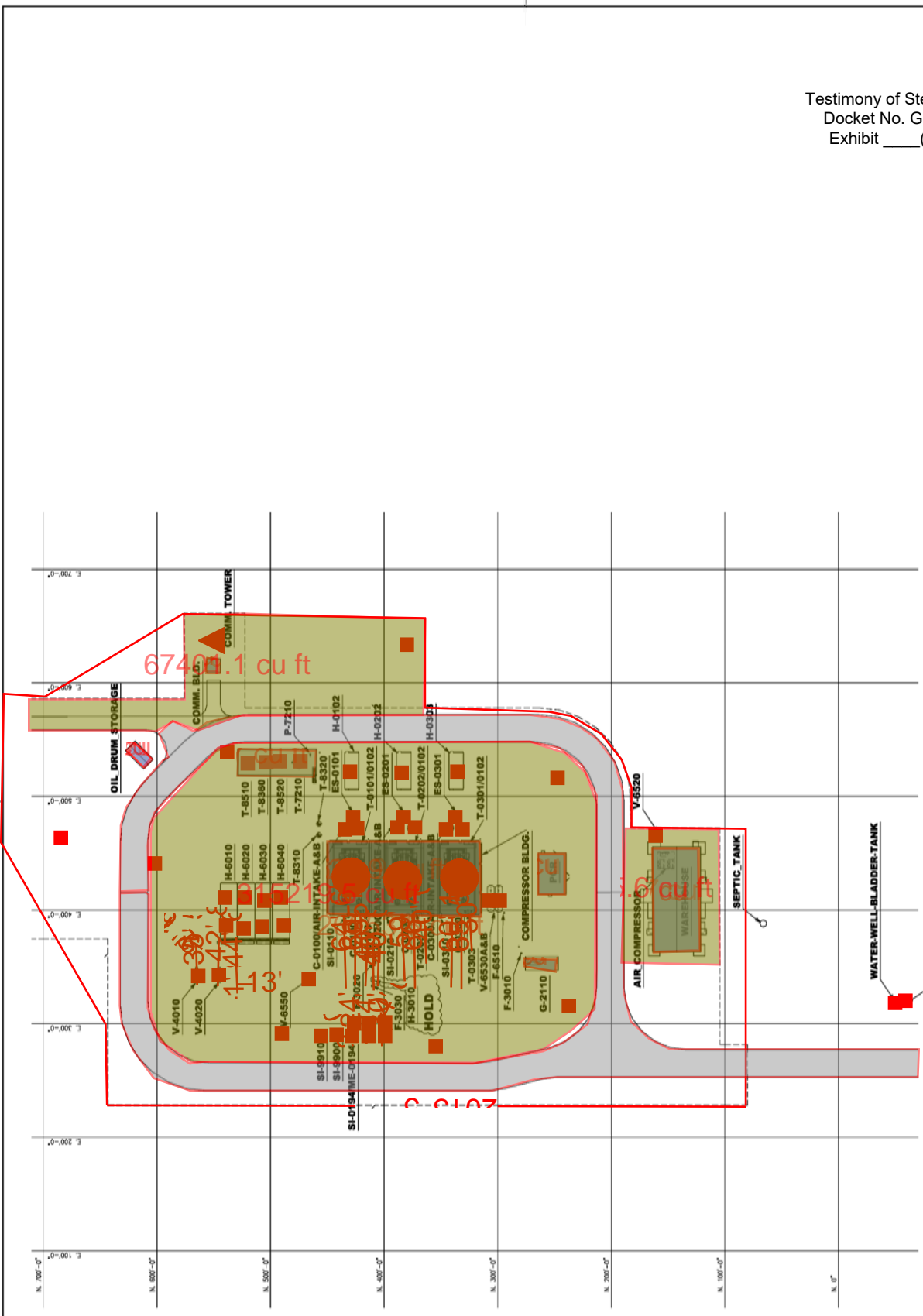
Testimony of Steven R. Fall
Docket No. G-39, Sub 47
Exhibit _____ (CPC-0007)

Markup Summary

Subject	Color	Page	Comment	Count	Length	Area	Volume	Surface Area
Perimeter Fence (1 items)					2013.45			
Surface Pipe (3 items)					839.02			
Bldg (6 items)					976.12	14124.8	494368.3	34164.3
Tank (18 items)				18				
Exhaust (9 items)				9				
Cooler (11 items)				11				
Compressor (3 items)				3				
Utility Pole (9 items)				9				
Tower (1 items)				1				
3' Concrete (1 items)					401.19	8842.97	26528.9	1203.56
6" Concrete (7 items)					3982.4	47360.92	23680.47	1991.22
						5262.324	1859.606	
Unsuitable Material (3 items)					2521.14	137515.4	412546.1	7563.42
						15279.49	15279.48	

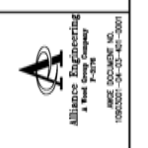
OFFICIAL COPY

MAY 15 2022



Testimony of Steven R. Fall
 Docket No. G-3 (sub 7)
 Exhibit ____ (0000837)

REFERENCE DRAWINGS NUMBER: 1-10-12 DATE: 08/28/12 TITLE: STATION ELEVATION SCALE: AS SHOWN		REVISIONS NO. DATE BY DESCRIPTION	
CARDINAL PIPELINE CONTROLS COMPRESSOR STATION #1 CARDINAL PIPELINE EXPANSION SITE PLAN GUILFORD COUNTY, NORTH CAROLINA SHEET # 1 OF 1			



OFFICIAL COPY

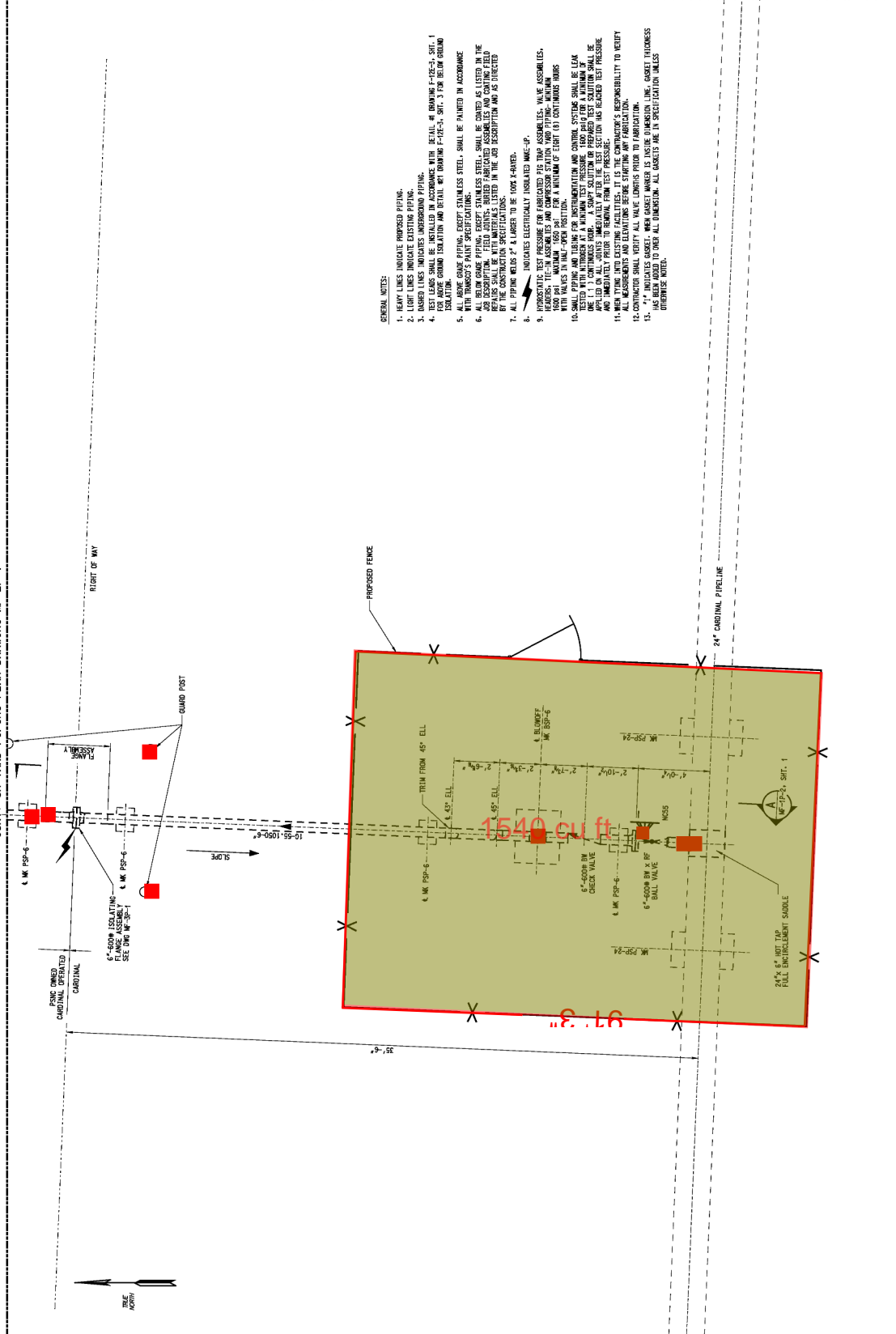
Mar 16 2022

Markup Details

Markup Summary

Subject	Color	Page	Comment	Count	Length	Area	Volume	Surface Area
Perimeter Fence (1 items)					91.29			
Tank (1 items)				1				
Bollard (2 items)				2				
Cut and Cap (4 items)				4				
Valve (1 items)				1				
Unsuitable Material (1 items)					91.48	513.35	1540.04	274.43
						57.03889	57.03852	

CONT. ON YARD PIPING PLAN DRAWING MF-2P-1



- GENERAL NOTES:**
1. HEAVY LINES INDICATE PROPOSED PIPING.
 2. LIGHT LINES INDICATE EXISTING PIPING.
 3. DASHED LINES INDICATE UNDERGROUND PIPING.
 4. TEST LEADS SHALL BE INSTALLED IN ACCORDANCE WITH DETAIL # IN DRAWING P-1005-3, SPT. 1 FOR ABOVE GROUND PIPING AND DETAIL # IN DRAWING P-1005-3, SPT. 2 FOR BELOW GROUND PIPING.
 5. ALL ABOVE GROUND PIPING, EXCEPT STAINLESS STEEL, SHALL BE PAINTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
 6. ALL BELOW GROUND PIPING, EXCEPT STAINLESS STEEL, SHALL BE COATED AS LISTED IN THE JOB DESCRIPTION. FIELD JOINTS, WELDED FABRICATED ASSEMBLIES AND CASTING FIELD JOINTS SHALL BE COATED AS LISTED IN THE JOB DESCRIPTION AND AS DIRECTED BY THE CONTRACTOR'S SPECIFICATIONS.
 7. ALL PIPELINE WELDS 2" & LARGER TO BE 100% X-RAYED.
 8. ⚡ INDICATES ELECTRICALLY INSULATED MAKE-UP.
 9. HYDROSTATIC TEST PRESSURE FOR FABRICATED PIPE TRAP ASSEMBLIES, VALVE ASSEMBLIES, JOINTS, WELDED FABRICATED ASSEMBLIES AND CASTING FIELD JOINTS SHALL BE 1.5 TIMES THE DESIGN PRESSURE. WELDED FABRICATED ASSEMBLIES SHALL BE TESTED WITH VALVES IN HALF-OPEN POSITION. A MINIMUM OF 20% OF CONTINUOUS RUNS SHALL BE TESTED.
 10. SMALL PIPING AND LEAKS FOR INSTRUMENTATION AND CONTROL SYSTEMS SHALL BE LEAK TESTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. LEAK TEST SOLUTION OR PREPARED TEST SOLUTION SHALL BE ONE (1) CONTINUOUS HOUR. A SHARP SOLUTION OR PREPARED TEST SOLUTION SHALL BE USED FOR ALL INSTRUMENTATION AND CONTROL SYSTEMS. INSTRUMENTATION HAS REACHED TEST PRESSURE AND MAINTAINED PRIOR TO REMOVAL FROM TEST PRESSURE.
 11. WHEN TYPED INTO CASTING FACILITIES, IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL DIMENSIONS AND ELEVATIONS BEFORE STARTING ANY FABRICATION.
 12. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS BEFORE STARTING ANY FABRICATION.
 13. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS BEFORE STARTING ANY FABRICATION.
 14. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS BEFORE STARTING ANY FABRICATION.
 15. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS BEFORE STARTING ANY FABRICATION.
 16. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS BEFORE STARTING ANY FABRICATION.

Testimony of Steve R. F.
 Docket No. G-3-2022-0000
 Exhibit (C)

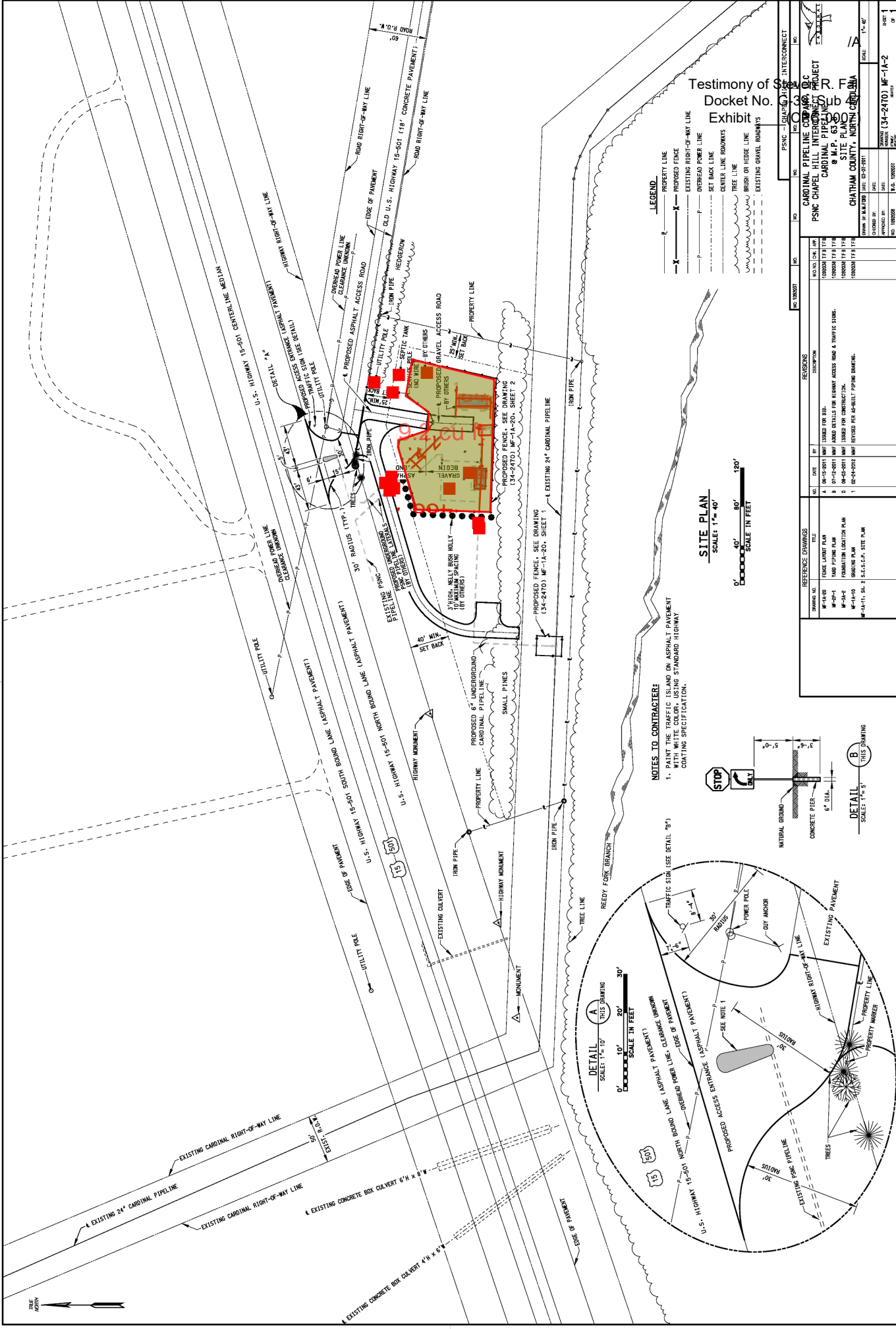
REV	DATE	BY	REVISIONS	REASON	DATE	BY	REVISIONS	REASON
1	08-04-2021	PT	ISSUED FOR CONSTRUCTION					
2	08-04-2021	PT	REVISED PER AS-BUILT INFORMATION					

PROJECT: CARDINAL PIPELINE COMPANY (C) PSC CHAPEL HILL INTERCONNECT PROJECT
 DRAWING NO: MF-2P-1
 SHEET NO: 1 OF 2

Markup Details

Markup Summary

Subject	Color	Page	Comment	Count	Length	Area	Volume	Surface Area
Perimeter Fence (1 items)					488.35			
Surface Pipe (12 items)					355.36			
Bldg (2 items)					152.05	643.67	22528.48	5321.85
Tank (3 items)				3				
Tank Septic (1 items)				1				
Utility Pole (2 items)				2				
Cut and Cap (6 items)				6				
6" Concrete (2 items)					152.05	643.67	321.84	76.03
						71.51889	11.92	
Unsuitable Material (1 items)					486.93	11989.73	35969.2	1460.8
						1332.192	1332.193	



Testimony of **Stacy R. Tibbitts**
 Docket No. **19-00000**
 Exhibit **1**

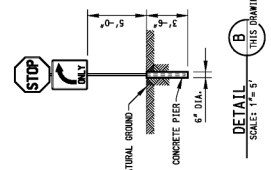
LEGEND

- PROPERTY LINE
- - - PROPOSED FENCE
- - - EXISTING RIGHT-OF-WAY LINE
- - - OVERHEAD POWER LINE
- - - SET BACK LINE
- - - CENTER LINE HIGHWAY
- - - TREE LINE
- - - BRUSH OR REDUCE LINE
- - - EXISTING GRAVEL ROADS

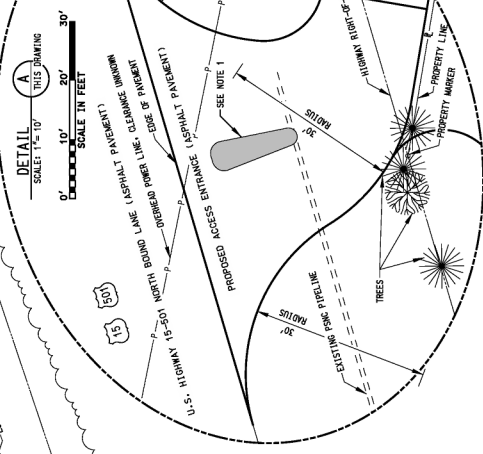
SITE PLAN
 SCALE: 1" = 40'



NOTES TO CONTRACTORS:
 1. PAINT THE TRAFFIC ISLAND ON ASPHALT PAVEMENT WITH WHITE COLOR, USING STANDARD HIGHWAY COATING SPECIFICATION.



DETAIL A
 SCALE: 1" = 10'

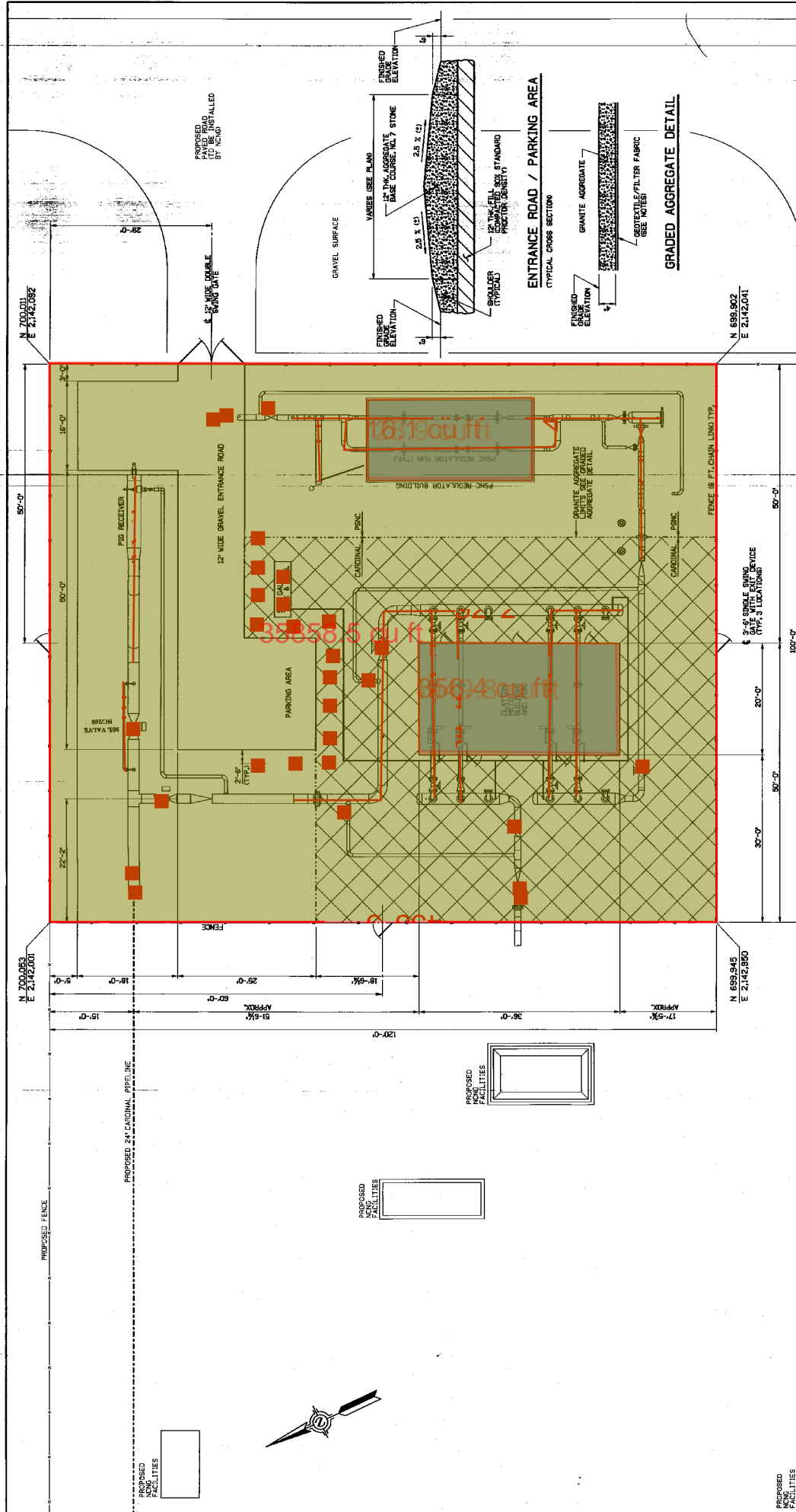


NO.	DATE	BY	REVISIONS	REASON
1	08-15-2011	NMF	ISSUED FOR BID.	
2	08-15-2011	NMF	ISSUED FOR BID.	
3	08-15-2011	NMF	ISSUED FOR BID.	
4	08-15-2011	NMF	ISSUED FOR BID.	
5	08-15-2011	NMF	ISSUED FOR BID.	
6	08-15-2011	NMF	ISSUED FOR BID.	
7	08-15-2011	NMF	ISSUED FOR BID.	
8	08-15-2011	NMF	ISSUED FOR BID.	
9	08-15-2011	NMF	ISSUED FOR BID.	
10	08-15-2011	NMF	ISSUED FOR BID.	
11	08-15-2011	NMF	ISSUED FOR BID.	
12	08-15-2011	NMF	ISSUED FOR BID.	
13	08-15-2011	NMF	ISSUED FOR BID.	
14	08-15-2011	NMF	ISSUED FOR BID.	
15	08-15-2011	NMF	ISSUED FOR BID.	
16	08-15-2011	NMF	ISSUED FOR BID.	
17	08-15-2011	NMF	ISSUED FOR BID.	
18	08-15-2011	NMF	ISSUED FOR BID.	
19	08-15-2011	NMF	ISSUED FOR BID.	
20	08-15-2011	NMF	ISSUED FOR BID.	
21	08-15-2011	NMF	ISSUED FOR BID.	
22	08-15-2011	NMF	ISSUED FOR BID.	
23	08-15-2011	NMF	ISSUED FOR BID.	
24	08-15-2011	NMF	ISSUED FOR BID.	
25	08-15-2011	NMF	ISSUED FOR BID.	
26	08-15-2011	NMF	ISSUED FOR BID.	
27	08-15-2011	NMF	ISSUED FOR BID.	
28	08-15-2011	NMF	ISSUED FOR BID.	
29	08-15-2011	NMF	ISSUED FOR BID.	
30	08-15-2011	NMF	ISSUED FOR BID.	
31	08-15-2011	NMF	ISSUED FOR BID.	
32	08-15-2011	NMF	ISSUED FOR BID.	
33	08-15-2011	NMF	ISSUED FOR BID.	
34	08-15-2011	NMF	ISSUED FOR BID.	
35	08-15-2011	NMF	ISSUED FOR BID.	
36	08-15-2011	NMF	ISSUED FOR BID.	
37	08-15-2011	NMF	ISSUED FOR BID.	
38	08-15-2011	NMF	ISSUED FOR BID.	
39	08-15-2011	NMF	ISSUED FOR BID.	
40	08-15-2011	NMF	ISSUED FOR BID.	
41	08-15-2011	NMF	ISSUED FOR BID.	
42	08-15-2011	NMF	ISSUED FOR BID.	
43	08-15-2011	NMF	ISSUED FOR BID.	
44	08-15-2011	NMF	ISSUED FOR BID.	
45	08-15-2011	NMF	ISSUED FOR BID.	
46	08-15-2011	NMF	ISSUED FOR BID.	
47	08-15-2011	NMF	ISSUED FOR BID.	
48	08-15-2011	NMF	ISSUED FOR BID.	
49	08-15-2011	NMF	ISSUED FOR BID.	
50	08-15-2011	NMF	ISSUED FOR BID.	
51	08-15-2011	NMF	ISSUED FOR BID.	
52	08-15-2011	NMF	ISSUED FOR BID.	
53	08-15-2011	NMF	ISSUED FOR BID.	
54	08-15-2011	NMF	ISSUED FOR BID.	
55	08-15-2011	NMF	ISSUED FOR BID.	
56	08-15-2011	NMF	ISSUED FOR BID.	
57	08-15-2011	NMF	ISSUED FOR BID.	
58	08-15-2011	NMF	ISSUED FOR BID.	
59	08-15-2011	NMF	ISSUED FOR BID.	
60	08-15-2011	NMF	ISSUED FOR BID.	
61	08-15-2011	NMF	ISSUED FOR BID.	
62	08-15-2011	NMF	ISSUED FOR BID.	
63	08-15-2011	NMF	ISSUED FOR BID.	
64	08-15-2011	NMF	ISSUED FOR BID.	
65	08-15-2011	NMF	ISSUED FOR BID.	
66	08-15-2011	NMF	ISSUED FOR BID.	
67	08-15-2011	NMF	ISSUED FOR BID.	
68	08-15-2011	NMF	ISSUED FOR BID.	
69	08-15-2011	NMF	ISSUED FOR BID.	
70	08-15-2011	NMF	ISSUED FOR BID.	
71	08-15-2011	NMF	ISSUED FOR BID.	
72	08-15-2011	NMF	ISSUED FOR BID.	
73	08-15-2011	NMF	ISSUED FOR BID.	
74	08-15-2011	NMF	ISSUED FOR BID.	
75	08-15-2011	NMF	ISSUED FOR BID.	
76	08-15-2011	NMF	ISSUED FOR BID.	
77	08-15-2011	NMF	ISSUED FOR BID.	
78	08-15-2011	NMF	ISSUED FOR BID.	
79	08-15-2011	NMF	ISSUED FOR BID.	
80	08-15-2011	NMF	ISSUED FOR BID.	
81	08-15-2011	NMF	ISSUED FOR BID.	
82	08-15-2011	NMF	ISSUED FOR BID.	
83	08-15-2011	NMF	ISSUED FOR BID.	
84	08-15-2011	NMF	ISSUED FOR BID.	
85	08-15-2011	NMF	ISSUED FOR BID.	
86	08-15-2011	NMF	ISSUED FOR BID.	
87	08-15-2011	NMF	ISSUED FOR BID.	
88	08-15-2011	NMF	ISSUED FOR BID.	
89	08-15-2011	NMF	ISSUED FOR BID.	
90	08-15-2011	NMF	ISSUED FOR BID.	
91	08-15-2011	NMF	ISSUED FOR BID.	
92	08-15-2011	NMF	ISSUED FOR BID.	
93	08-15-2011	NMF	ISSUED FOR BID.	
94	08-15-2011	NMF	ISSUED FOR BID.	
95	08-15-2011	NMF	ISSUED FOR BID.	
96	08-15-2011	NMF	ISSUED FOR BID.	
97	08-15-2011	NMF	ISSUED FOR BID.	
98	08-15-2011	NMF	ISSUED FOR BID.	
99	08-15-2011	NMF	ISSUED FOR BID.	
100	08-15-2011	NMF	ISSUED FOR BID.	

Markup Details

Markup Summary

Subject	Color	Page	Comment	Count	Length	Area	Volume	Surface Area
Perimeter Fence (1 items)					438.48			
Surface Pipe (11 items)					428.9			
Bldg (2 items)					199.98	1145.1	40078.67	6999.24
Bollard (13 items)				13				
Tank (2 items)				2				
Cut and Cap (6 items)				6				
Valve (8 items)				8				
6" Concrete (2 items)					199.98	1145.1	572.56	99.99
						127.2333	21.20593	
Unsuitable Material (1 items)					439.03	11952.82	35858.46	1317.08
						1328.091	1328.091	



TESTIMONY
DOCKET
EXHIBIT

RD/LDG PLAN
No. 38-2
DATE: 11/15/22

CARDINAL OPERATING COMPANY

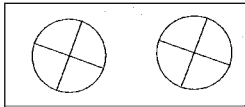
SITE # 1720
CLAY METER STATION
WAKE COUNTY, NORTH CAROLINA

Drawn By: J. ALLEN
Checked By: J. ALLEN
Date: 11/15/22

Project: 5509/0310
Scale: 1/4" = 1'-0"
Sheet: 1 of 1
Drawn No: 7899/7997
Rev: MF-1A-2

- GEOTEXTILE FABRIC NOTES.**
1. GEOTEXTILE/FILTER FABRIC SHALL MEET THE FOLLOWING PROPERTIES:
 - A. MINIMUM FABRIC WEIGHT - 4.0 OZ/Y²
 - B. MINIMUM TENSILE STRENGTH - 180 LB
 - C. MINIMUM PUNCTURE RESISTANCE - 150 LB
 - D. EQUIVALENT OPENING SIZE - 60/100
 2. CONTRACTOR WILL FURNISH TEST REPORT ON GEOTEXTILE SUPPLIED BY CONTRACTOR.
 3. CONTRACTOR SHALL BE RESPONSIBLE FOR GEOTEXTILE WITHIN 24 HOURS OF INSTALLATION AND SHALL BE RESPONSIBLE FOR PROTECTIVE WORKMAN AND INSTALLED AT SITE.

- LEGEND:**
- ⊗ PIPE SQUARES
 - ▣ 12" THICK GRANITE AGGREGATE
 - 6 FT. CHAIN LINK FENCE
 - - - - - PROPOSED FENCE (BY OTHERS)



M/L NC160

91-32-118 (B)

ATTACHMENT 4

STEVEN R FALL - CV

Steven R Fall
on behalf of
Cardinal Pipeline Company, LLC



Brown, Williams, Moorhead & Quinn, Inc.
Energy Consultants

CURRICULUM VITAE

NAME	Steven Fall
BUSINESS ADDRESS	1155 15th Street N.W., Suite 1004 Washington, DC 20005
EDUCATION	<p>Pennsylvania State University; Bachelor of Science in Biology/Minor in Chemistry</p> <p>Certifications: Maryland State Highway Traffic Control Manager OSHA 30 Card Certificate of Completion – Deck and Ramp Guidelines Certificate of Completion – Chimneys and Vents Confidential Clearance Eligible NUCA – National Utility Contractors Association HeavyBid/HeavyJob Software Foundation Software RSMears</p>
PRESENT POSITION	<p>Vice President Brown, Williams, Moorhead & Quinn, Inc. 1155 15th Street N.W., Suite 1004 Washington, DC 20005</p>
NATURE OF WORK PERFORMED WITH FIRM	<p>Analysis of terminal negative salvage and pipeline operations. Natural gas pipeline terminal negative salvage testimony provided for the Federal Energy Regulatory Commission. A list of cases in which Mr. Fall provided testimony is attached below.</p>
PREVIOUS EMPLOYMENT	<p>Department of Consumer and Regulatory Affairs Washington, DC (District of Columbia agency responsible for issuance of and adherence to licenses and permits)</p> <p>Project Manager 6/2017 – 10/2017 High impact position designated for situations requiring immediate resolution.</p>

Mobile Inspection Implementation: Research and development of the Mobile Inspection application and platform, which includes but is not limited to development of the Mobile Inspection Standard Operating Provisions Manual, training protocols and regimens.

International Accreditation Services Semi-Annual Report: Collection and interpretation of data from multiple departments summarized into a deliverable report required for inspection and permitting accreditation.

Hot Properties: District of Columbia properties undergoing construction that require guidance to achieve resolution of ongoing compliance difficulties. Understanding of the IRC, IBC, and DC Municipal Regulations required for situational analysis of safety and code compliance.

Anchor Construction Washington, DC
(Anchor Construction specializes in utility construction: water, storm, sewer, and conduits.)

Project Engineer 7/2014 – 6/2017
WSSC ESA IDIQ: Manage a \$32.5 million dollar sewer mainline repair, rehabilitation, and/or replacement project in coordination with the WSSC at the Cabin John and Paint Branch Basin. Required hands-on scheduling and management of materials, equipment, and crew members.

DDOT Klinge Valley Trail: \$7.6 million dollar green infrastructure installation including: bio-swale, bio-retention structures, permeable asphalt multi-use trail, Klinge Creek restoration, lighting and landscaping. Multi-agency coordination with underground utilities operated byDDOT, Washington Gas, National Park Service, PEPCO, and DC Water.

Howard Hughes Medical Institute Retaining Wall: \$1.5 million dollar project designed to remove, salvage and rebuild an existing retaining wall located on a designated conservation area at the Howard Hughes Medical Institute campus. Required understanding and compliance with restrictions imposed on operating areas, materials handling, and site restoration standards.

WSSC Large Meter Vault: \$575 thousand dollar large meter vault replacement project at various locations throughout Montgomery County, MD. Required hands-on scheduling and management of materials, equipment, and crew members.

Additional accomplishments and responsibilities include:

- Develop project objectives by reviewing project proposals, blue prints, drawings and required permits.
- Determine project responsibilities by identifying project phases and elements; assigning personnel to phases and elements; reviewing bids from contractors.
- Determine project specifications by studying product design, customer requirements, and performance standards.
- Determine project schedule by studying project plan and specifications; calculating time requirements; sequencing project elements.
- Develop and maintain project schedule by monitoring progress; coordinating activities through weekly and bi-weekly schedule updates.
- Control project plan by reviewing and inspecting design, specifications, and plan and schedule changes; recommending actions.
- Provide leadership through thorough communication of attainable goals, project direction and production analysis of daily/weekly/monthly activities.
- Maintain safe and clean working environment by enforcing OSHA mandated procedures, rules and regulations.

AKA White House Washington, DC
(The fusion of the long-term comfort of a luxury furnished apartment with the style and service of an intimate hotel)

Director of Engineering 7/2012 – 7/2014
Directly oversaw the \$1 million dollar renovation improvement, adding another level of hotel luxury suites to the existing facility. Received global recognition from company for outstanding work ethics and policies implemented. Improved department efficiency and established preventative maintenance procedures.
Additional accomplishments and responsibilities include:

Managed electrical systems, mechanical work and safety aspects of a 141 room hotel.

Directly oversaw the implementation of work planned for building maintenance, including assigning and delegating multiple projects to staff and vendors.

Monitored and controlled expenditures to successfully stay within property's monthly budget.

Supervised the maintenance of air conditioning, elevators, room appliances, building wire systems, roofing, landscaping and all operational equipment.

Independently created request for proposals to negotiate contract/vendor proposals.

Interviewed, trained, inspired and evaluated staff; disciplined and implemented corrective actions as necessary.

Developed the implemented the building Emergency Evacuation Plan in coordination with DC Fire Department.

Humanetics Corporation Eden Prairie, MN
(Humanetics is focused in three key areas organized around FDA regulatory boundaries: prescription drugs, medical foods, and consumer products)

Research Analyst 7/2005 – 3/2012
Oversaw and performed research and development of a radioprotectant in coordination with the Armed Forces Radiobiology Research Institute, Henry Jackson Foundation, Uniformed Services University of the Health Sciences, and BioReliance.

Designed and implemented testing of complex experiments to test prospective radiological protective and therapeutic agents.

Completed analysis on test results to assess the biological and physiological effects of designed experimentation.

Effectively communicated research ideas and methodology via written reports and oral presentations.

Generated experimental protocols and methodology.

Conducted laboratory site assessments, including site activation, interim monitoring and close-out visits.

Achieved proof of efficacy through preclinical testing conducted of an experimental radioprotectant designed to combat the effects of Acute Radiation Syndrome (ARS).

Organized and maintained detailed records of new research data as well as relevant published studies.

Provided technical guidance in training to no less than two dozen AFRRRI staff and military employees.
Completed yearly detailed FDA summary report.
Designed, implemented and updated experimental SOP's.

BioReliance Corporation Rockville, MD
(Provides nonclinical testing and manufacturing services for biologics)

Senior Research Associate 7/2000 – 7/2005
Team leader hired to assist in experimental development, data documentation and analysis at an established biotech corporation.

- Executed over 50 multi-phased experiments per year to assess the biological and physiological effects of carcinogenic exposure on rodents and cell cultures.
- Captured test results and collated consumable forms for supervisor.
- Assisted in the design of secondary experiments based on initial results.
- Ensured each experiment adhered to FDA mandated GLP standards.
- Provided daily briefings to laboratory manager regarding status and results of experiments.
- Designed and subsequently implemented and updated dozens of experimental SOP's.
- Monitored and maintained laboratory equipment and supplies.

#	JURISDICTION	CASE OR DOCKET NO.	UTILITY/ORGANIZATION INITIATING PROCEEDING	POSITION	SUBJECT MATTER
Formal Proceedings In Which Steven Fall Testified					
1	FERC	RP18-877	MOGAS PIPE LINE COMPANY	Witness	Natural Gas Terminal Decommissioning
2	FERC	RP18-940	EMPIRE PIPELINE INC.	Witness	Natural Gas Terminal Decommissioning
3	FERC	RP18-922	TRAILBLAZER PIPELINE COMPANY	Witness	Natural Gas Terminal Decommissioning
4	FERC	RP18-923	ENABLE MISSISSIPPI RIVER TRANSMISSION, LLC	Witness	Natural Gas Terminal Decommissioning
5	FERC	RP18-1115	SALTVILLE GAS STORAGE COMPANY	Witness	Natural Gas Terminal Decommissioning
6	FERC	RP18-1126	TRANSCONINENTAL GAS PIPELINE COMPANY	Witness	Natural Gas Terminal Decommissioning
7	FERC	RP19-78	PANHANDLE EASTERN PIPE LINE COMPANY, LP	Witness	Natural Gas Terminal Decommissioning
8	FERC	RP19-165	WBI ENERGY TRANSMISSION, INC.	Witness	Natural Gas Terminal Decommissioning
9	FERC	RP19-343	TEXAS EASTERN TRANSMISSION, LP	Witness	Natural Gas Terminal Decommissioning
10	FERC	RP19-352	SEA ROBIN PIPELINE COMPANY, LLC	Witness	Natural Gas Terminal Decommissioning
11	FERC	RP19-1426	NATIONAL FUEL GAS SUPPLY CORPORATION	Witness	Natural Gas Terminal Decommissioning
12	FERC	RP19-1523	PANHANDLE EASTERN PIPE LINE COMPANY, LP	Witness	Natural Gas Terminal Decommissioning
13	FERC	RP20-131	ENABLE MISSISSIPPI RIVER TRANSMISSION, LLC	Witness	Natural Gas Terminal Decommissioning
14	FERC	RP20-467	DOMINION ENERGY COVE POINT LNG, LP	Witness	Natural Gas Terminal Decommissioning
15	FERC	RP20-908	ALLIANCE PIPELINE, LP	Witness	Natural Gas Terminal Decommissioning
16	FERC	RP20-921	MARITIMES & NORTHEAST PIPELINE, LLC	Witness	Natural Gas Terminal Decommissioning

#	JURISDICTION	CASE OR DOCKET NO.	UTILITY/ORGANIZATION INITIATING PROCEEDING	POSITION	SUBJECT MATTER
17	FERC	RP20-980	EAST TENNESSEE NATURAL GAS, LLC	Witness	Natural Gas Terminal Decommissioning
18	FERC	RP21-441	FLORIDA GAS TRANSMISSION, LLC	Witness	Natural Gas Terminal Decommissioning
19	FERC	RP21-20	SHELL PIPELINE COMPANY, LP	Witness	Oil Pipeline Depreciation Testimony
21	FERC	RP21-1001	TEXAS EASTERN TRANSMISSION, LP	Witness	Natural Gas Terminal Decommissioning



CURRICULUM VITAE

NAME

David J. Haag

BUSINESS ADDRESS

P.O. Box 10
Sunderland, MD 20689-0010

PRESENT POSITION

President and Chief Executive Officer
Brown, Williams, Moorhead & Quinn, Inc.

EDUCATION

B.A. (with Honors) in Economics
with Management Minor
University of Calgary, Canada

Graduate Certificate
Public Utility Regulation and Economics
New Mexico State University

CONTINUING EDUCATION

Master's in Economics
New Mexico State University

TEACHING EXPERIENCE

Seminar Instructor (2013 – Present)
Center for Public Utilities
New Mexico State University
Pipeline Ratemaking Course
Seminars Taught:

- Determination of a Pipeline's Cost of Service

Dean of Energy Law Academy (2021 – Present)
Energy Bar Association

The Energy Law Academy provides education regarding core regulatory and legal concepts and basic industry fundamentals.

Course Taught: Introduction to the Federal Regulation of the Natural Gas Industry

- Cost of Service Ratemaking
- Emerging Rate Case Issues



**NATURE OF WORK
PERFORMED WITH FIRM**

Mr. Haag joined BWMQ in September 2019 as Chief Executive Officer and became President and Chief Executive Officer in September 2020. Brown Williams provides thorough analytical expertise and advocacy on behalf of clients across a wide range of energy issues, including pipeline Cost of Service and Rate Design, Certificate Applications, Depreciation, and Economic Analysis.

Mr. Haag is highly regarded in the natural gas pipeline industry as a pipeline cost of service, rate design, tariff, and regulatory expert, bringing to the role of President and CEO his extensive experience dealing with the Federal Energy Regulatory Commission, including the filing of expert testimony, management of numerous complex rate case filings, market-based rate studies, certificate filings, compliance filings, as well as gas pipeline and storage tariff filings.

Mr. Haag has filed expert testimony and / or affidavits on various rate and regulatory matters including business risk assessment, proxy groups, return on equity, capital structure, cost of service issues, rate design, cost classification, cost allocation, billing determinants, discount adjustments, market power tariffs, rate levelization, pipeline transportation values, and other rate-related issues.

Mr. Haag is well versed in Government, Public, and Stakeholder Relations, and maintains established relationships with FERC Staff as well as various industry trade associations, including the Interstate Natural Gas Association of America.

Mr. Haag is also seasoned in the analysis of complex commercial, financial, and regulatory matters related to pipelines and storage, and is able to assist with regulatory oversight for ongoing operations, new projects, acquisitions, mergers, and divestitures.

Finally, Mr. Haag is experienced in the management of oil pipeline tariffs under the Interstate Commerce Act, including the requisite depreciation and underlying cost of service issues pertaining to oil and products pipelines.



PREVIOUS EMPLOYMENT

Prior to joining BWMQ, Mr. Haag served as Vice President, Regulatory and Chief Compliance Officer for Tallgrass Energy, LP, where he was responsible for identifying, overseeing, and implementing regulatory strategies across each Tallgrass pipeline entity, including natural gas transmission pipelines, storage facilities, and crude oil pipelines. Mr. Haag was accountable for both the management of all rate and cost of service related filings (including Section 4 Rate Case filings, FERC Form 501-G filings, expert testimony, tariff filings, and the development of complex financial modeling for strategic analysis), as well as all Tallgrass FERC Certificate matters (including filings for the construction, modification, replacement, and abandonment of pipeline facilities).

As Chief Compliance Officer, Mr. Haag was responsible for ensuring that all Tallgrass regulated business was conducted in compliance and adherence with the FERC Standards of Conduct and other applicable regulations.

In addition, Mr. Haag also served at Tallgrass as Vice President of Commercial Operations, managing both the Trailblazer and Tallgrass Interstate Pipeline Systems. In this role, Mr. Haag was responsible to manage all commercial aspects of the business, including contracting, business development, and customer relationships across the two major pipelines.

Prior to joining Tallgrass, Mr. Haag served as Director of Rates for Boardwalk Pipeline Partners, L.P. where he was accountable for the various rate and cost of service matters across all regulated Boardwalk entities, including the provision of expert testimony and preparation of financial models and strategic analysis.

Mr. Haag was also previously employed as Manager, Rates and Regulatory Affairs for Portland Natural Gas Transmission, where he prepared, filed and managed all Portland regulatory filings; major filings included multiple Section 4 FERC rate case filings, FERC certificate applications, NAESB compliance filings, District Court matters, as well as the bankruptcy of a major shipper.

Earlier in his career, Mr. Haag also worked in Sales and Marketing for TransCanada Pipelines and is therefore also familiar with Canadian pipeline operations and regulations.



#	JURISDICTION	CASE OR DOCKET NO.	UTILITY/ORGANIZATION INITIATING PROCEEDING	SUBJECT MATTER
PIPELINE RATE CASE PROCEEDINGS				
15	FERC	RP21-1188	TEXAS EASTERN TRANSMISSION, LP	Business Risk / Proxy Group
14	FERC	RP21-1187	EASTERN GAS TRANSMISSION AND STORAGE, INC.	Rate Design / Business Risk / Proxy Group
13	FERC	RP21-1001	TEXAS EASTERN TRANSMISSION, LP	Business Risk / Proxy Group
12	FERC	PR21-34	ENABLE OKLAHOMA INTRASTATE TRANSMISSION, LLC	Return on Equity / Proxy Group (Section 311 Proceeding)
11	FERC	RP20-1204	TC ENERGY PIPELINES	Public Interest Impacts of Potential Contract Abrogation
10	FERC	RP20-980	EAST TENNESSEE NATURAL GAS, LLC	Business Risk / Proxy Group / Capital Structure
9	FERC	RP20-921	MARITIMES & NORTHEAST PIPELINE, L.L.C.	Business Risk / Proxy Group / Capital Structure
8	FERC	RP20-908	ALLIANCE PIPELINE L.P.	Business Risk / Proxy Group / Capital Structure
7	FERC	RP20-467	DOMINION ENERGY COVE POINT LNG, LP	Business Risk / Proxy Group
6	FERC	RP20-131	ENABLE MISSISSIPPI RIVER TRANSMISSION	Discount Adjustment
5	FERC	RP18-922	TRAILBLAZER PIPELINE COMPANY, LLC	Section 4 Rate Case
4	FERC	RP16-137	TALLGRASS INTERSTATE GAS TRANSMISSION, LLC	Section 4 Rate Case
3	FERC	RP15-65	GULF SOUTH PIPELINE COMPANY, LP	Section 4 Rate Case
2	FERC	RP10-729	PORTLAND NATURAL GAS TRANSMISSION SYSTEM	Section 4 Rate Case
1	FERC	RP08-306	PORTLAND NATURAL GAS TRANSMISSION SYSTEM	Section 4 Rate Case



#	JURISDICTION	CASE OR DOCKET NO.	UTILITY/ORGANIZATION INITIATING PROCEEDING	SUBJECT MATTER
---	--------------	--------------------	--	----------------

SECTION 7 CERTIFICATE FILINGS

4	FERC	CP18-103	ROCKIES EXPRESS PIPELINE, LLC	Installation of 6 new compressor units
3	FERC	CP18-102	CHEYENNE CONNECTOR, LLC	70 mile large-diameter greenfield pipeline
2	FERC	CP17-485	TALLGRASS INTERSTATE GAS TRANSMISSION, LLC	Partial facility abandonment application
1	FERC	CP15-137	ROCKIES EXPRESS PIPELINE, LLC	Capacity Enhancement Project – 800,000 Dth/d pipeline system expansion

#	JURISDICTION	CASE OR DOCKET NO.	UTILITY/ORGANIZATION INITIATING PROCEEDING	SUBJECT MATTER
---	--------------	--------------------	--	----------------

ELECTRIC RATE FILINGS

2	FERC	ER21-1816-000	KES KINGSBURG, LP	Return on Equity / Proxy Group / Business Risk / Capital Structure
1	FERC	ER21-998-000	MIDWAY SUNSET COGENERATION COMPANY	Return on Equity / Proxy Group / Business Risk / Capital Structure

#	JURISDICTION	CASE OR DOCKET NO.	SUBJECT MATTER
---	--------------	--------------------	----------------

FEDERAL COURT PROCEEDINGS

2	U.S. Bankruptcy Court for the Southern District of Texas – Houston Division	Case No. 20-35562 – GULFPORT ENERGY CORPORATION	Report on Motion to Reject Certain FERC Jurisdictional Contracts
1	U.S. Bankruptcy Court for the District of Delaware	Case No. 20-11548 – EXTRACTION OIL AND GAS, INC.	Report on Motion to Reject Certain FERC Jurisdictional Contracts



Proxy ROE Calculations - Core Proxy Group
Return on Equity (Two-Stage DCF) Calculation
Six-Months Ended December 2021

Ticker	Company	Average Dividend Yield	IBES Growth Rate	GDP Growth Rate	IBES 67% Weighting	GDP 33% Weighting	Combined Growth Rate	Adjusted Dividend Yield	DCF Return	Sample Standard Deviation
KMI	Kinder Morgan, Inc.	6.46%	7.39%	4.19%	4.93%	1.40%	6.32%	6.70%	13.02%	
PBA	Pembina Pipeline Corporation	6.32%	10.61%	4.19%	7.07%	1.40%	8.47%	6.66%	15.13%	
TRP	TC Energy Corporation	5.68%	1.55%	4.19%	1.03%	1.40%	2.43%	5.72%	8.15%	
WMB	The Williams Companies, Inc.	6.26%	2.00%	4.19%	1.33%	1.40%	2.73%	6.32%	9.05%	
Range									8.15% to 15.13%	
Mean									11.34%	3.29%
Median									11.04%	
Midpoint									11.64%	

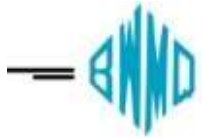
Proxy ROE Calculations - Expanded Proxy Group
Return on Equity (Two-Stage DCF) Calculation
Six-Months Ended December 2021

Ticker	Company	Average Dividend Yield	IBES Growth Rate	GDP Growth Rate	IBES 67% Weighting	GDP 33% Weighting	Combined Growth Rate	Adjusted Dividend Yield	DCF Return	Sample Standard Deviation
ENB	Enbridge Inc.	6.80%	8.11%	4.19%	5.41%	1.40%	6.80%	7.08%	13.88%	
KMI	Kinder Morgan, Inc.	6.46%	7.39%	4.19%	4.93%	1.40%	6.32%	6.70%	13.02%	
OKE	ONEOK, Inc.	6.54%	9.86%	4.19%	6.57%	1.40%	7.97%	6.86%	14.83%	
PBA	Pembina Pipeline Corporation	6.32%	10.61%	4.19%	7.07%	1.40%	8.47%	6.66%	15.13%	
TRP	TC Energy Corporation	5.68%	1.55%	4.19%	1.03%	1.40%	2.43%	5.72%	8.15%	
WMB	The Williams Companies, Inc.	6.26%	2.00%	4.19%	1.33%	1.40%	2.73%	6.32%	9.05%	
Range									8.15% to 15.13%	
Mean									12.34%	3.00%
Median									13.45%	
Midpoint									11.64%	



Dividend Yield Calculation

Ticker	Company	Month	Stock Price			Annualized Dividend	Dividend Yield	Average Dividend Yield	Annualized Dividend \$ CAD
			High	Low	Average				
ENB	Enbridge Inc.	Dec-21	\$ 39.13	\$ 36.21	\$ 37.67	\$ 2.66	7.05%	6.80%	\$ 3.34
		Nov-21	\$ 43.35	\$ 37.22	\$ 40.29	\$ 2.66	6.59%		\$ 3.34
		Oct-21	\$ 43.21	\$ 39.63	\$ 41.42	\$ 2.67	6.45%		\$ 3.34
		Sep-21	\$ 40.57	\$ 38.56	\$ 39.57	\$ 2.67	6.75%		\$ 3.34
		Aug-21	\$ 40.32	\$ 37.06	\$ 38.69	\$ 2.67	6.91%		\$ 3.34
		Jul-21	\$ 40.70	\$ 37.34	\$ 39.02	\$ 2.75	7.05%		\$ 3.34
		KMI	Kinder Morgan, Inc.	Dec-21	\$ 16.39	\$ 15.01	\$ 15.70		\$ 1.08
Nov-21	\$ 17.10			\$ 15.45	\$ 16.28	\$ 1.08	6.64%		
Oct-21	\$ 18.76			\$ 16.52	\$ 17.64	\$ 1.08	6.12%		
Sep-21	\$ 17.21			\$ 15.47	\$ 16.34	\$ 1.08	6.61%		
Aug-21	\$ 17.72			\$ 15.77	\$ 16.75	\$ 1.08	6.45%		
Jul-21	\$ 18.68			\$ 16.91	\$ 17.80	\$ 1.08	6.07%		
OKE	ONEOK, Inc.			Dec-21	\$ 63.37	\$ 55.65	\$ 59.51	\$ 3.74	6.28%
		Nov-21	\$ 65.66	\$ 59.58	\$ 62.62	\$ 3.74	5.97%		
		Oct-21	\$ 66.78	\$ 57.78	\$ 62.28	\$ 3.74	6.01%		
		Sep-21	\$ 59.78	\$ 51.70	\$ 55.74	\$ 3.74	6.71%		
		Aug-21	\$ 54.24	\$ 48.51	\$ 51.38	\$ 3.74	7.28%		
		Jul-21	\$ 57.55	\$ 49.75	\$ 53.65	\$ 3.74	6.97%		
		PBA	Pembina Pipeline Corporation	Dec-21	\$ 30.87	\$ 28.89	\$ 29.88	\$ 1.97	6.59%
Nov-21	\$ 34.60			\$ 29.17	\$ 31.89	\$ 1.98	6.21%	\$ 2.52	
Oct-21	\$ 34.73			\$ 31.36	\$ 33.05	\$ 2.04	6.17%	\$ 2.52	
Sep-21	\$ 32.09			\$ 30.33	\$ 31.21	\$ 1.97	6.31%	\$ 2.52	
Aug-21	\$ 33.47			\$ 29.63	\$ 31.55	\$ 1.99	6.31%	\$ 2.52	
Jul-21	\$ 33.51			\$ 30.06	\$ 31.79	\$ 2.00	6.30%	\$ 2.52	
TRP	TC Energy Corporation			Dec-21	\$ 47.77	\$ 44.77	\$ 46.27	\$ 2.72	5.88%
		Nov-21	\$ 54.71	\$ 46.58	\$ 50.65	\$ 2.76	5.44%	\$ 3.48	
		Oct-21	\$ 55.34	\$ 47.73	\$ 51.54	\$ 2.76	5.35%	\$ 3.48	
		Sep-21	\$ 50.71	\$ 47.47	\$ 49.09	\$ 2.76	5.61%	\$ 3.48	
		Aug-21	\$ 49.12	\$ 44.83	\$ 46.98	\$ 2.82	6.00%	\$ 3.48	
		Jul-21	\$ 50.39	\$ 46.46	\$ 48.43	\$ 2.82	5.82%	\$ 3.48	
		WMB	The Williams Companies, Inc.	Dec-21	\$ 28.03	\$ 24.86	\$ 26.45	\$ 1.64	6.20%
Nov-21	\$ 29.00			\$ 26.73	\$ 27.87	\$ 1.64	5.89%		
Oct-21	\$ 29.89			\$ 25.89	\$ 27.89	\$ 1.64	5.88%		
Sep-21	\$ 26.61			\$ 23.98	\$ 25.30	\$ 1.64	6.48%		
Aug-21	\$ 25.53			\$ 23.53	\$ 24.53	\$ 1.64	6.69%		
Jul-21	\$ 27.01			\$ 24.35	\$ 25.68	\$ 1.64	6.39%		



GDP Growth Calculation

Energy Information Administration ("EIA") AEO 2021 Table A20

	Year	Amount
Real Gross Domestic Product (Ave. Annual Growth 2025 to 2050)	2025	\$21,193
	2050	\$34,365
GDP Chain-Type Price Index (Ave. Annual Growth 2025 to 2050)	2025	1.219
	2050	2.213
RGDP*Index	2025	\$25,834
RGDP*Index	2050	\$76,050

GDP Growth **4.41%**

IHS Markit

GDP Growth 2024 - 2049 **4.10%**

Social Security Administration ("SSA") Table VI.G.4 (2021)

	Year	SSA
	2025	\$27,041
	2050	\$73,006

GDP Growth **4.05%**

Average

4.19%

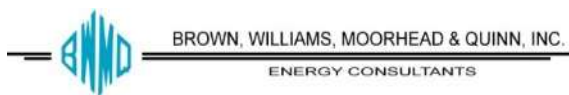


Proxy CAPM Calculations - Core Proxy Group
Uses One Step DCF With Size Adjustment
December 2021

Ticker	Company	Market Return			6-Month Hist Avg 30 Yr. Treasury Risk- Free Rate	CAPM Risk Premium	Value Line Adjusted Beta	Unadjusted Return	Market Cap \$ Millions	Size Adjustment	CAPM Cost of Equity	Sample Standard Deviation		
		S&P 500 Dividend Yield	Composite Growth Rate	CAPM Cost of Equity										
KMI	Kinder Morgan, Inc.	1.77%	12.39%	14.16%	1.94%	12.22%	1.15	15.99%	\$ 35,303.12	-0.22%	15.77%			
PBA	Pembina Pipeline Corporation	1.77%	12.39%	14.16%	1.94%	12.22%	1.10	15.38%	\$ 21,153.00	0.49%	15.87%			
TRP	TC Energy Corporation	1.77%	12.39%	14.16%	1.94%	12.22%	1.05	14.77%	\$ 45,689.93	-0.22%	14.55%			
WMB	The Williams Companies, Inc.	1.77%	12.39%	14.16%	1.94%	12.22%	1.20	16.60%	\$ 31,175.52	-0.22%	16.38%			
											Range	14.55% to	16.38%	
											Mean		15.64%	0.78%
											Median		15.82%	
											Midpoint		15.47%	

Proxy CAPM Calculations - Expanded Proxy Group
Uses One Step DCF With Size Adjustment
December 2021

Ticker	Company	Market Return			6-Month Hist Avg 30 Yr. Treasury Risk- Free Rate	CAPM Risk Premium	Value Line Adjusted Beta	Unadjusted Return	Market Cap \$ Millions	Size Adjustment	CAPM Cost of Equity	Sample Standard Deviation		
		S&P 500 Dividend Yield	Composite Growth Rate	CAPM Cost of Equity										
ENB	Enbridge Inc.	1.77%	12.39%	14.16%	1.94%	12.22%	0.90	12.94%	\$ 97,835.54	-0.22%	12.72%			
KMI	Kinder Morgan, Inc.	1.77%	12.39%	14.16%	1.94%	12.22%	1.15	15.99%	\$ 35,303.12	-0.22%	15.77%			
OKE	ONEOK, Inc.	1.77%	12.39%	14.16%	1.94%	12.22%	1.50	20.27%	\$ 25,766.06	0.49%	20.76%			
PBA	Pembina Pipeline Corporation	1.77%	12.39%	14.16%	1.94%	12.22%	1.10	15.38%	\$ 21,153.00	0.49%	15.87%			
TRP	TC Energy Corporation	1.77%	12.39%	14.16%	1.94%	12.22%	1.05	14.77%	\$ 45,689.93	-0.22%	14.55%			
WMB	The Williams Companies, Inc.	1.77%	12.39%	14.16%	1.94%	12.22%	1.20	16.60%	\$ 31,175.52	-0.22%	16.38%			
											Range	12.72% to	20.76%	
											Mean		16.01%	2.67%
											Median		15.82%	
											Midpoint		16.74%	



CAPM Analysis - S&P 500
 as of December 31, 2021

OFFICIAL COPY
 MAY 15 2022

Data Sources >		Google Finance	Yahoo! Finance	Google Finance	Yahoo! Finance	Single Stage			
Ticker	Name	12/31/2021	Current Dividend	Market Cap @ 12/31/2021	Market Cap Weighting	IBES 5 Year Annual Growth Rate	Weighted IBES Growth Rate	Weighted Dividend Yield	DCF Result
		Price	Yield	(\$ Millions)					
AAP	Advance Auto Parts	239.88	1.67%	\$ 14,813,094,032	0.05981%	14.20%	0.00849%	0.00100%	15.87%
AAPL	Apple Inc.	177.57	0.50%	\$ 2,968,654,358,713	11.98569%	19.61%	2.35039%	0.05993%	20.11%
ABBV	AbbVie Inc.	135.4	4.17%	\$ 237,532,357,879	0.95902%	4.68%	0.04488%	0.03999%	8.85%
ABC	AmerisourceBergen	132.89	1.38%	\$ 27,404,911,229	0.11065%	12.35%	0.01366%	0.00153%	13.73%
ABT	Abbott Labs.	140.74	1.34%	\$ 244,076,514,421	0.98544%	12.53%	0.12348%	0.01320%	13.87%
ACN	Accenture Plc	414.55	0.94%	\$ 267,789,944,469	1.08118%	11.80%	0.12758%	0.01016%	12.74%
ADI	Analog Devices	175.77	1.57%	\$ 94,660,185,119	0.38218%	15.90%	0.06077%	0.00600%	17.47%
ADM	Archer Daniels Midl'	67.59	2.19%	\$ 37,862,973,818	0.15287%	9.55%	0.01460%	0.00335%	11.74%
ADP	Automatic Data Proc.	246.58	1.69%	\$ 102,255,169,797	0.41285%	10.48%	0.04327%	0.00698%	12.17%
AEE	Ameren Corp.	89.01	2.47%	\$ 22,623,802,721	0.09134%	7.70%	0.00703%	0.00226%	10.17%
AEP	Amer. Elec. Power	88.97	3.51%	\$ 44,265,938,816	0.17872%	6.03%	0.01078%	0.00627%	9.54%
AES	AES Corp.	24.3	2.60%	\$ 16,207,814,552	0.06544%	8.15%	0.00533%	0.00170%	10.75%
AFL	Aflac Inc.	58.39	2.74%	\$ 38,818,469,109	0.15673%	6.11%	0.00958%	0.00429%	8.85%
AIZ	Assurant Inc.	155.86	1.75%	\$ 8,935,655,965	0.03608%	17.90%	0.00646%	0.00063%	19.65%
AJG	Gallagher (Arthur J.	169.67	1.13%	\$ 34,573,971,032	0.13959%	10.60%	0.01480%	0.00158%	11.73%
ALLE	Allegion plc	132.44	1.09%	\$ 11,599,469,272	0.04683%	10.05%	0.00471%	0.00051%	11.14%
AMCR	Amcor plc	12.01	4.01%	\$ 18,122,057,112	0.07317%	5.57%	0.00408%	0.00293%	9.58%
AMGN	Amgen	224.97	3.45%	\$ 126,464,417,370	0.51059%	5.95%	0.03038%	0.01762%	9.40%
AMP	Ameriprise Fin'l	301.66	1.50%	\$ 34,106,249,655	0.13770%	9.42%	0.01297%	0.00207%	10.92%
AMT	Amer. Tower 'A'	292.5	1.90%	\$ 128,504,061,627	0.51882%	17.01%	0.08825%	0.00986%	18.91%
ANTM	Anthem, Inc.	463.54	0.98%	\$ 111,041,975,250	0.44832%	13.55%	0.06075%	0.00439%	14.53%
AON	Aon plc	300.56	0.68%	\$ 65,359,406,363	0.26388%	14.21%	0.03750%	0.00179%	14.89%
AOS	Smith (A.O.)	85.85	1.30%	\$ 13,242,286,234	0.05346%	8.00%	0.00428%	0.00070%	9.30%
APD	Air Products & Chem.	304.26	1.97%	\$ 66,179,413,808	0.26719%	11.96%	0.03196%	0.00526%	13.93%
APH	Amphenol Corp.	87.46	0.91%	\$ 51,866,944,428	0.20941%	13.20%	0.02764%	0.00191%	14.11%
ARE	Alexandria Real Esta	222.96	2.06%	\$ 33,737,278,793	0.13621%	0.10%	0.00014%	0.00281%	2.16%
ATO	Atmos Energy	104.77	2.60%	\$ 13,809,302,788	0.05575%	7.80%	0.00435%	0.00145%	10.40%
ATVI	Activision Blizzard	66.53	0.71%	\$ 51,788,301,350	0.20909%	13.90%	0.02906%	0.00148%	14.61%
AVB	AvalonBay Communitie	252.59	2.52%	\$ 34,894,843,113	0.14089%	2.54%	0.00358%	0.00355%	5.06%
AVGO	Broadcom Inc.	665.41	2.46%	\$ 275,325,016,820	1.11160%	14.74%	0.16385%	0.02735%	17.20%
AVY	Avery Dennison	216.57	1.24%	\$ 17,656,984,935	0.07129%	10.07%	0.00718%	0.00088%	11.31%
AWK	Amer. Water Works	188.86	1.32%	\$ 33,362,998,284	0.13470%	8.60%	0.01158%	0.00178%	9.92%
BAX	Baxter Int'l Inc.	85.84	1.41%	\$ 42,999,539,228	0.17361%	11.57%	0.02009%	0.00245%	12.98%
BBWI	Bath & Body Works	69.79	0.80%	\$ 18,588,057,953	0.07505%	10.00%	0.00750%	0.00060%	10.80%
BBY	Best Buy Co.	101.6	2.92%	\$ 25,454,824,183	0.10277%	9.10%	0.00935%	0.00300%	12.02%
BDX	Becton, Dickinson	251.48	1.27%	\$ 71,018,536,455	0.28673%	10.10%	0.02896%	0.00364%	11.37%
BEN	Franklin Resources	33.49	3.60%	\$ 16,990,782,392	0.06860%	10.64%	0.00730%	0.00247%	14.24%
BFB	Brown-Forman 'B'	72.86	1.03%	\$ 33,155,894,138	0.13386%	10.59%	0.01418%	0.00138%	11.62%
BK	Bank of New York Mel	58.08	2.41%	\$ 48,335,296,268	0.19515%	11.30%	0.02205%	0.00470%	13.71%
BLK	BlackRock, Inc.	915.56	1.84%	\$ 139,595,106,244	0.56360%	16.66%	0.09390%	0.01037%	18.50%

BLL	Ball Corp.	96.27	0.86%	\$	30,135,107,360	0.12167%	15.05%	0.01831%	0.00105%	15.91%
BMV	Bristol-Myers Squibb	62.35	3.20%	\$	137,906,546,220	0.55679%	7.37%	0.04104%	0.01782%	10.57%
BR	Broadridge Fin'l	182.82	1.43%	\$	20,964,221,953	0.08464%	11.80%	0.00999%	0.00121%	13.23%
BRO	Brown & Brown	70.28	0.69%	\$	19,504,394,118	0.07875%	13.22%	0.01041%	0.00054%	13.91%
BXP	Boston Properties	115.18	3.43%	\$	18,354,310,750	0.07410%	7.00%	0.00519%	0.00254%	10.43%
CAG	Conagra Brands	34.15	3.87%	\$	16,079,202,315	0.06492%	1.83%	0.00119%	0.00251%	5.70%
CAH	Cardinal Health	51.49	3.87%	\$	14,500,805,076	0.05855%	6.56%	0.00384%	0.00227%	10.43%
CARR	Carrier Global	54.24	1.14%	\$	45,591,032,117	0.18407%	18.79%	0.03459%	0.00210%	19.93%
CBOE	Cboe Global Markets	130.4	1.55%	\$	13,735,605,845	0.05546%	2.50%	0.00139%	0.00086%	4.05%
CDW	CDW Corp.	204.78	1.00%	\$	27,735,673,085	0.11198%	12.71%	0.01423%	0.00112%	13.71%
CERN	Cerner Corp.	92.87	1.20%	\$	27,140,538,301	0.10958%	11.81%	0.01294%	0.00131%	13.01%
CHD	Church & Dwight	102.5	0.99%	\$	24,495,399,386	0.09890%	7.31%	0.00723%	0.00098%	8.30%
CHRW	C.H. Robinson	107.63	2.16%	\$	14,201,773,029	0.05734%	10.45%	0.00599%	0.00124%	12.61%
CI	Cigna Corp.	229.63	1.83%	\$	76,848,139,180	0.31027%	13.76%	0.04269%	0.00568%	15.59%
CINF	Cincinnati Financial	113.93	2.17%	\$	18,532,815,253	0.07482%	14.39%	0.01077%	0.00162%	16.56%
CL	Colgate-Palmolive	85.34	2.11%	\$	70,554,863,905	0.28486%	7.19%	0.02048%	0.00601%	9.30%
CLX	Clorox Co.	174.36	2.76%	\$	21,128,698,668	0.08531%	1.50%	0.00128%	0.00235%	4.26%
CMCSA	Comcast Corp.	50.33	1.99%	\$	232,325,614,320	0.93800%	18.74%	0.17578%	0.01867%	20.73%
CME	CME Group	228.46	1.65%	\$	81,162,421,921	0.32769%	4.96%	0.01625%	0.00541%	6.61%
CMI	Cummins Inc.	218.14	2.47%	\$	31,435,528,829	0.12692%	18.13%	0.02301%	0.00313%	20.60%
CMS	CMS Energy Corp.	65.05	2.84%	\$	18,621,742,090	0.07518%	5.72%	0.00430%	0.00214%	8.56%
CNP	CenterPoint Energy	27.91	2.52%	\$	17,356,690,799	0.07008%	4.60%	0.00322%	0.00177%	7.12%
COO	Cooper Cos.	418.94	0.01%	\$	20,980,373,612	0.08471%	10.00%	0.00847%	0.00001%	10.01%
COST	Costco Wholesale	567.7	0.70%	\$	247,501,804,885	0.99927%	10.84%	0.10832%	0.00699%	11.54%
CPB	Campbell Soup	43.46	3.42%	\$	13,045,036,486	0.05267%	4.10%	0.00216%	0.00180%	7.52%
CSCO	Cisco Systems	63.37	2.50%	\$	265,224,146,230	1.07082%	6.45%	0.06907%	0.02677%	8.95%
CSX	CSX Corp.	37.6	0.99%	\$	82,131,907,782	0.33160%	15.60%	0.05173%	0.00328%	16.59%
CTAS	Cintas Corp.	443.17	0.88%	\$	44,314,293,787	0.17892%	11.20%	0.02004%	0.00157%	12.08%
CTSH	Cognizant Technology	88.72	1.13%	\$	46,647,593,313	0.18834%	12.03%	0.02266%	0.00213%	13.16%
CTXS	Citrix Sys.	94.59	1.76%	\$	11,964,667,835	0.04831%	11.15%	0.00539%	0.00085%	12.91%
CVS	CVS Health	103.16	2.41%	\$	135,860,469,862	0.54853%	6.33%	0.03472%	0.01322%	8.74%
D	Dominion Energy	78.56	3.39%	\$	62,831,699,752	0.25368%	6.65%	0.01687%	0.00860%	10.04%
DD	DuPont de Nemours	80.78	1.71%	\$	42,303,176,060	0.17080%	13.73%	0.02345%	0.00292%	15.44%
DG	Dollar General	235.83	0.76%	\$	54,140,518,272	0.21859%	6.61%	0.01445%	0.00166%	7.37%
DHI	Horton D.R.	108.45	0.89%	\$	37,606,732,856	0.15183%	7.00%	0.01063%	0.00135%	7.89%
DHR	Danaher Corp.	329.01	0.26%	\$	226,456,504,613	0.91430%	17.16%	0.15689%	0.00238%	17.42%
DOV	Dover Corp.	181.6	1.10%	\$	25,738,686,305	0.10392%	14.66%	0.01523%	0.00114%	15.76%
DPZ	Domino's Pizza	564.33	0.70%	\$	19,954,867,558	0.08057%	12.22%	0.00985%	0.00056%	12.92%
DRE	Duke Realty Corp.	65.64	2.13%	\$	24,225,881,454	0.09781%	6.00%	0.00587%	0.00208%	8.13%
DTE	DTE Energy	119.54	2.92%	\$	22,976,045,624	0.09276%	2.65%	0.00246%	0.00271%	5.57%
DUK	Duke Energy	104.9	3.87%	\$	79,650,110,909	0.32158%	5.45%	0.01753%	0.01245%	9.32%
EBAY	eBay Inc.	66.5	1.08%	\$	41,403,884,335	0.16716%	11.87%	0.01984%	0.00181%	12.95%
ECL	Ecolab Inc.	234.59	0.87%	\$	65,856,030,513	0.26589%	16.21%	0.04310%	0.00231%	17.08%
ED	Consol. Edison	85.32	4.32%	\$	29,877,614,878	0.12063%	2.00%	0.00241%	0.00521%	6.32%
EFX	Equifax, Inc.	292.79	0.53%	\$	34,775,308,602	0.14040%	13.68%	0.01921%	0.00074%	14.21%
EIX	Edison Int'l	68.25	4.68%	\$	25,469,046,075	0.10283%	4.10%	0.00422%	0.00481%	8.78%
EL	Lauder (Estee)	370.2	0.65%	\$	133,360,474,650	0.53843%	18.71%	0.10074%	0.00350%	19.36%
EMN	Eastman Chemical	120.91	2.62%	\$	16,296,841,208	0.06580%	13.63%	0.00897%	0.00172%	16.25%
EMR	Emerson Electric	92.97	2.11%	\$	54,907,919,902	0.22169%	12.90%	0.02860%	0.00468%	15.01%
EQR	Equity Residential	90.5	2.86%	\$	33,552,699,871	0.13547%	6.10%	0.00826%	0.00387%	8.96%
ES	Eversource Energy	90.98	2.82%	\$	30,705,286,227	0.12397%	6.68%	0.00828%	0.00350%	9.50%
ESS	Essex Property Trust	352.23	2.37%	\$	22,519,741,125	0.09092%	7.90%	0.00718%	0.00215%	10.27%

ETN	Eaton Corp. plc	172.82	1.76%	\$	67,554,709,348	0.27275%	18.00%	0.04909%	0.00480%	19.76%
ETR	Entergy Corp.	112.65	3.77%	\$	22,441,561,528	0.09061%	3.85%	0.00349%	0.00342%	7.62%
EVRG	Evergy, Inc.	68.61	3.38%	\$	15,576,532,480	0.06289%	5.70%	0.00358%	0.00213%	9.08%
EXPD	Expeditors Int'l	134.29	0.91%	\$	22,228,318,996	0.08974%	3.40%	0.00305%	0.00082%	4.31%
EXR	Extra Space Storage	226.73	2.91%	\$	29,183,057,626	0.11782%	6.00%	0.00707%	0.00343%	8.91%
FAST	Fastenal Co.	64.06	2.01%	\$	36,195,020,351	0.14613%	6.33%	0.00925%	0.00294%	8.34%
FBHS	Fortune Brands Home	106.9	1.06%	\$	14,143,513,645	0.05710%	8.70%	0.00497%	0.00061%	9.76%
FCX	Freeport-McMoRan Inc.	41.73	0.79%	\$	61,360,144,080	0.24774%	18.10%	0.04484%	0.00196%	18.89%
FDS	FactSet Research	486.01	0.70%	\$	17,878,868,282	0.07218%	6.29%	0.00454%	0.00051%	6.99%
FDX	FedEx Corp.	258.64	1.12%	\$	68,642,946,211	0.27714%	11.65%	0.03229%	0.00310%	12.77%
FIS	Fidelity Nat'l Info.	109.15	1.25%	\$	68,633,299,983	0.27710%	17.26%	0.04783%	0.00346%	18.51%
FMC	FMC Corp.	109.89	2.07%	\$	14,056,730,453	0.05675%	8.31%	0.00472%	0.00117%	10.38%
FOX	Fox Corp. 'B'	34.27	1.24%	\$	21,028,208,143	0.08490%	9.20%	0.00781%	0.00105%	10.44%
FRC	First Republic Bank	206.51	0.45%	\$	36,714,674,420	0.14823%	16.35%	0.02424%	0.00067%	16.80%
FRT	Federal Rlty. Inv. T	136.32	3.14%	\$	10,635,000,000	0.04294%	6.70%	0.00288%	0.00135%	9.84%
FTV	Fortive Corp.	76.29	0.37%	\$	26,584,943,045	0.10733%	10.17%	0.01092%	0.00040%	10.54%
GD	Gen'l Dynamics	208.47	2.28%	\$	57,891,263,635	0.23373%	8.35%	0.01952%	0.00533%	10.63%
GILD	Gilead Sciences	72.61	3.92%	\$	90,528,818,813	0.36550%	1.30%	0.00475%	0.01433%	5.22%
GIS	Gen'l Mills	67.38	3.01%	\$	39,847,833,129	0.16088%	4.61%	0.00742%	0.00484%	7.62%
GL	Globe Life Inc.	93.72	0.84%	\$	9,658,660,634	0.03900%	7.37%	0.00287%	0.00033%	8.21%
GPC	Genuine Parts	140.2	2.33%	\$	19,695,495,936	0.07952%	4.60%	0.00366%	0.00185%	6.93%
GPS	Gap (The), Inc.	17.65	1.94%	\$	6,934,097,310	0.02800%	4.90%	0.00137%	0.00054%	6.84%
GRMN	Garmin Ltd.	136.17	1.70%	\$	25,799,995,126	0.10417%	7.30%	0.00760%	0.00177%	9.00%
GWW	Grainger (W.W.)	518.24	1.61%	\$	26,279,857,014	0.10610%	15.38%	0.01632%	0.00171%	16.99%
HAS	Hasbro, Inc.	101.78	2.67%	\$	14,001,610,350	0.05653%	17.70%	0.01001%	0.00151%	20.37%
HCA	HCA Healthcare	256.92	0.76%	\$	78,928,257,284	0.31867%	13.84%	0.04410%	0.00242%	14.60%
HD	Home Depot	415.01	1.61%	\$	425,788,452,250	1.71909%	10.60%	0.18222%	0.02768%	12.21%
HIG	Hartford Fin'l Svcs.	69.04	2.23%	\$	23,732,843,724	0.09582%	9.36%	0.00897%	0.00214%	11.59%
HII	Huntington Ingalls	186.74	2.62%	\$	7,528,661,557	0.03040%	0.70%	0.00021%	0.00080%	3.32%
HON	Honeywell Int'l	208.51	1.68%	\$	142,774,408,013	0.57644%	12.73%	0.07338%	0.00968%	14.41%
HPE	Hewlett Packard Ent.	15.77	3.25%	\$	21,033,443,900	0.08492%	13.61%	0.01156%	0.00276%	16.86%
HPQ	HP Inc.	37.67	2.68%	\$	43,496,031,254	0.17561%	16.52%	0.02901%	0.00471%	19.20%
HRL	Hormel Foods	48.81	2.35%	\$	26,211,552,614	0.10583%	7.80%	0.00825%	0.00249%	10.15%
HSY	Hershey Co.	193.47	1.86%	\$	39,511,510,288	0.15952%	8.82%	0.01407%	0.00297%	10.68%
HUM	Humana Inc.	463.86	0.64%	\$	58,813,394,835	0.23745%	13.38%	0.03177%	0.00152%	14.02%
IBM	Int'l Business Mach.	133.66	4.91%	\$	120,700,308,715	0.48732%	16.35%	0.07968%	0.02393%	21.26%
ICE	Intercontinental Exc	136.77	0.99%	\$	75,417,299,941	0.30449%	8.88%	0.02704%	0.00301%	9.87%
IEX	IDEX Corp.	236.32	0.91%	\$	17,586,841,453	0.07101%	12.00%	0.00852%	0.00065%	12.91%
IFF	Int'l Flavors & Frag	150.65	2.36%	\$	38,151,490,614	0.15403%	8.10%	0.01248%	0.00364%	10.46%
INFO	IHS Markit	132.92	0.61%	\$	51,705,798,852	0.20876%	11.05%	0.02307%	0.00127%	11.66%
INTC	Intel Corp.	51.5	2.71%	\$	213,393,334,274	0.86156%	10.00%	0.08616%	0.02335%	12.71%
INTU	Intuit Inc.	643.22	0.42%	\$	179,372,012,916	0.72420%	14.40%	0.10428%	0.00304%	14.82%
IPG	Interpublic Group	37.45	2.88%	\$	14,828,817,005	0.05987%	16.60%	0.00994%	0.00172%	19.48%
IRM	Iron Mountain	52.33	5.31%	\$	14,706,219,370	0.05938%	6.41%	0.00381%	0.00315%	11.72%
ITW	Illinois Tool Works	246.8	2.00%	\$	75,924,602,331	0.30654%	14.37%	0.04405%	0.00613%	16.37%
J	Jacobs Engineering	139.23	0.62%	\$	18,082,035,995	0.07300%	14.40%	0.01051%	0.00045%	15.02%
JKHY	Henry (Jack) & Assoc	166.99	1.11%	\$	12,364,850,340	0.04992%	9.64%	0.00481%	0.00055%	10.75%
JNJ	Johnson & Johnson	171.07	2.53%	\$	447,594,153,187	1.80712%	8.89%	0.16065%	0.04572%	11.42%
JNPR	Juniper Networks	35.71	2.87%	\$	11,452,878,738	0.04624%	9.56%	0.00442%	0.00133%	12.43%
JPM	JPMorgan Chase	158.35	2.53%	\$	478,664,437,627	1.93257%	8.25%	0.15944%	0.04889%	10.78%
K	Kellogg	64.42	3.65%	\$	21,722,693,640	0.08770%	3.29%	0.00289%	0.00320%	6.94%
KEY	KeyCorp	23.13	3.17%	\$	22,000,906,847	0.08883%	11.40%	0.01013%	0.00282%	14.57%

KIM	Kimco Realty	24.65	3.13%	\$	15,176,455,415	0.06127%	4.60%	0.00282%	0.00192%	7.73%
KLAC	KLA Corp.	430.11	1.02%	\$	65,447,678,539	0.26424%	15.15%	0.04003%	0.00270%	16.17%
KMB	Kimberly-Clark	142.92	3.19%	\$	47,156,796,451	0.19039%	1.88%	0.00358%	0.00607%	5.07%
KMI	Kinder Morgan Inc.	15.86	6.47%	\$	39,433,423,092	0.15921%	6.92%	0.01102%	0.01030%	13.39%
KO	Coca-Cola	59.21	2.92%	\$	252,664,468,286	1.02011%	10.12%	0.10324%	0.02979%	13.04%
KR	Kroger Co.	45.26	2.01%	\$	33,270,387,738	0.13433%	11.90%	0.01598%	0.00270%	13.91%
L	Loews Corp.	57.76	0.43%	\$	14,779,646,892	0.05967%	14.03%	0.00837%	0.00026%	14.46%
LDOS	Leidos Hldgs.	88.9	1.56%	\$	12,667,025,517	0.05114%	9.60%	0.00491%	0.00080%	11.16%
LEN	Lennar Corp.	116.16	0.98%	\$	34,264,185,297	0.13834%	10.70%	0.01480%	0.00136%	11.68%
LHX	L3Harris Technologie	213.24	1.76%	\$	41,633,142,758	0.16809%	10.60%	0.01782%	0.00296%	12.36%
LIN	Linde plc	346.43	1.27%	\$	174,781,118,600	0.70566%	14.92%	0.10529%	0.00896%	16.19%
LLY	Lilly (Eli)	276.22	1.57%	\$	258,021,624,615	1.04174%	14.80%	0.15418%	0.01636%	16.37%
LMT	Lockheed Martin	355.41	3.20%	\$	97,909,684,698	0.39530%	4.35%	0.01720%	0.01265%	7.55%
LNT	Alliant Energy	61.47	2.85%	\$	15,149,331,587	0.06116%	5.80%	0.00355%	0.00174%	8.65%
LOW	Lowe's Cos.	258.48	1.28%	\$	172,277,156,983	0.69555%	17.70%	0.12311%	0.00890%	18.98%
LRCX	Lam Research	719.15	1.09%	\$	101,473,624,808	0.40969%	15.72%	0.06440%	0.00447%	16.81%
LW	Lamb Weston Holdings	63.38	1.59%	\$	9,266,572,751	0.03741%	17.40%	0.00651%	0.00059%	18.99%
MAA	Mid-America Apartmen	229.44	1.90%	\$	25,849,699,100	0.10437%	7.00%	0.00731%	0.00198%	8.90%
MAS	Masco Corp.	70.22	1.63%	\$	16,788,331,074	0.06778%	12.20%	0.00827%	0.00110%	13.83%
MCHP	Microchip Technology	87.06	1.08%	\$	48,956,234,900	0.19766%	16.20%	0.03202%	0.00213%	17.28%
MCK	McKesson Corp.	248.57	0.76%	\$	37,371,998,269	0.15089%	9.48%	0.01430%	0.00115%	10.24%
MCO	Moody's Corp.	390.58	0.63%	\$	71,311,202,774	0.28791%	11.01%	0.03170%	0.00181%	11.64%
MDLZ	Mondelez Int'l	66.31	2.37%	\$	90,935,439,674	0.36714%	9.25%	0.03396%	0.00870%	11.62%
MDT	Medtronic plc	103.45	1.94%	\$	140,860,843,007	0.56871%	13.57%	0.07717%	0.01103%	15.51%
MET	MetLife Inc.	62.49	3.09%	\$	53,573,485,613	0.21630%	7.60%	0.01644%	0.00668%	10.69%
MKC	McCormick & Co.	96.61	1.69%	\$	25,501,492,300	0.10296%	6.50%	0.00669%	0.00174%	8.19%
MKTX	MarketAxess Holdings	411.27	0.65%	\$	15,286,260,303	0.06172%	6.51%	0.00402%	0.00040%	7.16%
MLM	Martin Marietta	440.52	0.58%	\$	27,598,367,759	0.11143%	15.80%	0.01761%	0.00065%	16.38%
MMC	Marsh & McLennan	173.82	1.23%	\$	85,559,560,927	0.34544%	12.50%	0.04318%	0.00425%	13.73%
MMM	3M Company	177.63	3.33%	\$	101,720,146,718	0.41069%	8.93%	0.03667%	0.01368%	12.26%
MO	Altria Group	47.39	7.83%	\$	87,146,708,197	0.35185%	4.67%	0.01643%	0.02755%	12.50%
MOS	Mosaic Company	39.29	1.16%	\$	15,278,957,452	0.06169%	7.00%	0.00432%	0.00072%	8.16%
MRK	Merck & Co.	76.64	3.62%	\$	192,653,664,130	0.77782%	12.77%	0.09933%	0.02816%	16.39%
MS	Morgan Stanley	98.16	2.75%	\$	181,379,168,245	0.73230%	6.07%	0.04445%	0.02014%	8.82%
MSCI	MSCI Inc.	612.69	0.57%	\$	48,799,384,389	0.19702%	17.79%	0.03505%	0.00112%	18.36%
MSFT	Microsoft Corp.	336.32	0.74%	\$	2,493,024,667,349	10.06538%	15.25%	1.53497%	0.07448%	15.99%
MSI	Motorola Solutions	271.7	1.19%	\$	45,287,529,323	0.18284%	13.73%	0.02510%	0.00218%	14.92%
MTB	M&T Bank Corp.	153.58	3.13%	\$	20,347,592,511	0.08215%	14.20%	0.01167%	0.00257%	17.33%
NDAQ	Nasdaq, Inc.	210.01	1.04%	\$	34,048,888,087	0.13747%	14.44%	0.01985%	0.00143%	15.48%
NEE	NextEra Energy	93.36	1.89%	\$	179,637,996,321	0.72527%	7.85%	0.05693%	0.01371%	9.74%
NI	NiSource Inc.	27.61	3.58%	\$	10,732,622,154	0.04333%	3.52%	0.00153%	0.00155%	7.10%
NKE	NIKE, Inc. 'B'	166.67	0.72%	\$	259,392,057,688	1.04727%	17.00%	0.17804%	0.00754%	17.72%
NLOK	NortonLifeLock Inc.	25.98	1.96%	\$	15,058,551,839	0.06080%	14.50%	0.00882%	0.00119%	16.46%
NLSN	Nielsen Hldgs. plc	20.51	1.15%	\$	7,533,886,043	0.03042%	5.30%	0.00161%	0.00035%	6.45%
NOC	Northrop Grumman	387.07	1.62%	\$	60,940,270,386	0.24604%	6.70%	0.01648%	0.00399%	8.32%
NSC	Norfolk Southern	297.71	1.57%	\$	70,735,348,409	0.28559%	14.33%	0.04092%	0.00448%	15.90%
NTAP	NetApp, Inc.	91.99	2.33%	\$	20,694,664,880	0.08355%	12.04%	0.01006%	0.00195%	14.37%
NTRS	Northern Trust Corp.	119.61	2.54%	\$	25,041,863,347	0.10110%	15.60%	0.01577%	0.00257%	18.14%
NWL	Newell Brands	21.84	3.63%	\$	9,299,244,259	0.03754%	4.16%	0.00156%	0.00136%	7.79%
NXPI	NXP Semi. NV	227.78	1.02%	\$	61,728,413,085	0.24922%	18.42%	0.04591%	0.00254%	19.44%
O	Realty Income Corp.	71.59	4.21%	\$	39,929,409,123	0.16121%	5.45%	0.00879%	0.00679%	9.66%
OKE	ONEOK Inc.	58.76	7.12%	\$	26,724,980,574	0.10790%	9.86%	0.01064%	0.00768%	16.98%

OMC	Omnicom Group	73.27	3.81%	\$	15,695,311,477	0.06337%	9.50%	0.00602%	0.00241%	13.31%
ORCL	Oracle Corp.	87.21	1.40%	\$	235,343,017,728	0.95018%	11.20%	0.10642%	0.01330%	12.60%
OTIS	Otis Worldwide	87.07	1.06%	\$	35,977,924,533	0.14526%	11.96%	0.01737%	0.00154%	13.02%
PAYX	Paychex, Inc.	136.5	2.31%	\$	48,496,547,424	0.19580%	6.83%	0.01337%	0.00452%	9.14%
PBCT	People's United Fin'	17.82	4.49%	\$	7,815,734,771	0.03156%	13.73%	0.00433%	0.00142%	18.22%
PCAR	PACCAR Inc.	88.26	1.57%	\$	30,747,758,422	0.12414%	19.78%	0.02456%	0.00195%	21.35%
PEAK	Healthpeak Propertie	36.09	3.53%	\$	19,134,370,712	0.07725%	1.70%	0.00131%	0.00273%	5.23%
PEG	Public Serv. Enterpr	66.73	3.23%	\$	33,318,180,884	0.13452%	2.35%	0.00316%	0.00434%	5.58%
PEP	PepsiCo, Inc.	173.71	2.79%	\$	236,765,336,075	0.95592%	9.82%	0.09387%	0.02667%	12.61%
PFE	Pfizer, Inc.	59.05	2.73%	\$	320,606,957,044	1.29442%	12.42%	0.16077%	0.03534%	15.15%
PFG	Principal Fin'l Grou	72.33	3.61%	\$	19,538,265,231	0.07888%	15.64%	0.01234%	0.00285%	19.25%
PG	Procter & Gamble	163.58	2.17%	\$	388,934,045,514	1.57029%	7.14%	0.11212%	0.03408%	9.31%
PH	Parker-Hannifin	318.12	1.42%	\$	40,683,962,834	0.16426%	9.68%	0.01590%	0.00233%	11.10%
PHM	PulteGroup, Inc.	57.16	1.18%	\$	14,287,263,485	0.05768%	18.10%	0.01044%	0.00068%	19.28%
PKG	Packaging Corp.	136.15	3.03%	\$	12,752,506,845	0.05149%	16.86%	0.00868%	0.00156%	19.89%
PM	Philip Morris Int'l	95	4.91%	\$	147,742,884,675	0.59650%	12.57%	0.07498%	0.02929%	17.48%
PNR	Pentair plc	73.03	1.07%	\$	11,732,397,542	0.04737%	16.40%	0.00777%	0.00051%	17.47%
PNW	Pinnacle West Capita	70.59	4.10%	\$	7,869,111,300	0.03177%	0.10%	0.00003%	0.00130%	4.20%
POOL	Pool Corp.	566	0.58%	\$	22,120,937,109	0.08931%	17.00%	0.01518%	0.00052%	17.58%
PPG	PPG Inds.	172.44	1.62%	\$	40,571,795,271	0.16381%	9.30%	0.01523%	0.00265%	10.92%
PRU	Prudential Fin'l	108.24	4.32%	\$	41,663,149,439	0.16821%	10.40%	0.01749%	0.00727%	14.72%
PSA	Public Storage	374.56	2.39%	\$	63,576,527,091	0.25668%	17.00%	0.04364%	0.00613%	19.39%
PWR	Quanta Services	114.66	0.27%	\$	16,343,245,064	0.06598%	15.44%	0.01019%	0.00018%	15.71%
REG	Regency Centers Corp	75.35	3.43%	\$	13,109,779,357	0.05293%	9.10%	0.00482%	0.00182%	12.53%
RIF	Raymond James Fin'l	100.4	1.01%	\$	21,061,469,810	0.08503%	19.42%	0.01651%	0.00086%	20.43%
ROK	Rockwell Automation	348.85	1.30%	\$	39,492,053,836	0.15945%	12.19%	0.01944%	0.00207%	13.49%
ROL	Rollins, Inc.	34.21	0.86%	\$	16,404,907,067	0.06623%	8.20%	0.00543%	0.00057%	9.06%
ROP	Roper Tech.	491.86	0.49%	\$	50,659,075,200	0.20453%	11.90%	0.02434%	0.00100%	12.39%
RSG	Republic Services	139.45	1.32%	\$	42,478,021,536	0.17150%	9.67%	0.01658%	0.00226%	10.99%
SBNY	Signature Bank	323.47	0.71%	\$	19,922,909,753	0.08044%	6.32%	0.00508%	0.00057%	7.03%
SEE	Sealed Air	67.47	1.43%	\$	9,770,933,912	0.03945%	9.60%	0.00379%	0.00056%	11.03%
SHW	Sherwin-Williams	352.16	0.67%	\$	89,230,612,704	0.36026%	11.88%	0.04280%	0.00241%	12.55%
SJM	Smucker (J.M.)	135.82	3.24%	\$	14,526,087,290	0.05865%	1.11%	0.00065%	0.00190%	4.35%
SNA	Snap-on Inc.	215.38	2.64%	\$	11,440,420,788	0.04619%	9.80%	0.00453%	0.00122%	12.44%
SO	Southern Co.	68.58	4.21%	\$	71,663,881,770	0.28934%	6.50%	0.01881%	0.01218%	10.71%
SPG	Simon Property Group	159.77	4.00%	\$	53,027,971,602	0.21410%	8.60%	0.01841%	0.00856%	12.60%
SPGI	S&P Global	471.93	0.65%	\$	111,059,980,680	0.44840%	9.34%	0.04188%	0.00291%	9.99%
SRE	Sempra Energy	132.28	3.32%	\$	42,031,187,028	0.16970%	4.30%	0.00730%	0.00563%	7.62%
STE	STERIS plc	243.41	0.75%	\$	24,005,520,000	0.09692%	10.00%	0.00969%	0.00073%	10.75%
STT	State Street Corp.	93	2.63%	\$	34,566,348,552	0.13956%	15.19%	0.02120%	0.00367%	17.82%
STX	Seagate Technology p	112.98	3.11%	\$	25,026,502,334	0.10104%	14.57%	0.01472%	0.00314%	17.68%
STZ	Constellation Brands	250.97	1.21%	\$	46,908,943,060	0.18939%	9.14%	0.01731%	0.00229%	10.35%
SWK	Stanley Black & Deck	188.62	1.70%	\$	30,523,057,181	0.12323%	14.40%	0.01775%	0.00209%	16.10%
SWKS	Skyworks Solutions	155.14	1.32%	\$	26,279,199,850	0.10610%	16.88%	0.01791%	0.00140%	18.20%
SYK	Stryker Corp.	267.42	0.94%	\$	101,035,408,897	0.40792%	13.35%	0.05446%	0.00383%	14.29%
T	AT&T Inc.	24.6	8.36%	\$	181,202,875,000	0.73159%	2.70%	0.01975%	0.06116%	11.06%
TAP	Molson Coors Beverag	46.35	0.72%	\$	10,221,848,744	0.04127%	4.14%	0.00171%	0.00030%	4.86%
TECH	Bio-Techne Corp.	517.34	0.24%	\$	19,456,277,129	0.07855%	15.00%	0.01178%	0.00019%	15.24%
TEL	TE Connectivity	161.34	1.35%	\$	52,735,492,612	0.21292%	11.00%	0.02342%	0.00287%	12.35%
TER	Teradyne Inc.	163.53	0.37%	\$	27,019,591,872	0.10909%	14.45%	0.01576%	0.00040%	14.82%
TFC	Truist Fin'l	58.55	3.48%	\$	80,133,565,130	0.32353%	8.90%	0.02879%	0.01126%	12.38%
TFX	Teleflex Inc.	328.48	0.41%	\$	15,764,730,966	0.06365%	11.00%	0.00700%	0.00026%	11.41%

TGT	Target Corp.	231.44	1.64%	\$	110,140,958,495	0.44468%	13.29%	0.05910%	0.00729%	14.93%
TMO	Thermo Fisher Sci.	667.24	0.18%	\$	253,837,902,171	1.02485%	4.99%	0.05114%	0.00184%	5.17%
TPR	Tapestry Inc.	40.6	2.46%	\$	11,399,158,001	0.04602%	8.80%	0.00405%	0.00113%	11.26%
TROW	Price (T. Rowe) Grou	196.64	2.05%	\$	44,251,283,319	0.17866%	15.80%	0.02823%	0.00366%	17.85%
TRV	Travelers Cos.	156.43	2.24%	\$	38,401,943,961	0.15504%	8.15%	0.01264%	0.00347%	10.39%
TSCO	Tractor Supply	238.6	1.07%	\$	26,892,184,433	0.10857%	8.95%	0.00972%	0.00116%	10.02%
TSN	Tyson Foods 'A'	87.16	2.12%	\$	31,468,246,939	0.12705%	7.50%	0.00953%	0.00269%	9.62%
TXN	Texas Instruments	188.47	2.29%	\$	174,897,396,265	0.70613%	10.00%	0.07061%	0.01617%	12.29%
UHS	Universal Health 'B'	129.66	0.62%	\$	10,510,362,925	0.04243%	7.90%	0.00335%	0.00026%	8.52%
UNH	UnitedHealth Group	502.14	1.39%	\$	465,274,492,800	1.87851%	13.02%	0.24458%	0.02611%	14.41%
UNP	Union Pacific	251.93	1.98%	\$	159,497,465,093	0.64396%	14.25%	0.09176%	0.01275%	16.23%
UPS	United Parcel Serv.	214.34	1.92%	\$	184,258,104,000	0.74393%	15.89%	0.11821%	0.01428%	17.81%
USB	U.S. Bancorp	56.17	2.95%	\$	84,727,019,674	0.34208%	12.08%	0.04132%	0.01009%	15.03%
V	Visa Inc.	216.71	0.69%	\$	465,330,483,123	1.87873%	19.71%	0.37030%	0.01296%	20.40%
VMC	Vulcan Materials	207.58	0.73%	\$	27,630,508,940	0.11156%	17.20%	0.01919%	0.00081%	17.93%
VNO	Vornado R'lty Trust	41.86	4.55%	\$	8,236,528,506	0.03325%	17.33%	0.00576%	0.00151%	21.88%
VRSK	Verisk Analytics	228.73	0.54%	\$	35,392,633,191	0.14289%	8.79%	0.01256%	0.00077%	9.33%
VTRS	Viatis Inc.	13.53	3.32%	\$	17,082,676,125	0.06897%	0.40%	0.00028%	0.00229%	3.72%
VZ	Verizon Communic.	51.96	4.55%	\$	216,965,236,961	0.87598%	3.59%	0.03145%	0.03986%	8.14%
WAB	Wabtec Corp.	92.11	0.58%	\$	17,355,661,895	0.07007%	7.30%	0.00512%	0.00041%	7.88%
WBA	Walgreens Boots	52.16	3.60%	\$	45,661,048,825	0.18435%	5.14%	0.00948%	0.00664%	8.74%
WEC	WEC Energy Group	97.07	3.05%	\$	30,082,989,131	0.12146%	6.50%	0.00789%	0.00370%	9.55%
WELL	Welltower Inc.	85.77	2.84%	\$	37,259,496,535	0.15043%	13.00%	0.01956%	0.00427%	15.84%
WHR	Whirlpool Corp.	234.66	2.42%	\$	14,629,348,765	0.05906%	8.10%	0.00478%	0.00143%	10.52%
WLTW	Willis Towers Wat. p	237.49	1.23%	\$	29,441,905,527	0.11887%	7.40%	0.00880%	0.00146%	8.63%
WM	Waste Management	166.9	1.49%	\$	67,495,337,558	0.27251%	14.57%	0.03970%	0.00406%	16.06%
WMB	Williams Cos.	26.04	5.79%	\$	31,937,037,079	0.12894%	5.00%	0.00645%	0.00747%	10.79%
WMT	Walmart Inc.	144.69	1.51%	\$	398,245,684,776	1.60788%	7.99%	0.12847%	0.02428%	9.50%
WRB	Berkley (W.R.)	82.39	0.62%	\$	14,472,148,025	0.05843%	9.00%	0.00526%	0.00036%	9.62%
WY	Weyerhaeuser Co.	41.18	1.97%	\$	30,710,840,900	0.12399%	5.00%	0.00620%	0.00244%	6.97%
XEL	Xcel Energy Inc.	67.7	2.81%	\$	36,312,124,168	0.14661%	6.30%	0.00924%	0.00412%	9.11%
XOM	Exxon Mobil Corp.	61.19	6.38%	\$	266,418,372,601	1.07564%	1.00%	0.01076%	0.06863%	7.38%
YUM	Yum! Brands	138.86	1.59%	\$	39,833,843,191	0.16083%	15.54%	0.02499%	0.00256%	17.13%
ZBH	Zimmer Biomet Hldgs.	127.04	0.65%	\$	26,942,852,118	0.10878%	11.24%	0.01223%	0.00071%	11.89%
ZTS	Zoetis Inc.	244.03	0.46%	\$	111,496,827,760	0.45016%	13.50%	0.06077%	0.00207%	13.96%
				\$	24,768,314,335,080	100%		12.39%		1.77%
							CAPM Weighted Return >	14.16%		

Excluded Entities (No Dividend / Negative Growth Rate / > 20% Growth Rate)

A	Agilent Technologies	159.65	0.53%	\$	46,758,784,416	53.30%
AAL	Amer. Airlines	17.96	N/A	\$	12,283,347,723	-124.20%
ABMD	ABIOMED Inc.	359.17	N/A	\$	16,376,363,062	10.03%
ADBE	Adobe Inc.	567.06	N/A	\$	267,437,672,131	18.47%
ADSK	Autodesk, Inc.	281.19	N/A	\$	61,964,836,581	26.57%
AIG	Amer. Int'l Group	56.86	2.25%	\$	47,949,680,625	31.70%
AKAM	Akamai Technologies	117.04	N/A	\$	18,807,048,425	12.00%
ALB	Albemarle Corp.	233.77	0.67%	\$	27,002,808,663	29.83%
ALGN	Align Techn.	657.18	N/A	\$	51,119,648,534	31.83%
ALK	Alaska Air Group	52.1	N/A	\$	6,784,023,451	-23.40%
ALL	Allstate Corp.	117.65	2.75%	\$	34,214,780,162	-0.80%
AMAT	Applied Materials	157.36	0.61%	\$	142,135,409,697	20.42%
AMD	Advanced Micro Dev.	143.9	N/A	\$	182,904,618,707	32.44%
AME	AMETEK, Inc.	147.04	0.54%	\$	33,359,394,224	-1.20%
AMZN	Amazon.com	3334.34	N/A	\$	1,721,284,675,948	35.77%
ANET	Arista Networks	143.75	N/A	\$	44,024,522,684	12.50%
ANSS	ANSYS, Inc.	401.12	N/A	\$	34,298,476,210	12.14%
APA	APA Corp.	26.89	1.86%	\$	10,097,206,416	-24.00%
APTV	Aptiv PLC	164.95	N/A	\$	45,248,894,662	47.59%
AXP	Amer. Express	163.6	1.06%	\$	133,147,025,928	41.00%
AZO	AutoZone Inc.	2096.39	N/A	\$	42,279,865,110	14.00%
BA	Boeing	201.32	N/A	\$	123,410,937,237	12.33%
BAC	Bank of America	44.49	1.90%	\$	378,472,955,838	24.32%
BIIB	Biogen	239.92	N/A	\$	36,130,462,417	-6.50%
BIO	Bio-Rad Labs. 'A'	755.57	N/A	\$	21,548,079,865	17.80%
BKNG	Booking Holdings	2399.23	N/A	\$	99,543,208,960	210.98%
BKR	Baker Hughes	24.06	2.99%	\$	25,916,898,676	348.10%
BRKB	Berkshire Hathaway '	299	N/A	\$	674,241,184,830	23.30%
BSX	Boston Scientific	42.48	N/A	\$	61,103,658,482	21.40%
BWA	BorgWarner	45.07	1.55%	\$	10,916,782,443	21.50%
C	Citigroup Inc.	60.39	3.39%	\$	124,354,009,256	28.35%
CAT	Caterpillar Inc.	206.74	2.15%	\$	111,785,599,003	32.24%
CB	Chubb Ltd.	193.31	1.73%	\$	82,960,757,749	26.32%
CBRE	CBRE Group	108.51	N/A	\$	36,368,131,873	11.00%
CCI	Crown Castle Int'l	208.74	2.95%	\$	88,588,690,431	21.00%
CCL	Carnival Corp.	20.12	N/A	\$	24,136,626,485	-115.60%
CDAY	Ceridian HCM Holding	104.46	N/A	\$	15,824,713,994	28.60%
CDNS	Cadence Design Sys.	186.35	N/A	\$	50,833,397,447	11.70%
CE	Celanese Corp.	168.06	1.64%	\$	18,661,831,090	28.36%
CF	CF Industries	70.78	2.03%	\$	15,294,240,250	-5.21%
CFG	Citizens Fin'l Group	47.25	3.35%	\$	20,930,657,705	-2.76%
CHTR	Charter Communic.	651.97	N/A	\$	116,051,483,732	36.75%
CMA	Comerica Inc.	87	3.75%	\$	11,669,602,868	-10.70%
CMG	Chipotle Mex. Grill	1748.25	N/A	\$	48,091,840,593	58.20%
CNC	Centene Corp.	82.4	N/A	\$	47,864,742,174	11.28%
COF	Capital One Fin'l	145.09	1.45%	\$	63,141,026,297	45.20%
COP	ConocoPhillips	72.18	2.40%	\$	97,113,990,357	-1.80%
CPRT	Copart, Inc.	151.62	N/A	\$	35,075,421,750	22.30%
CRL	Charles River	376.78	N/A	\$	18,240,861,592	16.55%
CRM	salesforce.com	254.13	N/A	\$	247,266,062,427	10.37%
CTLT	Catalent, Inc.	128.03	N/A	\$	21,395,076,814	16.60%

CTRA	Coterra Energy Inc	19	2.14%	\$	346,432,000	24.87%
CTVA	Corteva, Inc.	47.28	1.21%		#N/A	21.97%
CVX	Chevron Corp.	117.35	4.60%	\$	230,049,920,840	-4.90%
DAL	Delta Air Lines	39.08	N/A	\$	26,067,761,781	-23.70%
DE	Deere & Co.	342.89	1.20%	\$	106,485,886,843	41.52%
DFS	Discover Fin'l Svcs.	115.56	1.75%	\$	34,779,304,649	55.80%
DGX	Quest Diagnostics	173.01	1.67%	\$	20,229,459,393	-8.60%
DIS	Disney (Walt)	154.89	N/A	\$	285,299,141,003	50.89%
DISCK	Discovery Communic.	22.9	N/A	\$	12,729,460,029	20.00%
DISH	Dish Network 'A'	32.44	N/A	\$	17,492,446,944	-22.34%
DLR	Digital Realty Trust	176.87	2.62%	\$	48,839,813,272	27.70%
DLTR	Dollar Tree, Inc.	140.52	N/A	\$	31,713,173,473	7.58%
DOW	Dow Inc.	56.72	5.20%	\$	42,387,302,279	-5.43%
DRI	Darden Restaurants	150.64	2.92%	\$	19,444,374,668	29.57%
DVA	DaVita Inc.	113.76	N/A	\$	11,647,158,880	17.33%
DVN	Devon Energy	44.05	1.45%	\$	30,458,226,637	25.00%
DXC	DXC Technology	32.19	N/A	\$	8,346,581,930	28.43%
DXCM	DexCom Inc.	536.95	N/A	\$	50,631,105,895	16.40%
EA	Electronic Arts	131.9	0.52%	\$	37,624,787,725	26.27%
ENPH	Enphase Energy	182.94	N/A	\$	25,023,551,375	41.97%
EOG	EOG Resources	88.83	2.33%	\$	52,968,187,932	60.06%
EPAM	EPAM Systems	668.45	N/A	\$	37,126,922,804	24.75%
EQIX	Equinix, Inc.	845.84	1.36%	\$	73,955,788,067	40.10%
ETSY	Etsy, Inc.	218.94	N/A	\$	27,331,705,903	52.80%
EW	Edwards Lifesciences	129.55	N/A	\$	79,552,688,104	16.11%
EXC	Exelon Corp.	57.76	3.23%	\$	54,844,497,211	-0.47%
EXPE	Expedia Group	180.72	N/A	\$	28,040,182,842	8.50%
F	Ford Motor	20.77	1.97%	\$	86,778,373,924	72.06%
FANG	Diamondback Energy	107.85	1.89%	\$	20,217,261,791	52.89%
FB	Meta Platforms	336.35	N/A	\$	944,574,079,248	28.60%
FE	FirstEnergy Corp.	41.59	4.22%	\$	22,408,306,536	-1.84%
FFIV	FS, Inc.	244.71	N/A	\$	14,802,200,197	12.80%
FISV	Fiserv Inc.	103.79	N/A	\$	70,644,813,300	18.85%
FITB	Fifth Third Bancorp	43.55	2.91%	\$	30,406,683,518	-2.98%
FLT	FleetCor Technologie	223.84	N/A	\$	18,734,134,169	15.00%
FTNT	Fortinet Inc.	359.4	N/A	\$	55,432,939,685	16.62%
GE	Gen'l Electric	94.47	0.32%	\$	106,420,363,781	263.58%
GLW	Corning Inc.	37.23	2.55%	\$	31,815,067,838	24.00%
GM	Gen'l Motors	58.63	N/A	\$	88,868,349,270	13.30%
GNRC	Generac Holdings	351.92	N/A	\$	22,015,242,312	8.00%
GOOG	Alphabet Inc.	2893.59	N/A	\$	1,926,107,178,273	24.41%
GOOGL	Alphabet Inc. 'A'	2897.04	N/A	\$	1,925,238,104,135	24.41%
GPN	Global Payments	135.18	0.74%	\$	40,383,200,136	20.10%
GS	Goldman Sachs	382.55	2.08%	\$	132,333,625,431	20.91%
HAL	Halliburton Co.	22.87	0.79%	\$	21,140,453,178	55.20%
HBAN	Huntington Bancshs.	15.42	3.75%	\$	23,020,426,759	-2.15%

HES	Hess Corp.	74.03	1.45%	\$	23,409,152,111	-23.40%
HLT	Hilton Worldwide Hld	155.99	N/A	\$	43,430,417,335	278.95%
HOLX	Hologic, Inc.	76.56	N/A	\$	18,627,743,924	4.10%
HSIC	Schein (Henry)	77.53	N/A	\$	10,687,635,965	16.68%
HST	Host Hotels & Resort	17.39	N/A	\$	12,731,243,995	28.40%
HWM	Howmet Aerospace	31.83	N/A	\$	13,880,313,537	30.80%
IDXX	IDEXX Labs.	658.46	N/A	\$	54,038,960,244	17.22%
ILMN	Illumina Inc.	380.44	N/A	\$	59,359,575,831	24.03%
INCY	Incyte Corp.	73.4	N/A	\$	16,217,780,105	20.89%
IP	Int'l Paper	46.98	3.89%	\$	18,201,361,000	25.83%
IPGP	IPG Photonics	172.14	N/A	\$	9,234,159,062	42.00%
IQV	IQVIA Holdings	282.14	N/A	\$	51,967,170,245	19.39%
IR	Ingersoll Rand Inc.	61.87	N/A	\$	24,736,308,814	17.52%
ISRG	Intuitive Surgical	359.3	N/A	\$	127,260,553,650	14.57%
IT	Gartner Inc.	334.32	N/A	\$	26,545,933,968	16.40%
IVZ	Invesco Ltd.	23.02	2.98%	\$	10,833,735,881	22.55%
JBHT	Hunt (J.B.)	204.4	0.59%	\$	21,377,660,035	20.50%
JCI	Johnson Ctrls. Int'l	81.31	1.34%	\$	55,990,906,072	20.05%
KEYS	Keysight Technologie	206.51	N/A	\$	37,185,062,442	13.97%
KHC	Kraft Heinz Co.	35.9	4.42%	\$	43,735,020,099	-2.82%
KMX	CarMax, Inc.	130.23	N/A	\$	21,008,236,035	19.60%
LH	Laboratory Corp.	314.21	N/A	\$	28,956,428,668	-9.75%
LKQ	LKQ Corp.	60.03	1.75%	\$	17,151,330,484	33.50%
LNC	Lincoln Nat'l Corp.	68.26	2.64%	\$	12,700,200,187	41.25%
LUMN	Lumen Technologies	12.55	7.66%	\$	13,085,365,046	-10.20%
LUV	Southwest Airlines	42.84	N/A	\$	25,955,686,711	-21.00%
LVS	Las Vegas Sands	37.64	N/A	\$	29,795,594,400	-6.25%
LYB	LyondellBasell Inds.	92.23	4.90%	\$	31,334,933,242	51.39%
LYV	Live Nation Entertai	119.69	N/A	\$	27,415,247,322	80.30%
MA	MasterCard Inc.	359.32	0.54%	\$	359,340,856,955	27.30%
MAR	Marriott Int'l	165.24	N/A	\$	53,529,274,514	238.33%
MCD	McDonald's Corp.	268.07	2.06%	\$	199,813,415,399	20.42%
MGM	MGM Resorts Int'l	44.88	0.02%	\$	21,572,150,800	-129.20%
MHK	Mohawk Inds.	182.18	N/A	\$	12,425,499,400	4.00%
MNST	Monster Beverage	96.04	N/A	\$	50,725,918,691	14.85%
MPC	Marathon Petroleum	63.99	4.05%	\$	40,647,255,079	-17.53%
MPWR	Monolithic Power Sys	493.33	0.49%	\$	22,779,161,162	25.00%
MRNA	Moderna, Inc.	253.98	N/A	\$	95,653,668,889	16.80%
MRO	Marathon Oil Corp.	16.42	1.45%	\$	13,161,170,210	-2.40%
MTCH	Match Group	132.25	N/A	\$	38,349,552,389	29.60%
MTD	Mettler-Toledo Int'l	1697.21	N/A	\$	37,702,672,574	17.80%
MU	Micron Technology	93.15	0.21%	\$	105,911,982,368	58.64%
NCLH	Norwegian Cruise Lin	20.74	N/A	\$	9,223,720,012	-24.13%
NEM	Newmont Corp.	62.02	3.81%	\$	49,002,399,793	-1.60%
NFLX	Netflix, Inc.	602.44	N/A	\$	265,237,495,149	43.04%
NOW	ServiceNow, Inc.	649.11	N/A	\$	126,446,584,655	24.73%
NRG	NRG Energy	43.08	3.53%	\$	10,359,121,502	41.00%

NUE	Nucor Corp.	114.15	1.55%	\$	33,186,980,664	29.06%
NVDA	NVIDIA Corp.	294.11	0.07%	\$	761,503,219,604	32.60%
NVR	NVR, Inc.	5908.87	N/A	\$	20,025,829,261	4.80%
NWS	News Corp. 'B'	22.5	0.84%	\$	13,578,334,267	n/a
ODFL	Old Dominion Freight	358.38	0.22%	\$	39,757,036,205	22.70%
OGN	Organon & Co.	30.45	3.73%	\$	7,773,842,961	-1.00%
ORLY	O'Reilly Automotive	706.23	N/A	\$	46,805,738,083	13.62%
OXY	Occidental Petroleum	28.99	0.12%	\$	28,682,555,654	-5.15%
PAYC	Paycom Software	415.19	N/A	\$	24,261,832,290	27.00%
PENN	Penn Nat'l Gaming	51.85	N/A	\$	8,965,616,512	263.90%
PGR	Progressive Corp.	102.65	0.39%	\$	59,787,650,712	-9.80%
PKI	PerkinElmer Inc.	201.06	0.15%	\$	24,514,369,425	37.90%
PLD	Prologis	168.36	1.89%	\$	120,584,238,212	-6.05%
PNC	PNC Financial Serv.	200.52	2.49%	\$	86,992,156,637	-4.02%
PPL	PPL Corp.	30.06	5.83%	\$	22,348,812,686	-16.20%
PSX	Phillips 66	72.46	5.25%	\$	33,160,728,437	-11.15%
PTC	PTC Inc.	121.15	N/A	\$	14,240,681,804	21.41%
PVH	PVH Corp.	106.65	N/A	\$	7,772,327,917	-5.57%
PXD	Pioneer Natural Res.	181.88	1.26%	\$	45,132,995,926	62.00%
PYPL	PayPal Holdings	188.58	N/A	\$	227,548,690,948	20.29%
QCOM	Qualcomm Inc.	182.87	1.49%	\$	207,528,723,144	32.19%
QRVO	Qorvo Inc.	156.39	N/A	\$	17,536,511,792	15.40%
RCL	Royal Caribbean	76.9	N/A	\$	20,658,357,450	58.70%
RE	Everest Re Group Ltd	273.92	2.45%	\$	10,792,620,978	72.51%
REGN	Regeneron Pharmac.	631.52	N/A	\$	67,254,165,384	4.00%
RF	Regions Financial	21.8	2.88%	\$	21,534,651,820	44.80%
RHI	Robert Half Int'l	111.52	1.54%	\$	12,304,202,278	27.30%
RL	Ralph Lauren	118.86	2.35%	\$	8,930,481,729	74.15%
RMD	ResMed Inc.	260.48	0.66%	\$	37,388,176,834	23.00%
ROST	Ross Stores	114.28	1.06%	\$	40,724,931,597	89.78%
RTX	Raytheon Technologie	86.06	2.47%	\$	130,010,051,133	24.30%
SBAC	SBA Communications	389.02	0.64%	\$	40,659,185,305	183.48%
SBUX	Starbucks Corp.	116.97	1.74%	\$	136,501,701,859	54.89%
SCHW	Schwab (Charles)	84.1	0.96%	\$	161,287,081,384	21.15%
SEDG	SolarEdge Tech.	280.57	N/A	\$	14,801,572,798	20.30%
SIVB	SVB Fin'l Group	678.24	N/A	\$	40,368,707,225	8.00%
SLB	Schlumberger Ltd.	29.95	1.58%	\$	43,509,645,282	53.50%
SNPS	Synopsys, Inc.	368.5	N/A	\$	55,705,009,683	16.00%
SYF	Synchrony Financial	46.39	1.76%	\$	25,912,717,549	38.20%
SYF	Sysco Corp.	78.55	2.56%	\$	40,371,683,625	53.81%
TDG	TransDigm Group	636.28	N/A	\$	35,296,305,056	12.80%
TDY	Teledyne Technologie	436.89	N/A	\$	20,517,543,598	18.30%
TJX	TJX Companies	75.92	1.51%	\$	90,945,016,171	126.20%
TMUS	T-Mobile US	115.98	N/A	\$	144,115,731,709	40.25%
TRMB	Trimble Inc.	87.19	N/A	\$	21,850,273,281	10.00%
TSLA	Tesla, Inc.	1056.78	N/A	\$	1,170,720,758,000	51.75%

TT	Trane Technologies p	202.03	1.20%	\$	46,320,319,500	20.91%
TTWO	Take-Two Interactive	177.72	N/A	\$	20,139,398,387	12.30%
TWTR	Twitter Inc.	43.22	N/A	\$	34,599,120,739	41.00%
TXT	Textron, Inc.	77.2	0.11%	\$	17,003,599,793	27.85%
TYL	Tyler Technologies	537.95	N/A	\$	21,676,888,733	10.00%
UA	Under Armour 'C'	18.04	N/A	\$	9,242,627,924	21.80%
UAL	United Airlines Hldg	43.78	N/A	\$	14,898,336,521	-159.00%
UDR	UDR, Inc.	59.99	2.55%	\$	18,223,440,097	-34.21%
ULTA	Ulta Beauty	412.34	N/A	\$	22,612,472,906	56.90%
URI	United Rentals	332.29	N/A	\$	24,105,901,426	16.95%
VFC	V.F. Corp.	73.22	2.88%	\$	28,838,068,404	47.71%
VIAC	ViacomCBS Inc.	30.18	2.89%	\$	21,226,409,463	-2.99%
VLO	Valero Energy	75.11	5.80%	\$	31,905,522,794	-13.00%
VRSN	VeriSign Inc.	253.82	N/A	\$	27,929,553,167	8.00%
VRTX	Vertex Pharmac.	219.6	N/A	\$	55,833,718,791	9.80%
VTR	Ventas, Inc.	51.12	3.25%	\$	20,477,718,235	-10.90%
WAT	Waters Corp.	372.6	N/A	\$	21,972,439,041	9.30%
WDC	Western Digital	65.21	N/A	\$	20,395,686,946	47.80%
WFC	Wells Fargo	47.98	1.56%	\$	200,836,871,581	114.28%
WRK	WestRock Co.	44.36	1.80%	\$	11,774,281,771	24.26%
WST	West Pharmac. Svcs.	469.01	0.15%	\$	33,078,817,281	25.80%
WYNN	Wynn Resorts	85.04	N/A	\$	10,239,193,745	-114.90%
XLNX	Xilinx Inc.	212.03	N/A	\$	54,670,518,464	9.00%
XRAY	Dentsply Sirona	55.79	0.67%	\$	12,290,085,806	26.35%
XYL	Xylem Inc.	119.92	0.90%	\$	21,125,109,170	21.89%
ZBRA	Zebra Techn. 'A'	595.2	N/A	\$	31,533,685,458	10.00%
ZION	Zions Bancorp.	63.16	2.39%	\$	10,091,107,412	-32.40%

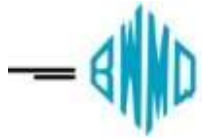
CAPM - Current 30-Year Treasury Yields

<u>Month</u>	<u>Risk-Free Rate 30-Year 1/</u>
Jul-21	1.94
Aug-21	1.92
Sep-21	1.94
Oct-21	2.06
Nov-21	1.94
Dec-21	1.85
Six-Month Average	<u><u>1.94%</u></u>

1/ 6-month average of 30-year U.S. Treasury Constant Maturity Rate series, St. Louis FRED.

Source: Federal Reserve statistical release H.15

<https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H15>



BROWN, WILLIAMS, MOORHEAD & QUINN, INC.

ENERGY CONSULTANTS

Docket No. G-39, Sub 47

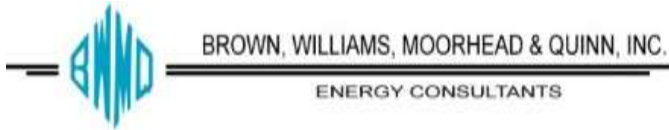
Exhibit No. DH-004

Page 14 of 14

Duff & Phelps - 2020 Valuation Handbook

CSRP Deciles Size Premium as of December 31, 2020 (Duff & Phelps Cost of Capital Navigator)

Breakdown of CSRP Deciles 1 - 10	Market Capitalization (in \$ Millions)		Return in Excess of CAPM
1-Largest	\$	29,025.803 – \$ 1,966,078.882	-0.22%
2	\$	13,178.743 – \$ 28,808.073	0.49%
3	\$	6,743.361 – \$ 13,177.828	0.71%
4	\$	3,861.858 – \$ 6,710.676	0.75%
5	\$	2,445.693 – \$ 3,836.536	1.09%
6	\$	1,591.865 – \$ 2,444.745	1.37%
7	\$	911.586 – \$ 1,591.765	1.54%
8	\$	451.955 – \$ 911.103	1.46%
9	\$	190.019 – \$ 451.800	2.29%
10-Smallest	\$	20.194 – \$ 189.831	5.01%



Proxy Group Capital Structures and Cost of Debt - Core Proxy Group
as of December 31, 2020

<u>Proxy Entity</u>	<u>Equity (\$ Millions)</u>		<u>Debt (\$ Millions)</u>		<u>Interest Expense (\$ Millions)</u>	<u>Debt Cost</u>	<u>Source</u>			
Kinder Morgan Inc.	\$	31,838	49.77%	\$	32,131	50.23%	\$	1,595	4.96%	2020 Form 10-K
Pembina Pipeline Corporation	\$	15,015	59.37%	\$	10,276	40.63%	\$	420	4.09%	2020 Form 40-F
TC Energy Corporation	\$	33,080	48.65%	\$	34,913	51.35%	\$	2,228	6.38%	2020 Form 40-F
The Williams Companies, Inc.	\$	14,583	40.47%	\$	21,451	59.53%	\$	1,192	5.56%	2020 Form 10-K
Proxy Group Average			49.57%			50.43%			5.25%	
Proxy Group Median			49.21%			50.79%			5.26%	
Proxy Group Low			40.47%			40.63%			4.09%	
Proxy Group High			59.37%			59.53%			6.38%	

Proxy Group Capital Structures and Cost of Debt - Expanded Proxy Group
as of December 31, 2020

<u>Proxy Entity</u>	<u>Equity (\$ Millions)</u>		<u>Debt (\$ Millions)</u>		<u>Interest Expense (\$ Millions)</u>	<u>Debt Cost</u>	<u>Source</u>			
Enbridge, Inc.	\$	64,363	50.61%	\$	62,819	49.39%	\$	2,790	4.44%	2020 Form 10-K
Kinder Morgan Inc.	\$	31,838	49.77%	\$	32,131	50.23%	\$	1,595	4.96%	2020 Form 10-K
ONEOK, Inc.	\$	6,042	29.81%	\$	14,228	70.19%	\$	713	5.01%	2020 Form 10-K
Pembina Pipeline Corporation	\$	15,015	59.37%	\$	10,276	40.63%	\$	420	4.09%	2020 Form 40-F
TC Energy Corporation	\$	33,080	48.65%	\$	34,913	51.35%	\$	2,228	6.38%	2020 Form 40-F
The Williams Companies, Inc.	\$	14,583	40.47%	\$	21,451	59.53%	\$	1,192	5.56%	2020 Form 10-K
Proxy Group Average			46.45%			53.55%			5.07%	
Proxy Group Median			49.21%			50.79%			4.99%	
Proxy Group Low			29.81%			40.63%			4.09%	
Proxy Group High			59.37%			70.19%			6.38%	

Docket No. G-39, Sub 47
 Exhibit __ (KM-002)
 Schedule 1

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Present Rates

Line No.	Description (A)	Present Rates 1/		
		(B)	(C)	(D)
		Monthly (\$/Mcf)	Monthly (\$/Dt)	Daily (\$/Dt)
1	Reservation Charges			
2	Zone 1A	0.79026	0.76354	0.02510
3	Zone 1B	1.22568	1.18424	0.03893
4	Zone 2	2.53828	2.45244	0.08063
5	Commodity Charges (\$/Dt)			
6	Zone 1A			0.00000
7	Zone 1B			0.00000
8	Zone 2			0.00000
9	Excess CFT Service (\$/Dt)			
10	Zone 1A			0.02510
11	Zone 1B			0.03893
12	Zone 2			0.08063
13	1/ Present Rates from Cardinal's Approved October 25, 2018 Federal Tax Cuts and			
14	Jobs Act Filing in Docket Nos. M-100, Sub 148 and G-39, Sub 42,			
15	effective January 1, 2018.			

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Proposed Rates

Line No.	Description (A)	Present Rates (B) \$	Proposed Rates (C) \$
1	Monthly Reservation Charges (\$/Mcf)		
2	Zone 1A	0.79026	0.89687
3	Zone 1B	1.22568	1.39104
4	Zone 2	2.53828	2.71483
5	Monthly Reservation Charges (\$/Dt)		
6	Zone 1A	0.76354	0.86654
7	Zone 1B	1.18424	1.34400
8	Zone 2	2.45244	2.62302
9	Daily Reservation Charges (\$/Dt)		
10	Zone 1A	0.02510	0.02849
11	Zone 1B	0.03893	0.04419
12	Zone 2	0.08063	0.08624
13	Commodity Charges (\$/Dt)		
14	Zone 1A	0.00000	0.00000
15	Zone 1B	0.00000	0.00000
16	Zone 2	0.00000	0.00000
17	Excess CFT Service (\$/Dt)		
18	Zone 1A	0.02510	0.02849
19	Zone 1B	0.03893	0.04419
20	Zone 2	0.08063	0.08624

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Original Cost of Property Used and Useful
in Public Service in North Carolina
For the Test Period Ended December 31, 2021, As Adjusted

<u>Line No.</u>	<u>Particulars</u>	<u>Amount</u>
	(A)	(B) \$
1	Intangible Plant	1,074,876
2	Transmission Plant	153,670,332
3	General Plant	1,768,644
4	Asset Retirement Obligation	<u>(6,013)</u>
5	Total Utility Plant	<u><u>156,507,839</u></u>

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Present Fair Value
For the Test Period Ended December 31, 2021, As Adjusted

<u>Line No.</u>	<u>Particulars</u>	<u>Amount</u>
	(A)	(B)
		\$
1	Not Applicable	

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Accumulated Depreciation, Depreciation Policy and Rates
 For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Accumulated Depreciation (A)	Amount (B) \$
1	Zone 1 Accumulated Depreciation	(18,616,395)
2	Zone 2 Accumulated Depreciation	(54,739,463)
3	ARO	(54,951)
4	Per Books as of December 31, 2021	<u>(73,410,809)</u>
5	Adjustment to remove ARO	54,951
6	Adjusted Accumulated Reserve	<u>(73,355,857)</u>

Depreciation Policy

7 Depreciation expense is computed monthly using the straight-line method
 8 applied to end-of the month depreciable base. Set forth below are the
 9 rates submitted in Docket No. G-39, Sub 46.

Depreciation Rates

	Description of Function	Rate
10	Intangible Plant Franchises	0.55%
11	Miscellaneous Intangible Plant	1.57%
12	Land Rights	1.93%
13	Rights of Way	1.97%
14	Compressor Station Structures and Improvements	3.51%
15	M & R Station Structures and Improvements	2.85%
16	Mains	2.50%
17	Compressor Station Equipment	2.94%
18	Measurement and Regulating Station Equipment	2.49%
	General Plant	
19	In House Developed Software	6.67%
20	Data Process & Computer Equipment	12.50%
21	Office Furniture and Equipment	10.00%
22	Tools, Shop and Garage Equipment	5.00%
23	Power Operated Equipment	10.00%
24	Communications Equipment	4.35%
25	Truck - 5 Years	16.67%
26	Fully Depreciated Plant	0.00%

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Materials and Supplies (Average Working Capital)
For the Test Period Ended December 31, 2021, As Adjusted

<u>Line No.</u>	<u>Particulars</u>	<u>13-Month Average Amount</u>
	(A)	(B)
		\$
1	Materials and Supplies	156,038
2	Line Pack	<u>190,321</u>
3	Total Working Capital	<u><u>346,360</u></u>

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Cash Working Capital
For the Test Period Ended December 31, 2021, As Adjusted

<u>Line No.</u>	<u>Particulars</u>	<u>Amount</u>
	(A)	(B) \$
1	Cardinal is not claiming a cash working capital allowance	

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Statement of Gross Revenue Received, Operating Expense
and Net Operating Income for Return on Investment
For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Particulars	Per Books December 31, 2021	Accounting and End of Period Adjustments	December 31, 2021, as Adjusted	Revenue Increase / Decrease	Proposed Rates
	(A)	(B)	(C)	(D)	(E)	(F)
		\$	\$	\$	\$	\$
	Operating Revenues 1/					
1	Transportation of Gas	11,786,686	(67,321)	(1) 11,719,365	919,530	(7) 12,638,895
2	Total Operating Revenues	<u>11,786,686</u>	<u>(67,321)</u>	<u>11,719,365</u>	<u>919,530</u>	<u>12,638,895</u>
	Operating Expenses 1/					
3	Operation and Maintenance Expenses	2,391,583	(30,607)	(2) 2,360,976	16,610	(8) 2,377,586
4	Depreciation Expense	3,846,736	10,018	(3) 3,856,754	191,712	(9) 4,048,466
5	Regulatory Debit / Credit	40,565	(40,565)	(4) 0	0	0
6	Income Taxes	971,861	0	971,861	155,424	(10) 1,127,285
7	Taxes other than Income Taxes	523,228	0	523,228	16,431	(11) 539,659
8	EDIT Amortization	(713,556)	185,105	(5) (528,451)	13,783	(12) (514,668)
9	Pipeline Integrity Deferral	0	0	0	82,411	(13) 82,411
10	Accretion Expense	37,546	(37,546)	(6) 0	0	0
11	Total Operating Expenses	<u>7,097,963</u>	<u>86,405</u>	<u>7,184,368</u>	<u>476,372</u>	<u>7,660,739</u>
12	Net Operating Income	<u>4,688,723</u>	<u>(153,726)</u>	<u>4,534,997</u>	<u>443,159</u>	<u>(14) 4,978,156</u>
	Original Cost Rate Base 1/					
13	Plant in Service	156,507,838	6,014	(15) 156,513,852	0	156,513,852
14	Accumulated Depreciation	(72,552,544)	0	(72,552,544)	(803,313)	(73,355,857)
15	Net Plant	83,955,294	6,014	83,961,308	(803,313)	83,157,994
16	Working Capital	346,360	0	346,360	0	346,360
17	Accumulated Deferred Income Taxes	(13,380,354)	(13,366,107)	(16) (26,746,461)	331,039	(17) (26,415,422)
18	Total Rate Base	<u>70,921,300</u>	<u>(13,360,093)</u>	<u>57,561,207</u>	<u>(472,274)</u>	<u>57,088,932</u>
19	Rate of Return on Rate Base			<u>7.88%</u>		<u>8.72%</u>

20 1/ See Schedule 8 page 3 for a description of the accounting and proforma adjustments.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 38
Return on Proprietary Capital and Overall Return of Investment
For the Test Period Ended December 31, 2021, and as Proposed

Line No.	Capital Structure (A)	Capitalization at December 31, 2021 (B) \$	Ratio (C)	Rate Base (D) \$	Embedded Cost (E)	Weighted Cost of Capital (F)	Net Operating Income (G) \$
1	Long-Term Debt	0	0.00%	0	0.00%	0.00%	0
2	Current Portion of Long Term Debt	0	0.00%	0	0.00%	0.00%	0
3	Proprietary Capital	<u>38,038,248</u>	<u>100.00%</u>	<u>57,561,207</u>	7.88%	<u>7.88%</u>	<u>4,534,997</u>
4	Total Capital	<u><u>38,038,248</u></u>	<u><u>100.00%</u></u>	<u><u>57,561,207</u></u>		<u><u>7.88%</u></u>	<u><u>4,534,997</u></u>
5						Rate Base	57,561,207
6						Return	4,534,997
After Adjustments for Proposed Rates							
7	Long-Term Debt	0	40.00% 1/	22,835,573	5.25%	2.10%	1,198,868
8	Current Portion of Long Term Debt	0	0.00%	0	0.00%	0.00%	0
9	Proprietary Capital	<u>0</u>	<u>60.00% 1/</u>	<u>34,253,359</u>	11.04%	<u>6.62%</u>	<u>3,779,288</u>
10	Total Capital	<u><u>0</u></u>	<u><u>100.00%</u></u>	<u><u>57,088,932</u></u>		<u><u>8.72%</u></u>	<u><u>4,978,156</u></u>
11						Rate Base	57,088,932
12						Return	4,978,156
13	1/ Hypothetical capital structure as proposed by Mr. David Haag in Exhibit No. DH-001.						

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Accounting and Pro Forma Adjustments
For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Description (A)	Filed Amount (B) \$
1	Revenue from Income Statement Dated December 31, 2021	11,786,686
	(1) Adjustments to Test Year to Normalize Revenue	
2	To remove tracked electric power revenue	(67,246)
3	To remove rounding due to billing	(75)
4	Statement G Adjustment	<u>(67,321)</u>
	(2) Operating Expenses	
5	To reverse accounting entry related to fuel tracker	(1,869,762)
6	To reverse accounting entry related to fuel tracker	1,916,509
7	To reverse accounting entry related to electric power tracker	(75,938)
8	To reverse accounting entry related to other tracked costs	(1,416)
9	Total Operating Expense, Statement H-1	<u>(30,607)</u>
10	(3) To remove ARO Depreciation	<u>10,018</u>
11	(4) To reflect the removal non-rate base items	<u>(40,565)</u>
	Adjustments to EDIT Flowback	
12	Excess Deferred Income Tax Amortization as recorded on books	(713,556)
13	To reflect the current flowback associated with changes in State Income Tax (Expense)	(528,451)
14	(5) Current Period Adjustment for EDIT Correction to Books	<u>185,105</u>
15	(6) To remove the accretion expense associated with ARO	<u>(37,546)</u>
16	(7) To reflect an increase in revenue at proposed rates	<u>919,530</u>
	(8) Adjustments to Test Year to Normalize Expenses	
17	To reflect new insurance premiums effective October 2021	22,908
18	To reflect signed lease renewal effective August 2021	2,528
19	To reflect rate case year legal expenses	2,400
20	To reflect amortization of rate case related consulting fees	(11,225)
21	Total Operating Expense, Statement H-1 Adjustment	<u>16,611</u>
22	(9) To reflect an increase in depreciation expense due to the proposed depreciation rates	<u>191,712</u>
23	(10) To reflect the tax adjustment associated with the change in revenue due to the proposed rates	<u>155,424</u>
24	(11) Taxes Other Than Income - Include Gross Receipts Tax	<u>16,431</u>
25	Current EDIT flowback associated with State Income Tax Changes down to 3% - Docket No. G-39, Sub 42	(528,451)
26	To reflect the proposed flowback associated with changes in Federal and State Income Tax	(514,668)
27	(12) Proposed Period Adjustment for EDIT	<u>(13,783)</u>
28	(13) Pipeline Integrity Deferral - From G-39, Sub 38 Settlement	<u>82,411</u>
29	(14) To reflect an increase in revenue to reflect the proposed Rate of Return	<u>443,159</u>
	Summary Revenue / Expense - Test Year Adjusted	
30	Total Revenue	12,638,895
31	Total Expense	7,633,175
32	Total Operating Income - Ties to Return on Investment	<u>5,005,719</u>
	Rate Base Adjustments	
33	(15) Change in Plant in Service - remove ARO	<u>6,014</u>
	ADIT	
34	To remove non-rate base deferred taxes	(26,654)
35	To include AFUDC Regulatory Asset	728,603
36	Excess ADIT from Docket G-39, Sub 42 and M-100, Sub 138	(13,737,017)
37	Remaining ADIT from Docket G-39, Sub 38	(331,039)
38	(16) Accumulated Deferred Income Taxes - removal of non-rate base deferred income taxes and to include AFUDC Regulatory Asset	<u>(13,366,107)</u>
39		
40	(17) Remove ADIT from Docket G-39, Sub 38 - Amortization has ended - See rate case proposal in Exhibit No. KM-001	<u>331,039</u>
41	Total Adjustments to Rate Base	<u>(13,029,054)</u>

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Comparative Income Statements

Line No.	Description (A)	Twelve Months Ended December 31,	
		2021 (B) \$	2020 (C) \$
1	Operating Revenues	11,786,686	11,819,316
	Operating Expenses		
2	Operation Expenses	1,774,033	1,521,360
3	Maintenance Expenses	617,550	718,418
4	Depreciation Expense and Amortization	3,856,754	3,815,401
5	Depreciation for Asset Retirement Costs	(10,018)	(150)
6	Regulatory Debits	68,093	(41,431)
7	(Less) Regulatory Credits	(27,528)	(39,153)
8	Taxes Other Than Income Taxes	523,228	558,350
9	Income Taxes-Federal	780,055	1,528,000
10	Income Taxes-Other	95,006	187,000
11	Provision for Deferred Income Taxes	96,800	(655,000)
12	Excess Deferred Income Tax Amortization	(713,556)	(697,422)
13	Accretion Expense	37,546	39,304
14	Total Utility Operating Expenses	<u>7,097,963</u>	<u>6,934,677</u>
15	Net Utility Operating Income	<u>4,688,723</u>	<u>4,884,639</u>
	Other Deductions and Other (Income)		
16	Interest and Dividend (Income)	(5,828)	(14,083)
17	Allowance for Other Funds Used During Construction	(1,932)	(78,251)
18	Other Deductions	15,139	15,339
19	Income Taxes - Federal	(1,955)	0
20	Interest on Long-Term Debt	1,419,394	1,423,283
21	Amortization of Debt Discount and Expense	12,994	12,994
22	Allowance for Other Funds Used During Construction-Credit	(716)	(29,026)
23	Total Other Deductions and Other (Income)	<u>1,437,096</u>	<u>1,330,256</u>
24	Net Income	<u><u>3,251,627</u></u>	<u><u>3,554,383</u></u>

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Comparative Balance Sheets

Line No.	Description (A)	December 31,	
		2021 (B) \$	2020 (C) \$
<u>Assets and Other Debits</u>			
	Utility Plant		
1	Utility Plant	156,507,838	156,727,080
2	Construction Work in Progress	(493,414)	310,072
3	Total Utility Plant	156,014,424	157,037,152
4	(Less) Accumulated Provision for Depr. Amort. Depl.	72,552,544	69,749,812
5	Net Utility Plant	83,461,880	87,287,340
6	System Balancing Gas	189,790	214,023
	Other Property and Investments		
7	Derivative Instrument Assets - Hedges	0	0
8	Total Other Property and Investments	0	0
	Current and Accrued Assets		
9	Cash & Temporary Cash Investments	9,665,992	2,546,920
10	Special Deposits	0	0
11	Customer Accounts Receivable	1,001,128	1,000,832
12	Other Accounts Receivable	460,752	0
13	Accounts Receivable from Associated Companies	0	0
14	Fuel Stock	0	0
15	Plant Materials and Operating Supplies	188,669	112,315
16	Stores Expense Undistributed	(107)	0
17	Prepayments	15,618,098	16,468,296
18	Interest and Dividends Receivable	0	0
19	Miscellaneous Current and Accrued Assets	0	0
20	Total Current and Accrued Assets	26,934,532	20,128,363
	Deferred Debits		
21	Unamortized Debt Expense	4,890	17,884
22	Other Regulatory Assets	1,939,685	1,913,598
23	Clearing Accounts	(49,500)	0
24	Unamortized Loss on Reacquired Debt	0	0
25	Miscellaneous Deferred Debits	57,105	37,054
26	Accumulated Deferred Income Taxes	3,360,738	3,692,894
27	Total Deferred Debits	5,312,918	5,661,430
28	Total Assets and Other Debits	115,899,120	113,291,156
<u>Liabilities and Other Credits</u>			
	Proprietary Capital		
29	Other Paid-in Capital	33,640,854	33,640,854
30	Retained Earnings	4,452,297	1,200,670
31	Accumulated Other Comprehensive Income	(370,579)	(960,560)
32	Total Proprietary Capital	37,722,572	33,880,964
	Long-Term Debt		
33	Other Long-Term Debt	0	45,000,000
34	Total Long-Term Debt	0	45,000,000
	Other Non-Current Liabilities		
35	Asset Retirement Obligations	725,754	708,847
36	Total Noncurrent Liabilities	725,754	708,847
	Current and Accrued Liabilities		
37	Current Portion of long-term debt	45,000,000	0
38	Accounts Payable	559,441	257,295
39	Accounts Payable to Associated Companies	73,587	99,981
40	Taxes Accrued	196	6,311
41	Interest Accrued	174,994	174,994
42	Miscellaneous Current and Accrued Liabilities	320,179	304,866
43	Derivative Instrument Liabilities - Hedges	373,398	1,140,379
44	Total Current and Accrued Liabilities	46,501,795	1,983,826
	Deferred Credits		
45	Other Deferred Credits	69,359	47,743
46	Other Regulatory Liabilities	14,138,548	14,870,328
47	Accumulated Deferred Income Taxes	16,741,092	16,799,448
48	Total Deferred Credits	30,948,999	31,717,519
49	Total Liabilities and Other Credits	115,899,120	113,291,156

CARDINAL PIPELINE COMPANY, LLC
 Overall Cost of Service
 For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Particulars (A)	Reference (B)	Amount (C) \$
1	O&M Expense	Stmt H-1	2,377,586
2	Pipeline Integrity Deferral	Sch H-1(e)	82,411
3	Depreciation, Depletion, and Amortization	Stmt H-2	4,048,466
4	Taxes: Other than Income Taxes	Stmt H-4	539,659
5	State and Local Income Taxes	Stmt H-3	122,664
6	Federal Income Taxes	Stmt H-3	1,004,621
7	Return	Stmt B	4,978,156
8	EDIT Amortization	Stmt H-3(a)	<u>(514,668)</u>
9	Total Cost of Service of Facilities		<u><u>12,638,895</u></u>

CARDINAL PIPELINE COMPANY, LLC
Rate Base and Return
For the Test Period Ended December 31, 2021, As Adjusted

<u>Line No.</u>	<u>Particulars</u> (A)	<u>Reference</u> (B)	<u>Amount</u> (C) \$
1	Gas Plant in Service	Stmt C or Sch 3	156,513,852
2	Accumulated Provision for Depreciation	Stmt D or Sch 5	<u>(73,355,857)</u>
3	Net Utility Plant		83,157,994
4	Working Capital	Stmt E	346,360
5	Accumulated Deferred Income Taxes	Stmt B-1	<u>(26,415,420)</u>
6	Total Rate Base		<u><u>57,088,934</u></u>
7	Proposed Rate of Return	Stmt F	<u>8.72%</u>
8	Return on Rate Base		<u><u>4,978,156</u></u>

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Accumulated Deferred Income Taxes
 For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Account No.	Description	Balance at December 31, 2021	Adjustment	Adjusted Balance
		(A)	(B)	(C)	(D)
			\$	\$	\$
1		FERC Account 190 - Noncurrent DFIT			
2	190	ARO	137,198	(137,198)	0
3	190	CIAC	(88,937)	88,937	0
4	190	Reg Liabilities - State Rate Change	69,518	(69,518)	0
5	190	Reg Liabilities - Current - State Rate Adj	13,389	(13,389)	0
6	190	Reg Liabilities - Reverse South Georgia	2,884,770	0	2,884,770
7	190	Accrual Audit Services - A/P	16,803	(16,803)	0
8	190	Derivatives - FAS 133 - Noncurrent	239,480	(239,480)	0
9	190	SDIT Derivatives - FAS133 - Noncurrent	(5,987)	5,987	0
10	190	DSIT - Account 190 - Noncurrent	(81,406)	9,286	(72,119)
11		Total Account 19006001 - Noncurrent DFIT	<u>3,184,828</u>	<u>(372,177)</u>	<u>2,812,651</u>
12		FERC Account 190 - Noncurrent DSIT			
13	190	ARO	16,333	(16,333)	0
14	190	CIAC	(11,779)	11,779	0
15	190	Reg Liabilities - State Rate Change	8,276	(8,276)	0
16	190	Reg Liabilities - Current - State Rate Adj	1,594	(1,594)	0
17	190	Reg Liabilities - Reverse South Georgia	343,425	0	343,425
18	190	Accrual Audit Services - A/P	2,000	(2,000)	0
19	190	Derivatives - FAS 133 - Noncurrent	28,509	(28,509)	0
20	190	SDIT - FAS133 - Noncurrent	(713)	713	0
21		Total Account 19007001 - Noncurrent DSIT	<u>387,646</u>	<u>(44,221)</u>	<u>343,425</u>
22		FERC Account 282 - Noncurrent DFIT			
23	282	Book Depreciation - Utility	14,883,965	0	14,883,965
24	282	Tax Depreciation - Utility	(29,418,345)	0	(29,418,345)
25	282	Equity AFUDC	(644,719)	0	(644,719)
26	282	Capitalized Software	(201,061)	0	(201,061)
27	282	PP&E Cost Adj - Other	683,563	0	683,563
28	282	PP&E Cost ADJ/ARO	(61,301)	61,301	0
29	282	Tax Gain/Loss-Sale PP&E	(290,365)	0	(290,365)
30	282	DSIT - Account 282 - Noncurrent	376,032	(1,533)	374,499
31		Total Account 28206001 - Noncurrent DFIT	<u>(14,672,232)</u>	<u>59,769</u>	<u>(14,612,463)</u>
32		FERC Account 282 - Noncurrent DSIT			
33	282	Book Depreciation - Utility	1,771,901	0	1,771,901
34	282	Tax Depreciation - Utility	(3,501,350)	0	(3,501,350)
35	282	Equity AFUDC	(76,752)	0	(76,752)
36	282	Capitalized Software	(23,936)	0	(23,936)
37	282	PP&E Cost Adj - Other	81,377	0	81,377
38	282	PP&E Cost ADJ/ARO	(7,298)	7,298	0
39	282	Tax Gain/Loss-Sale PP&E	(34,567)	0	(34,567)
40		Total Account 28207001 - Noncurrent DSIT	<u>(1,790,626)</u>	<u>7,298</u>	<u>(1,783,328)</u>

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Accumulated Deferred Income Taxes
 For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Account No.	Description	Balance at December 31, 2021	Adjustment	Adjusted Balance
		(A)	(B)	(C)	(D)
			\$	\$	\$
41		FERC Account 283 - Noncurrent DFIT			
42	283	AFUDC - Equity Gross-up	(152,910)		(152,910)
43	283	Reg Asset - NC - Fuel Tracker	(52,129)	52,129	0
44	283	ARO Regulatory Account	(154,148)	154,148	0
45	283	Reg Asset- C-Reserve	0	0	0
46	283	Reg Asset - Pipeline Integrity O&M Deferral	(86,506)	86,506	0
47	283	Reg Liabilities - C - Fuel Tracker	(26,663)	26,663	0
48	283	Reg Liabilities - C - Electric Power Deferral-Demand	(2,442)	2,442	0
49	283	Reg Liab - Current - Tracker Trans Def	28,002	(28,002)	0
50	283	DSIT - Account 283 - Noncurrent	11,476	(7,653)	3,822
51		Total Account 28306001 - Noncurrent DFIT	<u>(435,321)</u>	<u>286,233</u>	<u>(149,087)</u>
52		FERC Account 283 - Noncurrent DSIT			
53	283	AFUDC - Equity Gross-up	(18,204)	0	(18,204)
54	283	Reg Asset - NC - Fuel Tracker	(7,663)	7,663	0
55	283	ARO Regulatory Account	(18,351)	18,351	0
56	283	Reg Asset- C-Reserve	0	0	0
57	283	Reg Asset - Pipeline Integrity O&M Deferral	(10,298)	10,298	0
58	283	Reg Liabilities - C - Fuel Tracker	(3,174)	3,174	0
59	283	Reg Liabilities - C - Electric Power Deferral-Demand	(291)	291	0
60	283	Reg Liab - Current - Tracker Trans Def	3,334	(3,334)	0
61		Total Account 28307001 - Noncurrent DSIT	<u>(54,647)</u>	<u>36,444</u>	<u>(18,204)</u>
62		Total Deferred FIT	<u>(11,922,725)</u>	<u>(26,175)</u>	<u>(11,948,900)</u>
63		Total Deferred SIT	<u>(1,457,627)</u>	<u>(479)</u>	<u>(1,458,106)</u>
64		Total Deferred Taxes	<u>(13,380,352)</u>	<u>(26,654)</u>	<u>(13,407,006)</u>
65		Plus: Regulatory Asset - AFUDC	728,603	0	728,603
66		Plus: Regulatory Liability - Reverse South Georgia 1/	(331,039)	331,039	0
67		Plus: Regulatory Liability - Reverse South Georgia 2/	(13,737,017)	0	(13,737,017)
68		Total Deferred Taxes in Rate Base	<u>(26,719,805)</u>	<u>304,385</u>	<u>(26,415,420)</u>

69 1/ The remaining unamortized balance of Excess ADIT from Docket G-39, Sub 38 - 2017.

70 2/ The Excess ADIT created from the reduction in the Federal Income Tax Rate from 35% to 21% under the Tax Cuts and Jobs Act of 2017
 71 and the 2018 reduction of the North Carolina Corporate Income Tax Rate from 3% to 2.5%.

Docket No. G-39, Sub 47
Exhibit __ (KM-002)
Statement C

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Original Cost of Plant
For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Account Number	Title of Accounts (A)	Balance at December 31, 2021 (B) \$	Adjustments (C) \$	Balance, As Adjusted (D) \$
		<u>Intangible Plant</u>			
1	301	Organization	0		0
2	302	Franchises and Consents	176,783		176,783
3	303	Miscellaneous Intangible Plant	898,093		898,093
4		Total Intangible Plant	<u>1,074,876</u>	<u>0</u>	<u>1,074,876</u>
6		Fully Depreciated / Non-Depreciable	0		0
7		Total Depreciable Intangible Plant	<u>1,074,876</u>	<u>0</u>	<u>1,074,876</u>
		<u>Gas Production Plant</u>			
8	304.1	Land	0		0
9	311.0	Liquefied Pet. Gas Equipment	0		0
10		Total Gas Production Plant	<u>0</u>	<u>0</u>	<u>0</u>
		<u>Other Storage Plant</u>			
11	360	Land	0		0
12	361	Structures and Improvements	0		0
13	362	Gas Holders	0		0
14	363	Purification Equipment	0		0
15	363.1	Liquefaction Equipment	0		0
16	363.2	Vaporizing Equipment	0		0
17	363.3	Compressor Equipment	0		0
18	363.4	Measuring & Reg. Equipment	0		0
19	363.5	Other Equipment	0		0
20		Total Other Storage Plant	<u>0</u>	<u>0</u>	<u>0</u>
		<u>Transmission Plant</u>			
21	365.11	Land	658,662		658,662
22	365.12	Land Rights	96,745		96,745
23	365.2	Rights-of-way	4,011,679		4,011,679
24	366.1	Structures and Improvements	2,673,056		2,673,056
25	366.2	Structures and Improvements Measure	1,428,304		1,428,304
26	367	Mains	100,636,221		100,636,221
27	368	Compressor Station Equipment	35,401,074		35,401,074
28	369	Measuring and Reg. Sta. Equipment	8,764,591		8,764,591
29	371	Other Equipment	0		-
30		Total Transmission Plant	<u>153,670,332</u>	<u>0</u>	<u>153,670,332</u>
31		Fully Depreciated / Non-Depreciable	658,662		658,662
32		Total Depreciable Transmission Plant	<u>153,011,670</u>	<u>0</u>	<u>153,011,670</u>

Docket No. G-39, Sub 47
Exhibit __ (KM-002)
Statement C

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Original Cost of Plant
For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Account Number	Title of Accounts (A)	Balance at December 31, 2021 (B) \$	Adjustments (C) \$	Balance, As Adjusted (D) \$
<u>Distribution Plant</u>					
33	374	Land and Land Rights	0		0
34	375	Structures and Improvements	0		0
35	376	Mains	0		0
36	377	Compressor Station Equipment	0		0
37	378	Meas. and Reg. Sta. Equip. - General	0		0
38	379	Meas. and Reg. Sta. Equip. - City Gate	0		0
39	380	Services	0		0
40	380.2	House Piping	0		0
41	381	Meters	0		0
42	381.1	Meter Accessories	0		0
43	383	House Regulators	0		0
44	384	House Reg. Installations	0		0
45	385	Industrial Meas. and Reg. Sta. Equip.	0		0
46	386	Other Prop. on Customers' Premises	0		0
47	387	Other Equipment	0		0
48		Total Distributions Plant	0	0	0
<u>General Plant</u>					
49	390	Structures and Improvements fully depreciated	5,269		5,269
50	391.1	Office Furniture and Equipment - Developed Software	113,437		113,437
51	391.1	Furniture & Equipment - Software fully Depreciated	843,871		843,871
52	391.2	Office Furniture and Equipment - Data Process & Computer Equip.	0		0
53	391.3	Office Furniture and Equipment - Tower Office Furniture & Equip	32,228		32,228
54	392	Transportation Equipment	0		0
55	392	Transportation Equipment fully depreciated	3,761		3,761
56	394	Tools, Shop, and Garage Equipment	553,486		553,486
57	396	Power Operated Equipment	31,910		31,910
58	396	Power Operated Equipment fully depreciated	10,649		10,649
59	397	Communication Equipment	31,632		31,632
60	397	Communication Equipment - Original Cardinal	142,401		142,401
61		Total General Plant	1,768,644	0	1,768,644
62		Fully Depreciated / Non-Depreciable	1,005,951	0	1,005,951
63		Total Depreciable General Plant	762,693	0	762,693
64	372	Asset Retirement Obligations	(6,013)	6,013	0
65		Total Asset Retirement Obligations	(6,013)	6,013	0
66		Total Gas Plant in Service	156,507,839	6,013	156,513,852
67		Fully Depreciated / Non-Depreciable	1,664,612	0	1,664,612
68		Total Depreciable Plant	154,843,226	6,013	154,849,239

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 38
 Accumulated Provision for Depreciation, Depletion, and Amortization
 For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Account Number	Title of Accounts (A)	Balance at December 31, 2021 (B) \$	Adjustments (C) \$	Balance, As Adjusted (D) \$
		<u>Intangible Plant</u>			
1	301	Organization	0		0
2	302	Franchises and Consents	156,125		156,125
3	303	Miscellaneous Intangible Plant	535,129		535,129
4		Original Intangible Plant	<u>691,254</u>	<u>0</u>	<u>691,254</u>
5		<u>Gas Production Plant</u>			
6	304.1	Land	0		0
7	311.0	Liquefied Pet. Gas Equipment	0		0
8		Total Gas Production Plant	<u>0</u>	<u>0</u>	<u>0</u>
9		<u>Other Storage Plant</u>			
10	360	Land	0		0
11	361	Structures and Improvements	0		0
12	362	Gas Holders	0		0
13	363	Purification Equipment	0		0
14	363.1	Liquefaction Equipment	0		0
15	363.2	Vaporizing Equipment	0		0
16	363.3	Compressor Equipment	0		0
17	363.4	Measuring & Reg. Equipment	0		0
18	363.5	Other Equipment	0		0
19		Total Other Storage Plant	<u>0</u>	<u>0</u>	<u>0</u>
		<u>Transmission Plant</u>			
20	365.11	Land	0		0
21	365.12	Land Rights	50,145		50,145
22	365.2	Rights-of-way	2,070,392		2,070,392
23	366.1	Structures and Improvements	693,780		693,780
24	366.2	Structures and Improvements Measure	581,827		581,827
25	367	Mains	53,870,264		53,870,264
26	368	Compressor Station Equipment	9,930,073		9,930,073
27	369	Measuring and Reg. Sta. Equipment	3,941,201		3,941,201
28	371	Other Equipment	0		0
29		Original Transmission Plant	<u>71,137,681</u>	<u>0</u>	<u>71,137,681</u>
		<u>Distribution Plant</u>			
30		<u>Distribution Plant</u>			
31	374	Land and Land Rights	0		0
32	375	Structures and Improvements	0		0
33	376	Mains	0		0
34	377	Compressor Station Equipment	0		0
35	378	Meas. and Reg. Sta. Equip. - General	0		0
36	379	Meas. and Reg. Sta. Equip. - City Gate	0		0
37	380	Services	0		0
38	380.2	House Piping	0		0
39	381	Meters	0		0
40	381.1	Meter Accessories	0		0
41	383	House Regulators	0		0
42	384	House Reg. Installations	0		0
43	385	Industrial Meas. and Reg. Sta. Equip.	0		0
44	386	Other Prop. on Customers' Premises	0		0
45	387	Other Equipment	0		0
46		Total Distributions Plant	<u>0</u>	<u>0</u>	<u>0</u>
		<u>General Plant</u>			
47	390	Structures and Improvements fully depreciated	5,269		5,269
48	391.1	Office Furniture and Equipment - Developed Software	66,960		66,960
49	391.1	Furniture & Equipment - Software (fully depreciated)	843,871		843,871
50	391.2	Office Furniture and Equipment - Data Process & Computer Equip.	0		0
51	391.3	Office Furniture and Equipment - Tower Office Furniture & Equip	26,882		26,882
53	392	Transportation Equipment	0		0
52	392	Transportation Equipment (fully depreciated)	3,761		3,761
54	394	Tools, Shop, and Garage Equipment	379,861		379,861
55	396	Power Operated Equipment	27,542		27,542
56	396	Power Operated Equipment (fully depreciated)	10,649		10,649
57	397	Communication Equipment	19,725		19,725
58	397	Communication Equipment - Original (fully depreciated)	142,401		142,401
59		Total General Plant	<u>1,526,922</u>	<u>0</u>	<u>1,526,922</u>
60		Total Accumulated Reserve less ARO and RWIP	<u>73,355,857</u>	<u>0</u>	<u>73,355,857</u>
61	372	Asset Retirement Obligations	54,951	(54,951)	0
62		Total Asset Retirement Obligations	<u>54,951</u>	<u>(54,951)</u>	<u>0</u>
63		Total	<u>73,410,809</u>	<u>(54,951)</u>	<u>73,355,857</u>

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Working Capital
For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Month	Line Pack	Materials and Supplies	Total
	(A)	(B)	(C)	(D)
		\$	\$	\$
1	December - 2020	214,023	112,314	326,338
2	January - 2021	214,023	112,314	326,338
3	February - 2021	216,937	112,314	329,252
4	March - 2021	194,912	114,587	309,499
5	April - 2021	105,759	115,821	221,580
6	May - 2021	211,664	140,972	352,636
7	June - 2021	141,781	189,942	331,723
8	July - 2021	219,346	190,235	409,581
9	August - 2021	204,086	187,421	391,507
10	September - 2021	188,392	187,524	375,915
11	October - 2021	204,452	187,615	392,067
12	November - 2021	169,010	188,771	357,781
13	December - 2021	189,790	188,669	378,459
14	Total	<u>2,474,176</u>	<u>2,028,500</u>	<u>4,502,676</u>
15	Thirteen Month Average	<u>190,321</u>	<u>156,038</u>	<u>346,360</u>

Docket No. G-39, Sub 47
Exhibit __ (KM-002)
Statement F

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Rate of Return, Cost of Capital, and Cost of Debt
As Proposed

<u>Line No.</u>	<u>Capital Structure</u> (A)	<u>Percent of Capital</u> (B)	<u>Cost</u> (C)	<u>Weighted Cost of Capital</u> (D)
1	Long-Term Debt	40.00% 1/	5.25%	2.10%
2	Current Portion of Long Term Debt	0.00%	0.00%	0.00%
3	Proprietary Capital	<u>60.00% 1/</u>	11.04%	<u>6.62%</u>
4	Total Capital	<u>100.00% 1/</u>		<u>8.72%</u>
5	1/ Hypothetical capital structure as proposed by Mr. David Haag in Exhibit No. DH-001.			

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Quantities and Revenues
 For the Test Period Ended December 31, 2021, As Adjusted
 And As Proposed

Line No.	Rate Schedule (A)	Annual Reservation Quantity (B) Mcf	Annual Reservation Quantity (C) Dth	Usage Quantity (D) Dth	Annual Revenue (E) \$
Annual Test Period Ended December 31, 2021					
1	Zone 1A Reservation	60,000	62,100	0	568,929
2	Zone 1A Usage	0	0	1,677,731	0
3	Zone 1B Reservation	70,000	72,450	0	1,029,475
4	Zone 1B Usage	0	0	19,103,530	0
5	Zone 2 Reservation	332,270	343,900	0	10,120,961
6	Zone 2 Usage	0	0	65,354,955	0
7	Total	<u>462,270</u>	<u>478,450</u>	<u>86,136,216</u>	<u>11,719,365</u> 1/
As Proposed					
8	Zone 1A Reservation	60,000	62,100	0	645,748
9	Zone 1A Usage	0	0	1,677,731	0
10	Zone 1B Reservation	70,000	72,450	0	1,168,474
11	Zone 1B Usage	0	0	19,103,530	0
12	Zone 2 Reservation	332,270	343,900	0	10,824,673
13	Zone 2 Usage	0	0	65,354,955	0
14	Total	<u>462,270</u>	<u>478,450</u>	<u>86,136,216</u>	<u>12,638,895</u>
Difference (Proposed less Actual)					
15	Zone 1A Reservation	0	0	0	76,819
16	Zone 1A Usage	0	0	0	0
17	Zone 1B Reservation	0	0	0	138,999
18	Zone 1B Usage	0	0	0	0
19	Zone 2 Reservation	0	0	0	703,712
20	Zone 2 Usage	0	0	0	0
21	Total	<u>0</u>	<u>0</u>	<u>0</u>	<u>919,530</u>
22	% Difference				7.85%
23	Zone 1A change				13.50%
24	Zone 1B change				13.50%
25	Zone 2 change				6.95%
25	Notes:				
26	1/ Revenue at December 31, 2021, as Adjusted				
27	Annual Revenue at Current Rates		11,786,686		
28	Tracked Electric Power Revenue		(67,246)		
29	Rounding - due to Billing		(75)		
30	Income Statement dated 12/31/2021		<u>11,719,365</u>		

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Operation and Maintenance Expenses
For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Acct. No.	Description	Test Period												Adjustment	Total As Adjusted	
			1/31/2021	2/28/2021	3/31/2021	4/30/2021	5/31/2021	6/30/2021	7/31/2021	8/31/2021	9/30/2021	10/31/2021	11/30/2021	12/31/2021			Total
		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)
			\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
1	806	Imbalance Gas	73,650	15,370	(9,908)	(82,737)	96,242	(16,614)	(24,263)	(45,002)	(34,991)	(30,635)	(30,372)	50,657	(38,601)	38,601	0
2	810	Gas Used for Compressor Station Fuel	135,811	136,512	245,874	83,151	71,617	110,359	118,901	142,559	165,771	190,590	242,158	273,206	1,916,509	(1,916,509)	0
3	812	Gas used for Other Utility Operations - Credit	(209,461)	(151,882)	(235,965)	(414)	(167,859)	(93,745)	(94,639)	(97,558)	(130,780)	(159,955)	(211,787)	(323,864)	(1,877,907)	1,877,907	0
4	813	Other Gas Supply Expenses / Gains or Losses	172,606	148,968	257,991	89,566	61,954	163,628	17,074	112,818	146,474	143,894	245,813	308,976	1,869,762	(1,869,762)	0
5	850	Operation Supervision & Engineering	3,128	3,706	3,553	2,308	27,288	(22,325)	3,344	38	0	0	0	0	21,041	0	21,041
6	851	System Control & Load Dispatching	2,726	1,363	0	2,792	1,407	1,407	2,111	1,407	0	2,102	676	1,876	17,869	0	17,869
7	852	Communication System Expenses	3,173	1,413	1,218	2,144	147	2,004	21	520	790	347	695	0	12,472	0	12,472
8	853	Compressor Station Labor & Expenses	4,606	10,316	11,605	141,562	26,030	31,778	14,979	(6,330)	(59,744)	15,224	26,339	41,503	257,867	0	257,867
9	854	Gas for Compressor Station Fuel	(135,811)	(136,512)	(245,874)	(83,151)	(71,617)	(110,359)	(118,901)	(142,559)	(165,771)	(190,590)	(242,158)	(273,206)	(1,916,509)	1,916,509	0
10	855	Other Fuel & Power for Compressor Stations	6,323	6,023	6,106	5,268	5,040	6,228	0	14,406	(7,393)	0	33,937	75,938	(75,938)	0	0
11	856	Mains Expenses	21,069	17,996	16,829	67,219	16,890	36,460	8,710	52,028	30,964	80,036	37,710	55,312	441,222	1,112	442,334
12	857	Measuring & Regulating Station Expenses	1,131	1,067	1,202	5,718	894	705	1,041	1,612	21,535	8,435	97,528	(22,743)	118,124	0	118,124
13	859	Other Expenses	0	31	38	0	1,055	0	263	0	0	301	0	0	1,689	0	1,689
14	860	Rents	0	0	0	250	0	0	0	0	0	0	0	0	250	0	250
15	861	Maintenance Supervision & Engineering	0	0	0	0	0	0	52,700	(52,700)	0	0	0	0	0	0	0
16	862	Maintenance of Structures & Improvements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	863	Maintenance of Mains	13,487	21,465	17,806	29,778	353	16,222	23,940	37,244	(10,110)	9,465	12,834	10,985	183,469	0	183,469
18	864	Maintenance of Compressor Station Equipment	17,213	14,152	13,833	9,518	(9,111)	(41,339)	4,905	196,761	2,527	114	5,111	7,373	221,058	0	221,058
19	865	Maintenance of M&R Station Equipment	193	2,775	2,009	3,315	2,822	7,973	1,533	0	0	4,728	1,699	0	27,046	0	27,046
20	866	Maintenance of Communication Equipment	314	542	519	0	278	413	0	0	0	0	0	0	2,066	0	2,066
21	867	Maintenance of Other Equipment	1,855	24,273	2,311	26,518	1,815	17,447	1,437	(389)	106,126	2,195	325	0	183,911	0	183,911
22	920	Administrative & General Salaries	4,811	4,480	5,937	4,840	11,212	9,210	16,319	9,158	12,707	12,627	12,021	2,898	106,219	0	106,219
23	921	Office Supplies and Expenses	0	0	0	0	0	0	0	0	0	0	0	150	150	0	150
24	922	Administrative Expenses Transferred	0	0	0	0	0	0	8,544	(8,544)	0	0	0	0	0	0	0
25	923	Outside Services Employed	8,334	8,812	9,103	9,397	9,037	9,217	9,076	10,001	8,869	8,844	21,331	9,128	121,149	2,400	123,549
26	924	Property Insurance	21,348	21,348	21,348	21,348	21,348	21,348	21,348	21,348	21,348	21,348	23,754	23,754	260,985	24,063	285,047
27	925	Injury and Damages	10,407	10,407	10,407	10,407	10,407	10,407	10,407	10,407	10,407	10,407	10,292	10,292	124,653	(1,155)	123,498
28	926	Employee Pensions and Benefits	16,083	15,794	18,017	15,396	17,237	16,169	13,811	22,409	14,188	18,680	17,137	14,505	199,427	0	199,427
29	928	Regulatory Commission Expenses	0	500	0	0	0	0	0	0	0	0	61,225	0	61,225	(11,225)	50,000
30	930.2	Miscellaneous General Expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	932	Maintenance of General Plant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32		Total	172,998	178,918	153,957	364,194	134,486	176,591	92,661	279,635	132,917	148,158	332,330	224,739	2,391,583	(13,997)	2,377,586
33										806-813	Reverse Fuel Related Accounting Entry					(1,869,762)	
34										854	Reverse Fuel Related Accounting Entry					1,916,509	
35										855	Reverse Electric Power Related Accounting Entry					(75,938)	
36										856	Reverse Other Tracked Costs					(1,416)	
37											Total - Tracked Cost Adjustments					(30,607)	
38										924	Property Insurance					24,063	
39										925	General Liability Insurance					(1,155)	
40											Total - Insurance Adjustments					22,908	
41										856	Mains Expenses					2,528	
42											Total - Rent Adjustment					2,528	
43																	
44										923	External Legal Expense					2,400	
45										928	Consultant Fees					(11,225)	
46											Total - Rate Case Expense Adjustments					(8,825)	
											Total O&M Adjustments					(13,997)	

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Cost Classification of Operating Expense Amounts
 For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Acct. No.	Description	Total As Adjusted (B) \$	Fixed (C) \$	Variable (D) \$
1	806	Imbalance Gas	0	0	0
2	810	Gas Used for Compressor Station Fuel	0	0	0
3	812	Gas used for Other Utility Operations - Credit	0	0	0
4	813	Other Gas Supply Expenses / Gains or Losses	0	0	0
5	850	Operation Supervision & Engineering	21,041	21,041	0
6	851	System Control & Load Dispatching	17,869	17,869	0
7	852	Communication System Expenses	12,472	12,472	0
8	853	Compressor Station Labor & Expenses	257,867	257,867	0
9	854	Gas for Compressor Station Fuel	0	0	0
10	855	Other Fuel & Power for Compressor Stations	0	0	0
11	856	Mains Expenses	442,334	442,334	0
12	857	Measuring & Regulating Station Expenses	118,124	118,124	0
13	859	Other Expenses	1,689	1,689	0
14	860	Rents	250	250	0
15	861	Maintenance Supervision & Engineering	0	0	0
16	862	Maintenance of Structures & Improvements	0	0	0
17	863	Maintenance of Mains	183,469	183,469	0
18	864	Maintenance of Compressor Station Equipment	221,058	221,058	0
19	865	Maintenance of M&R Station Equipment	27,046	27,046	0
20	866	Maintenance of Communication Equipmment	2,066	2,066	0
21	867	Maintenance of Other Equipment	183,911	183,911	0
22	920	Administrative & General Salaries	106,219	106,219	0
23	921	Office Supplies and Expenses	150	150	0
24	922	Administrative Expenses Transferred	0	0	0
25	923	Outside Services Employed	123,549	123,549	0
26	924	Property Insurance	285,047	285,047	0
27	925	Injury and Damages	123,498	123,498	0
28	926	Employee Pensions and Benefits	199,427	199,427	0
29	928	Regulatory Commission Expenses	50,500	50,500	0
30	930.2	Miscellaneous General Expenses	0	0	0
31	932	Maintenance of General Plant	0	0	0
32		Total	<u>2,377,586</u>	<u>2,377,586</u>	<u>0</u>

Docket No. G-39, Sub 47
Exhibit __ (KM-002)
Schedule H-1(a)

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Tracked Costs Workpaper
Adjustment 1
For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Account Number	Description (A)	2021 Amount (B) \$	Total Adjustment (C) \$
1	806	Imbalance Gas	(38,601.36)	38,601.36
2	810	Gas Used for Compressor Station Fuel	1,916,508.75	(1,916,508.75)
3	812	Gas used for Other Utility Operations - Credit	(1,877,907.39)	1,877,907.39
4	813	Other Gas Supply Expenses / Gains or Losses	1,869,762.09	(1,869,762.09)
5		Total to Reverse Fuel Related Accounting Entry	1,869,762.09	(1,869,762.09)
6	854	Reverse Fuel Related Accounting Entry	(1,916,509)	1,916,509
7	855	Reverse Electric Power Related Accounting Entry	75,938	(75,938)
8	856	Reverse Other Tracked Costs	441,222	(1,416)
9		Total - Tracked Cost Adjustments	<u>470,413</u>	<u>(30,607)</u>

Docket No. G-39, Sub 47
Exhibit __ (KM-002)
Schedule H-1(b)

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Property and General Liability Insurance Workpaper
Adjustment 2
For the Test Period Ended December 31, 2021, As Adjusted

<u>Line No.</u>	<u>Account Number</u>	<u>Description</u>	<u>2021 Amount</u>	<u>Adjustment</u>	<u>Total As Adjusted</u>
		(A)	(B)	(C)	(D)
			\$	\$	\$
1	924	Property Insurance	260,985	24,063	285,047
2	925	General Liability Insurance	<u>124,653</u>	<u>(1,155)</u>	<u>123,498</u>
3		Total Insurance	<u><u>385,638</u></u>	<u><u>22,908</u></u>	<u><u>408,545</u></u>

Docket No. G-39, Sub 47
Exhibit __ (KM-002)
Schedule H-1(c)

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Rent Expense Workpaper
Adjustment 3
For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Account Number	Description (A)	2021 Amount (B) \$	Adjustment (C) \$	Total As Adjusted (D) \$
1	856	Mains Expenses	26,243	2,528	28,771
2		Total Rate Case Expenses	<u>26,243</u>	<u>2,528</u>	<u>28,771</u> 1/
3	1/ Details of Adjustment				
4		Year No.	Rent Period	Monthly \$	Annual \$
5		Year 1	August 1, 2021 - July 31, 2022	2,258	27,096
6		Year 2	August 1, 2022 - July 31, 2023	2,325	27,900
7		Year 3	August 1, 2023 - July 31, 2024	2,395	28,740
8		Year 4	August 1, 2024 - July 31, 2025	2,468	29,616
9		Year 5	August 1, 2025 - July 31, 2026	2,542	30,504
10		Total			<u>143,856</u>
11		Normalized (5 years)			<u>28,771</u>

Docket No. G-39, Sub 47
 Exhibit __ (KM-002)
 Schedule H-1(d)

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Rate Case Expense Workpaper
 Adjustment 4 and 5
 For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Account Number	Description	2021 Amount	Adjustment	Total As Adjusted
		(A)	(B)	(C)	(D)
			\$	\$	\$
1	923	External Legal Expense	12,000	2,400	14,400
2	928	Consultant Fees	<u>61,225</u>	<u>(11,225)</u>	<u>50,000</u>
3		Total Rate Case Expenses	<u><u>73,225</u></u>	<u><u>(8,825)</u></u>	<u><u>64,400</u></u>

Docket No. G-39, Sub 47
 Exhibit __ (KM-002)
 Schedule H-1(e)

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Pipeline Integrity Management Deferral Workpaper
 For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Account Number	Description (A)	Amount (B) \$
1	850	Operation Supervision & Engineering	1,589
2	856	Mains Expenses	410,059
3	863	Maintenance of Mains	408
4		Total Integrity Management Assessment	<u>412,056</u>
5		Amortization Period (Years)	<u>5</u>
6		Yearly Amortization	<u>82,411</u>

Docket No. G-39, Sub 47
Exhibit __ (KM-002)
Statement H-2

CARDINAL PIPELINE COMPANY, LLC
Depreciation, Depletion and Amortization Expense
For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Description of Function (A)	Depreciable Gas Plant As Adjusted (B) \$	Current Annual Depr. Rate (C)	Proposed Annual Depr. Rate (D)	Expense Per Books (E) \$	Adjustment (F) \$	Depreciation Expense (G) \$	
1	Franchises and Consents	302	176,783	4.00%	0.55%	7,071	(6,099)	972
2	Miscellaneous Intangible Plant	303	898,093	2.19%	1.57%	19,668	(5,568)	14,100
3	Land Rights	365.12	96,745	2.00%	1.93%	1,935	(68)	1,867
4	Rights-of-way	365.2	4,011,679	2.00%	1.97%	80,234	(1,204)	79,030
5	Structures and Improvements	366.1	2,673,056	3.00%	3.51%	80,192	13,632	93,824
6	Structures and Improvements Measure	366.2	1,428,304	2.63%	2.85%	37,564	3,143	40,707
7	Mains	367	100,636,221	2.20%	2.50%	2,213,997	301,909	2,515,906
8	Compressor Station Equipment	368	35,401,074	3.03%	2.94%	1,072,653	(31,861)	1,040,792
9	Measuring and Reg. Sta. Equipment	369	8,764,591	3.18%	2.49%	278,714	(60,476)	218,238
10	Land	365.11	0	0.00%	0.00%	0	0	0
11	Intangible, Transmission and Land		<u>154,086,547</u>			<u>3,792,028</u>	<u>213,408</u>	<u>4,005,436</u>
12	% of Gross Plant (Net of General Plant)							
	General Plant 1/							
13	Structures and Improvements fully depreciated	390	0	0.00%	10.00%	0	0	0
14	Office Furniture and Equipment - Developed Software	391.1	113,437	7.69%	6.67%	8,723	(1,157)	7,566
15	Furniture & Equipment - Software (fully depreciated)	391.1	0	0.00%	0.00%	0	0	0
16	Office Furniture and Equipment - Data Process & Computer Equip.	391.2	0	25.00%	12.50%	0	0	0
17	Office Furniture and Equipment - Tower Office Furniture & Equip	391.3	32,228	8.33%	10.00%	2,685	538	3,223
18	Transportation Equipment	392	0	18.00%	16.67%	0	0	0
19	Transportation Equipment (fully depreciated)	392	0	0.00%	0.00%	0	0	0
20	Tools, Shop, and Garage Equipment	394	553,486	8.33%	5.00%	46,105	(18,431)	27,674
21	Power Operated Equipment	396	31,910	7.92%	10.00%	2,527	664	3,191
22	Power Operated Equipment (fully depreciated)	396	0	0.00%	0.00%	0	0	0
23	Communication Equipment	397	31,632	7.14%	4.35%	2,259	(883)	1,376
24	Communication Equipment - Original (fully depreciated)	397	0	0.00%	0.00%	0	0	0
25	General Plant Allocated 1/		<u>762,693</u>			<u>62,299</u>	<u>(19,269)</u>	<u>43,030</u>
26	Total Depreciable Gas Plant in Service		<u>154,849,239</u>			<u>3,854,327</u>	<u>194,140</u>	<u>4,048,466</u>
27	Amount Per Books for the 12 Months Ending December 31, 2021							<u>3,856,754</u>
28	Difference							<u>191,712</u>
29	1/ General Plant Allocated is allocated among the zones using a Gross Plant Allocation.							

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Allowance for Income Taxes
 For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Particulars (A)	Amount (B) \$
1	Rate Base	57,088,934
2	Return	4,978,156
3	Interest and Debt Expense	(1,198,868)
4	Return After Federal Income Tax Adjustments	3,779,288
5	Federal Income Taxes	1,004,621
6	State Income Taxes	122,664
7	Total Income Taxes	<u>1,127,285</u>
8	State Income Taxes:	
9	Net State Taxable Income (Line 4/(1-(0.21+(0.025*(1-0.21))))	4,906,573
10	North Carolina Tax Rate	<u>2.50%</u>
11	State Income Tax	<u>122,664</u>
12	Federal Income Taxes:	
13	Net Federal Taxable Income (Line 12 - Line 14)	4,783,909
14	Federal Income Tax Rate	<u>21.00%</u>
15	Federal Income Tax	<u>1,004,621</u>

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Reverse South Georgia Workpaper
 For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Particulars (A)	Amount (B) \$
1	Regulatory Liability - Principle Balance	10,527,845
2	Tax Gross Up	3,209,172
3	Total Regulatory Liability - Income Tax Rate Reduction 1/	<u>13,737,017</u>
	<u>Average Remaining Life (ARL)</u>	
4	Depreciable Plant	154,086,547
5	Less Accumulated Depreciation Reserve	<u>(71,607,066)</u>
6	Total Net Depreciable Plant	82,479,481
7	Depreciation Expense	3,090,159
8	Total ARL (Years)	26.69
9	Principle Amortization	(394,434)
10	Gross Up Amount	<u>(120,234)</u>
11	Total RSG Amortization	(514,668)
12	1/ See the testimony of Mr. Michael Cousino in Exhibit MC-001	

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Taxes Other Than Income Taxes
For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Particulars	Amount December 31, 2021
	(A)	(B) \$
1	Ad Valorem - North Carolina	481,020
2	Payroll	42,208
3	Other - Public Utility Regulatory Fee	1/ 16,431
4	Total Taxes Other than Income Tax	<u>539,659</u>
5	1/ (.0013 * revenue)	

CARDINAL PIPELINE COMPANY, LLC
 Cost of Service / Cost Allocation
 For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Item (A)	Zone 1 Demand (B) \$	Zone 1 Commodity (C) \$	Zone 2 Demand (D) \$	Zone 2 Commodity (E) \$	Total (F) \$
1	Gross Plant	28,166,694	0	128,347,157	0	156,513,852
2	Accumulated Depreciation	<u>(18,616,395)</u>	<u>0</u>	<u>(54,739,463)</u>	<u>0</u>	<u>(73,355,857)</u>
3	Net Plant	9,550,300	0	73,607,695	0	83,157,995
4	Materials and Supplies	1/ 62,345	0	284,015	0	346,360
5	Deferred Income Taxes	3/ (2,194,181)	0	(24,221,239)	0	(26,415,420)
6	Rate Base	<u>7,418,464</u>	<u>0</u>	<u>49,670,471</u>	<u>0</u>	<u>57,088,935</u>
7	Overall Rate of Return	8.72%		8.72%		8.72%
8	Overall Return on Rate Base	646,890	0	4,331,265	0	4,978,155
9	O&M Expenses	2/ 308,848	0	2,068,738	0	2,377,586
10	Pipeline Integrity Deferral	2/ 10,705	0	71,706	0	82,411
11	Depreciation	698,098	0	3,350,369	0	4,048,466
12	Taxes Other Than Income	2/ 70,102	0	469,557	0	539,659
13	Income Taxes	2/ 146,434	0	980,851	0	1,127,285
14	EDIT Amortization	2/ (66,855)	0	(447,813)	0	(514,668)
15	Total Cost of Service	<u>1,814,222</u>	<u>0</u>	<u>10,824,673</u>	<u>0</u>	<u>12,638,895</u>
16	Zonal Cost of Service	<u>1,814,222</u>		<u>10,824,673</u>		
17	1/ Allocated between zones based on Gross Plant Factor:					
18	Zone 1 Gross Plant	28,166,694	18.00%			
19	Zone 2 Gross Plant	128,347,157	82.00%			
20	Total	156,513,852	100.00%			
21	2/ Allocated between zones based on Rate Base Factor:					
22	Zone 1 Rate Base	7,418,464	12.99%			
23	Zone 2 Rate Base	49,670,471	87.01%			
24	Total	57,088,934	100.00%			
25	3/ Calculation of Deferred Income Taxes:					
26	Total Deferred Income Taxes (Statement B-1)	<u>(26,415,420)</u>				
27	Calculation of Deferred Income Taxes for Zone 1					
28	<u>Book Basis in Plant @ December 31, 2021</u>					
29	Gross Plant (Statement D, Line 27)	28,166,694				
30	Accumulated Depreciation	<u>(18,616,395)</u> 1/				
31	Net Book Plant	9,550,300				
32	<u>Tax Basis in Plant @ December 31, 2021</u>					
33	Gross Plant (Statement D, Line 27)	28,166,694				
34	Accumulated Depreciation	<u>(28,166,694)</u>				
35	Net Tax Plant	0				
36	<u>Deferred Tax Computation</u>					
37	Book Basis (over) Tax Basis	(9,550,300)				
38	Effective Income Tax Rate (1-((1-2.5%)*(1-21%))	22.98%				
39	Deferred Income Taxes for Zone 1	<u>(2,194,181)</u>				
40	Calculation of Deferred Income Taxes for Zone 2					
41	Total Deferred Income Taxes (Line 25)	<u>(26,415,420)</u>				
42	Deferred Income Taxes for Zone 1 (Line 38)	<u>(2,194,181)</u>				
43	Deferred Income Taxes for Zone 2	<u>(24,221,239)</u>				

OFFICIAL COPY

MAY 15 2022

Docket No. G-39, Sub 47
 Exhibit __ (KM-002)
 Statement I-1(a)

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Depreciation, Depletion and Amortization Expense Detail - Functionalized
 For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Description of Function (A)	Account Number (B)	Gas Plant As Adjusted (C) \$	Zone 1 Gas Plant (D) \$	Zone 2 Gas Plant (E) \$	Proposed Annual Depr. Rate (F)	Zone 1 Depreciation Expense (G) \$	Zone 2 Depreciation Expense (H) \$	Total Depreciation Expense (I) \$	
1	Franchises and Consents	302	176,783	-	176,783	0.55%	-	972	972	
2	Miscellaneous Intangible Plant	303	898,093	136,135	761,958	1.57%	2,137	11,963	14,100	
3	Land Rights	365.12	96,745	-	96,745	1.93%	-	1,867	1,867	
4	Rights-of-way	365.2	4,011,679	15,515	3,996,164	1.97%	306	78,724	79,030	
5	Structures and Improvements	366.1	2,673,056	-	2,673,056	3.51%	-	93,824	93,824	
6	Structures and Improvements Measure	366.2	1,428,304	345,141	1,083,164	2.85%	9,837	30,870	40,707	
7	Mains	367	100,636,221	25,212,809	75,423,412	2.50%	630,320	1,885,585	2,515,906	
8	Compressor Station Equipment	368	35,401,074	-	35,401,074	2.94%	-	1,040,792	1,040,792	
9	Measuring and Reg. Sta. Equipment	369	8,764,591	1,919,094	6,845,497	2.49%	47,785	170,453	218,238	
10	Land	365.11	658,662	104,151	554,511	0.00%	-	-	-	
11	Intangible, Transmission and Land		<u>154,745,208</u>	<u>27,732,844</u>	<u>127,012,364</u>		<u>690,385</u>	<u>3,315,051</u>	<u>4,005,436</u>	
12	% of Gross Plant (Net of General Plant)		100%	17.92%	82.08%					
	General Plant 1/									
13	Structures and Improvements fully depreciated	390	5,269	944	4,325	10.00%	-	-	-	
14	Office Furniture and Equipment - Developed Software	391.1	113,437	20,330	93,108	6.67%	1,356	6,210	7,566	
15	Furniture & Equipment - Software (fully depreciated)	391.1	843,871	151,235	692,636	0.00%	-	-	-	
16	Office Furniture and Equipment - Data Process & Computer Equip.	391.2	-	0	-	12.50%	-	-	-	
17	Office Furniture and Equipment - Tower Office Furniture & Equip	391.3	32,228	5,776	26,452	10.00%	578	2,645	3,223	
18	Transportation Equipment	392	-	0	-	0.00%	-	-	-	
19	Transportation Equipment (fully depreciated)	392	3,761	674	3,087	16.67%	-	-	-	
20	Tools, Shop, and Garage Equipment	394	553,486	99,194	454,292	5.00%	4,960	22,715	27,675	
21	Power Operated Equipment	396	31,910	5,719	26,191	10.00%	572	2,619	3,191	
22	Power Operated Equipment (fully depreciated)	396	10,649	1,908	8,740	0.00%	-	-	-	
23	Communication Equipment	397	31,632	5,669	25,963	4.35%	247	1,129	1,376	
24	Communication Equipment - Original (fully depreciated)	397	142,401	142,401	-	0.00%	-	-	-	
25	General Plant Allocated 1/		<u>1,768,644</u>	<u>433,850</u>	<u>1,334,794</u>		<u>7,713</u>	<u>35,318</u>	<u>43,031</u>	
26	Total		<u>156,513,852</u>	<u>28,166,694</u>	<u>128,347,157</u>		<u>698,098</u>	<u>3,350,369</u>	<u>4,048,467</u>	
27	Amount Per Books for the 12 Months Ending December 31, 2021						<u>664,746</u>	<u>3,190,306</u>	<u>3,855,052</u>	
28	Difference								<u>193,415</u>	
29	1/ General Plant is allocated among the zones using a Gross Plant Allocation.									

Docket No. G-39, Sub 47
Exhibit __ (KM-002)
Statement I-1(b)

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Depreciation, Depletion and Amortization Expense Detail - Functionalized
For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Description of Function (A)	Account Number (B)	Accumulated Reserve Balance at December 31, 2021 (C) \$	Zone 1 Accumulated Reserve (D) \$	Zone 2 Accumulated Reserve (E) \$
1	Franchises and Consents	302	156,125	-	156,125
2	Miscellaneous Intangible Plant	303	535,129	111,911	423,218
3	Land Rights	365.12	50,145	-	50,145
4	Rights-of-way	365.2	2,070,392	8,068	2,062,324
5	Structures and Improvements	366.1	693,780	-	693,780
6	Structures and Improvements Measure	366.2	581,827	230,897	350,930
7	Mains	367	53,870,264	16,602,644	37,267,619
8	Compressor Station Equipment	368	9,930,073	-	9,930,073
9	Measuring and Reg. Sta. Equipment	369	3,941,201	1,272,345	2,668,857
10	Land	365.11	0	-	-
11	Intangible, Transmission and Land		<u>71,828,936</u>	<u>18,225,865</u>	<u>53,603,070</u>
General Plant 1/					
12	Structures and Improvements fully depreciated	390	5,269	944	4,325
13	Office Furniture and Equipment - Developed Software	391.1	66,960	12,000	54,959
14	Furniture & Equipment - Software (fully depreciated)	391.1	843,871	151,235	692,636
15	Office Furniture and Equipment - Data Process & Computer Equip.	391.2	-	0	-
16	Office Furniture and Equipment - Tower Office Furniture & Equip	391.3	26,882	4,818	22,064
17	Transportation Equipment	392	-	0	-
18	Transportation Equipment (fully depreciated)	392	3,761	674	3,087
19	Tools, Shop, and Garage Equipment	394	379,861	68,077	311,784
20	Power Operated Equipment	396	27,542	4,936	22,606
21	Power Operated Equipment (fully depreciated)	396	10,649	1,908	8,740
22	Communication Equipment	397	19,725	3,535	16,190
23	Communication Equipment - Original (fully depreciated)	397	142,401	142,401	-
24	General Plant Allocated 1/		<u>1,526,922</u>	<u>390,529</u>	<u>1,136,392</u>
25	Total		<u>73,355,857</u>	<u>18,616,395</u>	<u>54,739,463</u>
26	Amount Per Books for the 12 Months Ending December 31, 2016				
27	Difference				
28	1/ General Plant is allocated among the zones using a Gross Plant Allocation. For Gross Plant Allocation support, See Statement I-1(a).				
29		Zone 1	17.92%		
30		Zone 2	82.08%		

Docket No. G-39, Sub 47
Exhibit __ (KM-002)
Statement I-2

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
Design of Rates
For the Test Period Ended December 31, 2021, As Adjusted

Line No.	Item	Zone 1A Demand	Zone 1A Commodity	Zone 1B Demand	Zone 1B Commodity	Zone 2 Demand	Zone 2 Commodity	Total
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
		\$	\$	\$	\$	\$	\$	\$
1	Overall Return on Rate Base	230,252	0	416,638	0	4,331,265	0	4,978,155
2	O&M Expenses	109,930	0	198,918	0	2,068,738	0	2,377,586
3	Pipeline Integrity Deferral	3,810	0	6,895	0	71,706	0	82,411
4	Depreciation	248,479	0	449,619	0	3,350,369	0	4,048,467
5	Taxes Other Than Income	24,952	0	45,150	0	469,557	0	539,659
6	Income Taxes	52,121	0	94,313	0	980,851	0	1,127,285
7	EDIT Amortization	(23,796)	0	(43,059)	0	(447,813)	0	(514,668)
8	Total Cost of Service	<u>645,748</u>	<u>0</u>	<u>1,168,474</u>	<u>0</u>	<u>10,824,673</u>	<u>0</u>	<u>12,638,895</u>
9	Annual Billing Determinants							
10	Demand (Mcf)	720,000		840,000		3,987,240		
11	Demand (Dt)	745,200		869,400		4,126,800		
12	Commodity (Dt)	2/	1,677,731		19,103,530		65,354,955	
13	Rates	\$	\$	\$	\$	\$	\$	
14	Monthly Demand (Mcf)	0.89687		1.39104		2.71483		
15	Monthly Demand (Dt)	0.86654		1.34400		2.62302		
16	Daily Demand (Dt)	0.02849		0.04419		0.08624		
17	Commodity (Dt)		0.0000		0.0000		0.0000	
18	Excess CFT 100% Load (Dt)	\$						
19	Zone 1A	0.02849	3/					
20	Zone 1B	0.04419	4/					
21	Zone 2	0.08624	5/					

22 1/ Zone 1 costs are pre-expansion costs divided by previous ownership shares between Piedmont (Zone 1A) and PSNC (Zone 1B).
23 Zones 1A and 1B are allocated 35.5937% and 64.4063%, respectively, of the Zone 1 costs shown on Page 1 of Statement I.
24 2/ Commodity Dt is calculated using the annual level for the year ended December 31, 2021
25 3/ Zone 1A demand rate divided by 1.035 (btu conversion factor) times 12 divided by 365 plus the Zone 1A commodity rate.
26 4/ Zone 1B demand rate divided by 1.035 (btu conversion factor) times 12 divided by 365 plus the Zone 1B commodity rate.
27 5/ Zone 2 demand rate divided by 1.035 (btu conversion factor) times 12 divided by 365 plus the Zone 2 commodity rate.

**Cardinal Pipeline Company, LLC
Docket No. G-39, Subs 46 and 47
Cardinal Pipeline Fourth Set of Data Requests
Date Requested: June 16, 2022
Date Due: June 20, 2022**

Cardinal Pipeline Contact: Jordan Kirwin
Phone #: (713) 215-3723
Email: jordan.kirwin@williams.com

Cardinal Pipeline Legal Contact: David Glenn
Phone #: (713) 215-2341
Email: david.a.glenn@williams.com

Robert Kaylor
Phone #: (919) 828-5250
Email: bkaylor@rwkaylorlaw.com

In responding to this request, please refer to the definitions and general instructions attached to the Cardinal Pipeline Second Set of Data Requests, which are incorporated herein.

Data Requests on Direct Testimony and Exhibits of Neha Patel

QUESTION CPC 5.7

Referencing Exhibit B of Ms. Patel's testimony, please provide supporting calculations for the Demand dekatherm determinants for Cardinal's Zone 2. To the extent Ms. Patel disagrees with Cardinal's dekatherm determinants for Zone 2 of 4,126,800 as shown on Statement I-2, please explain why.

RESPONSE:

The Public Staff accepts the Cardinal's demand dekatherm determinants for Zone 2 of 4,126,800 dekatherms as shown on Statement I-2.

**STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH**

DOCKET NO. G-39, SUB 46
DOCKET NO. G-39, SUB 47

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. G-39, SUB 46)	
In the Matter of)	
Cardinal Pipeline Company, LLC)	PUBLIC STAFF’S RESPONSE
Depreciation Rate Study as of)	TO CARDINAL’S FIFTH DATA
December 31, 2020)	REQUEST
DOCKET NO. G-39, SUB 47)	
In the Matter of)	
Application of Cardinal Pipeline)	
Company, LLC for an Adjustment in)	
its Rates and Charges)	

Requests on Direct Testimony and Exhibits of Sonja Johnson

CPC-Staff-5.1 Exhibit I, Schedule 3-1, please explain and provide the basis for including negative salvage expense in the calculation of the total average remaining life in Public Staff’s calculation of the Reverse South Georgia. Please include any precedent, testimony, orders relied upon in deciding to include negative salvage expense in the calculation.

Response

In the calculation of the total average remaining life (ARL) of the Reverse South Georgia, the Public Staff utilized Exhibit (KM-002), Statement H-3(a) as a template; updating the amounts for depreciable plant, accumulated depreciation reserve, and depreciation expense to calculate a new ARL per the Public Staff. The Public Staff is currently considering whether negative salvage should remain in the calculation and would like to further discuss this matter with the Company. The Public Staff’s financial analysts will request a meeting with Company personnel for Thursday June 23, 2022.

CPC-Staff-5.2 With reference to Exhibit 1, Schedule 2, column c, line 4 of Ms. Johnson’s testimony, please confirm that the amount of (11,539) should be 11,539. Further, please confirm that, when updating Working Capital to the March 31, 2022 actuals provided by Cardinal in response to Public Staff 5-4 (March 2022 Updates), Statement E, Public Staff’s calculation of the 13-month average from March 2021 through March 2022 equals \$357,899.

Response

The Public Staff confirms that the amount reported on Johnson Exhibit I, Schedule 2, column c, line 4 should have been 11,539 and not (11,539). The Public Staff also agrees that the correct 13-month average is \$357,899. Please see the attached file “Working Capital Avg Balance.xlsx”



Working Capital
Avg Balance.xlsx

CPC-Staff-5.3 With reference to Exhibit I, Schedule 3, Footnote 7 of Ms. Johnson’s testimony, please confirm the rate used to calculate the regulatory fee reflected in Ms. Johnson’s exhibits.

Response

The Public Staff utilized the currently approved rate of .0013 as shown on Johnson Exhibit I, Schedule 1b, line 8 to calculate the revenue factors and on schedule 1a NOI&RB After, but inadvertently utilized a rate of .0014 in cell AD20 of Johnson Exhibit I, Schedule 3 “NOI After Adjusts.”

CPC-Staff-5.4 Does Ms. Johnson agree that it is appropriate to remove Asset Retirement Obligation capital for ratemaking purposes in the calculation of total Gas Plant In-Service? If the answer is no, please explain why Ms. Johnson does not agree.

Response

Yes, the Public Staff agrees that it is appropriate to remove Asset Retirement Obligation capital for ratemaking purposes in the calculation of total Gas Plant In-Service.

CPC-Staff-5.5 Please confirm that, once the Asset Retirement Obligation capital is removed from total Gas Plant In-Service from the March 2022 Updates, Public Staff’s calculation of the total depreciation and negative salvage expense is equal to \$4,060,108 using the depreciation and negative salvage rates recommended by Public Staff witness Ms. McCullar.

Response

The Public Staff has calculated a slightly different depreciation and negative salvage expense of \$4,060,636. Please see the attached file “Cardinal Depreciation.xlsx”



Cardinal
Depreciation_srj.xlsx

CPC-Staff-5.6 Please reconcile the amounts shown on Schedule 1a, column (b) for General Taxes (Line 7), Income taxes (Line 8) and Net operating income for a return (Line 10) with the amounts shown on Schedule 3, column (g) for General Taxes (Line 7), Income taxes (Line 8) and Net operating income for a return (Line 13).

Response

Please see the attached file “Cardinal Reconciliation.xlsx” The difference is as a result an incorrect regulatory fee being used on Johnson Exhibit I, Schedule 3 “NOI After Adjusts” in cell AD20. This error caused the difference in general taxes and therefore income taxes and net operating income for a return as well.



Cardinal
Reconciliation.xlsx

CARDINAL PIPELINE COMPANY, LLC
Depreciation, Depletion and Amortization Expense
For the Period Ended 3/31/2022

Line No.	Description of Function (A)	Depreciable Gas Plant As Adjusted (B) \$	Current Annual Depr. Rate (C)	Cardinal Proposed Annual Depr. Rate (D)	McCullar Annual Depr. Rate (E)	Expense Per Books (F) \$	Cardinal Adjustment (G) \$	Public Staff Adjustment (H) \$	Cardinal Depreciation Expense (I) \$	Public Staff Depreciation Expense (J) \$	Cardinal Calculated Depreciation Expense Using Public Staff Depreciation Rates (K) \$	
Intangible Plant												
1	Franchises and Consents	302	176,783	4.00%	0.55%	0.56%	7,071	(6,099)	(6,081)	972	990	990
2	Miscellaneous Intangible Plant	303	898,093	2.19%	1.57%	1.64%	19,668	(5,568)	(4,939)	14,100	14,729	14,729
3	Intangible		<u>1,074,876</u>				<u>26,740</u>	<u>(11,668)</u>	<u>(11,021)</u>	<u>15,072</u>	<u>15,719</u>	<u>15,719</u>
Transmission Plant												
4	Land Rights	365.12	96,745	2.00%	1.93%	1.91%	1,935	(68)	(87)	1,867	1,848	1,848
			658,661	0.00%	0.00%	0.00%	-	-	-	-	0	-
5	Rights-of-way	365.2	4,011,679	2.00%	1.97%	1.99%	80,234	(1,204)	(402)	79,030	79,832	79,832
6	Structures and Improvements	366.1	2,673,056	3.00%	3.51%	3.49%	80,192	13,632	13,098	93,824	93,290	93,290
7	Structures and Improvements Measure	366.2	1,428,304	2.63%	2.85%	2.87%	37,564	3,143	3,428	40,707	40,992	40,992
8	Mains	367	100,636,221	2.20%	2.50%	2.51%	2,213,997	301,909	311,972	2,515,906	2,525,969	2,525,969
9	Compressor Station Equipment	368	35,453,273	3.03%	2.94%	2.92%	1,074,234	(31,908)	(38,998)	1,042,326	1,035,236	1,035,236
10	Measuring and Reg. Sta. Equipment	369	8,764,591	3.18%	2.49%	2.54%	278,714	(60,476)	(56,093)	218,238	222,621	222,621
11	Land	365.11	0	0.00%	0.00%	0.00%	0	0	0	0	0	-
12	Transmission and Land		<u>153,722,531</u>				<u>3,766,870</u>	<u>225,028</u>	<u>232,918</u>	<u>3,991,898</u>	<u>3,999,788</u>	<u>3,999,788</u>
13	% of Gross Plant (Net of General Plant)											
General Plant 1/												
14	Structures and Improvements fully depreciated	390	5,269	0.00%	10.00%	10.00%	0	527		527	527	-
15	Office Furniture and Equipment - Developed Software	391.1	113,439	7.69%	6.67%	6.67%	8,723	(1,157)		7,566	7,566	7,566
16	Furniture & Equipment - Software (fully depreciated)	391.1	843,871	0.00%	0.00%	0.00%	0	0		0	0	-
17	Office Furniture and Equipment - Data Process & Computer Equip.	391.2	2,989	25.00%	12.50%	12.50%	747	(374)		374	374	374
18	Office Furniture and Equipment - Tower Office Furniture & Equip	391.3	32,228	8.33%	10.00%	10.00%	2,685	538		3,223	3,223	3,223
18	Transportation Equipment	392	0	18.00%	16.67%	16.67%	0	0		0	0	-
19	Transportation Equipment (fully depreciated)	392	3,761	0.00%	0.00%	0.00%	0	0		0	0	-
20	Tools, Shop, and Garage Equipment	394	577,431	8.33%	5.00%	5.00%	48,100	(19,228)		28,872	28,872	28,872
21	Power Operated Equipment	396	31,910	7.92%	10.00%	10.00%	2,527	664		3,191	3,191	3,191
22	Power Operated Equipment (fully depreciated)	396	10,649	0.00%	0.00%	0.00%	0	0		0	0	-
23	Communication Equipment	397	31,632	7.14%	4.35%	4.35%	2,259	(883)		1,376	1,376	1,376
24	Communication Equipment - Original (fully depreciated)	397	142,401	0.00%	0.00%	0.00%	0	0		0	0	-
25	General Plant Allocated 1/		<u>1,795,579</u>				<u>65,041</u>	<u>(19,913)</u>		<u>45,128</u>	<u>45,129</u>	<u>44,601</u>
26	Total Depreciable Gas Plant in Service		<u>156,592,986</u>				<u>3,858,650</u>	<u>193,448</u>		<u>4,052,098</u>	<u>4,060,636</u>	<u>4,060,108</u>
27	Asset Retirement Obligations		(6,013)									
28	Total Depreciable Gas Plant in Service		<u>156,586,973</u>									

OFFICIAL COPY
JUL 14 2022

Statement E

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
 Working Capital
 Average Balance as of March 31, 2022

Line No.	Month (A)	Line Pack (B) \$	Materials and Supplies (C) \$	Total (D) \$
1	March - 2021	194,912	114,587	309,499
2	April - 2021	105,759	115,821	221,580
3	May - 2021	211,664	140,972	352,636
4	June - 2021	141,781	189,942	331,723
5	July - 2021	219,346	190,235	409,581
6	August - 2021	204,086	187,421	391,507
7	September - 2021	188,392	187,524	375,915
8	October - 2021	204,452	187,615	392,067
9	November - 2021	169,010	188,771	357,781
10	December - 2021	189,790	188,669	378,459
11	January - 2022	189,790	199,302	389,092
12	February - 2022	162,044	189,939	351,983
13	March - 2022	198,953	191,913	390,867
14	Total	<u>2,379,979</u>	<u>2,272,711</u>	<u>4,652,691</u>
15	Thirteen Month Average	<u>183,075</u>	<u>174,824</u>	<u>357,899</u>

Cardinal Pipeline Company, LLC
Docket No. G-39, Sub 46
Docket No. G-39, Sub 47
Cost of Service

Item	Zone 1			Zone 2			Total
	Demand (\$)	Commodity (\$)	Total (\$)	Demand (\$)	Commodity (\$)	Total (\$)	
Plant	28,165,617		28,165,617	128,421,356		128,421,356	156,586,972
Accumulated Depreciation	(18,503,514)		(18,503,514)	(55,817,312)		(55,817,312)	(74,320,707)
Net Plant	9,662,102	0	9,662,102	72,604,044	0	72,604,044	82,266,265
Materials & Supplies	[2] 60,268		60,268	274,553		274,553	334,821
Deferred Income Taxes	(2,220,152)		(2,220,152)	(24,044,182)		(24,044,182)	(26,264,333)
Rate Base	7,502,219	0	7,502,219	48,834,415	0	48,834,415	56,336,753
Overall Return on Rate Base	[1] 516,238		516,238	3,359,808		3,359,808	3,876,045
O&M Expenses	[1] 316,695		316,695	2,060,892		2,060,892	2,377,587
Pipeline Integrity Deferral	[1] 10,977		10,977	71,434		71,434	82,411
Depreciation	730,262		730,262	3,326,750		3,326,750	4,057,012
General Taxes	[1] 71,892		71,892	467,834		467,834	539,659
Income Taxes	[1] 110,255		110,255	717,483		717,483	827,738
EDIT Amortization	(90,317)		(90,317)	(587,736)		(587,736)	(678,052)
Settlement Cost of Service	1,666,001	0	1,666,001	9,416,466	0	9,416,466	11,082,467

[1] Rate Base Zonal Allocation Factors:

Zone 1 Rate Base	7,502,219	13.32%
Zone 2 Rate Base	48,834,415	86.68%
Total	56,336,634	100.00%

[2] Allocated between zones based on Gross Plant Factor:

Zone 1	28,165,617	18.00%
Zone 2	128,421,356	82.00%
	156,586,972	100.00%

Cardinal Pipeline Company, LLC
Docket No. G-39, Sub 46
Docket No. G-39, Sub 47
Public Staff Recommended Rates

Item	Zone 1 A		Zone 1 B		Zone 2		Total
	Demand	Commodity	Demand	Commodity	Demand	Commodity	
Revenues Generated	\$592,991	\$0	\$1,073,010	\$0	\$9,416,466	\$0	\$11,082,467
Annual Billing Determinants							
Demand (Mcf)	720,000		840,000		3,987,240		
Demand (Dt)	745,200		869,400		4,126,793		
Commodity (Dt)		0		0		0	
Rates							
Monthly Demand (\$/Mcf)	\$0.82360		\$1.27739		\$2.36165		
Monthly Demand (\$/Dt)	\$0.79575		\$1.23420		\$2.28179		
Daily Demand (\$/Dt)	\$0.02616		\$0.04058		\$0.07502		
Commodity (\$/Dt)		\$0.00000		\$0.00000		\$0.00000	
Daily Electric Power Rate	\$0.00047		\$0.00047		\$0.00047		
Excess CFT 100% Load Factor (dt)							
Zone 1A	\$0.02616						
Zone 1B	\$0.04058						
Zone 2	\$0.07502						
Zone 1 COS Split							
Zone 1A	35.5937%						
Zone 1B	64.4063%						

NOVEMBER 6, 2012

INFRASTRUCTURE

MOODY'S
INVESTORS SERVICE

RATING METHODOLOGY

Natural Gas Pipelines

Table of Contents:

SUMMARY	1
ABOUT THE RATED UNIVERSE	3
ABOUT THIS RATING METHODOLOGY	5
DISCUSSION OF THE KEY RATING FACTORS	6
LIMITATIONS OF THE GRID AND OTHER RATING CONSIDERATIONS	14
CONCLUSION: SUMMARY OF THE GRID-INDICATED RATING OUTCOMES	18
APPENDIX A: NATURAL GAS PIPELINE METHODOLOGY GRID	19
APPENDIX B: OBSERVATIONS AND OUTLIERS FOR GRID MAPPING	21
APPENDIX C: OVERVIEW OF GAS PIPELINES IN NORTH AMERICA AND KEY CREDIT ISSUES OVER THE INTERMEDIATE TERM	23
MOODY'S RELATED RESEARCH	24

Analyst Contacts:

NEW YORK	+1.212.553.1653
Mihoko Manabe, CFA Vice President – Senior Credit Officer mihoko.manabe@moodys.com	+1.212.553.1942
William L. Hess Managing Director – Utilities william.hess@moodys.com	+1.212.553.3837
Maurizio Asperti Associate Analyst maurizio.asperti@moodys.com	+1.212.553.6836

>>contacts continued on the last page

Summary

This rating methodology sets forth Moody's approach to assessing credit risk for gas pipeline companies whose credit profiles are influenced by their rate regulation and contractual arrangements. This methodology is intended as a reference tool to use when evaluating credit profiles within this sector, helping issuers, investors, and other interested market participants understand how key qualitative and quantitative risk characteristics are likely to affect rating outcomes. This methodology does not include an exhaustive treatment of all factors that are reflected in Moody's ratings but should enable the reader to understand the qualitative considerations and financial information and ratios that are usually most important for ratings in this sector.

This rating methodology supersedes the Rating Methodology for Natural Gas Pipelines published in December 2009. While incorporating many of the core principles of the previous approach, this methodology streamlines and updates how the four key rating factors are defined. No rating changes will result from publication of this rating methodology.

This report includes discussion of the four rating factors and sub-factors included in the rating grid. The purpose of the rating grid is to provide a reference tool that can be used to approximate credit profiles within the pipeline sector. The grid provides summarized guidance for the factors that are generally most important in assigning ratings to these entities. The grid is a summary, and as such, does not include every rating consideration. The weights shown for each factor in the grid represent an approximation of their importance for rating decisions but actual importance may vary significantly. In addition, the illustrative mapping in this document uses historical results while our ratings also consider forward-looking expectations. As a result, the grid-indicated rating is not expected to match the actual rating of each entity, but it will generally produce an indicative rating within two notches of an actual rating.

The grid contains four key factors that are important in our assessment for ratings in the gas pipeline sector. The first three are qualitative factors while the fourth is a quantitative factor:

1. Market Position
2. Quality of Supply Sources
3. Contract Quality
4. Financial Strength

Certain factors also encompass a number of sub-factors or metrics that we explain in detail. Since an issuer's scoring on a particular grid factor sometimes will not match its overall rating, in the Appendix we include a discussion of some "outliers" – gas pipelines whose grid-indicated rating differs significantly from the actual rating.

This rating methodology is not intended to be an exhaustive discussion of all factors that Moody's analysts consider to be pertinent for ratings in the gas pipeline sector. Our ratings incorporate qualitative considerations and factors that do not lend themselves to a transparent presentation in a grid format. The grid represents a decision to avoid greater complexity that would result in grid-indicated ratings that map more closely to actual ratings, in favor of a simpler and more transparent presentation of the factors that are most important for ratings in this sector most of the time.

This report includes the following sections:

- » About the Rated Universe: an overview of the gas pipeline sector;
- » About This Rating Methodology: a description of our rating methodology;
- » Discussion of the Key Rating Factors: a detailed explanation of each of the factors that drive rating quality;
- » Limitations of the Grid and Other Rating Considerations: comments on the rating methodology's limitations, including a discussion of other considerations that are not included in the grid;
- » Appendices: an exhibit of the full grid (Appendix A); a table that lists the grid output for covered issuers with explanatory comments on some of the more significant differences between the grid-implied rating and our actual rating (Appendix B); and a brief sector overview and key credit issues over the intermediate term (Appendix C).

What's Changed

While incorporating many of the core principles of the 2009 version, this methodology updates how the four key rating factors are weighted and defined. These changes reflect a period of adjustment and increased competition as the North American pipeline industry reacts to the shale boom. The factor definitions and weightings also take into consideration that Moody's has been rating a growing number of pipelines outside North America. In terms of the weighting of the four factors, we have decreased Market Position from 20% to 15%, while also decreasing Quality of Supply Sources from 20% to 10%. Market Position is weighted slightly higher than Quality of Supply Sources, because the surge in shale supplies has made availability of supply less of a concern. We raised the weighting for Contract Quality from 20% to 30% as an important indicator of a pipeline's ability to see through this period of adjustment. We increased the weighting for Financial Strength from 40% to 45%, because companies need to be financially stronger to meet more uncertainty in their business environment. The low end of the scale in the methodology grid has been extended from B to Caa to better capture weaker performance.

About the Rated Universe

Gas pipelines are a relatively homogeneous group in terms of business model (single-asset operating company engaged in gas transmission) and regulatory framework (most of the rated pipelines operate under stable and well-established regulatory regimes, such as those in the US and Canada). This methodology includes a few holding companies, but comprises primarily single-asset operating companies. For holding companies, actual ratings may be lower than methodology grid-implied ratings because of the structural subordination of the holding company debt to the operating company debt.

Pipelines covered under this global methodology transport natural gas over long distances, crossing state, provincial, or international borders, and as such, are regulated at the federal level. They can be of national importance. Most of the pipelines operate in stable regulatory frameworks, such as in the US and Canada, that have been liberalized, with a history of operating under private ownership. Unlike the regulated utilities or networks we cover in our other methodologies, the pipelines in this methodology usually do not hold a monopoly franchise and could be subject to some competition. Although regulators oversee the rates pipelines charge, their revenues are determined more by commercial contracts with customers, rather than by revenue requirements set by regulators.

Other Gas-Related Rating Methodologies

The natural gas industry is not a single, homogenous sector, but rather comprises a large collection of companies performing a range of different functions, further differentiated by regulation and ownership. Some entities are vertically integrated to perform the full range of natural gas activities, while others have 'unbundled' to capture only a portion of the gas value chain or otherwise conduct gas-related operations a part of a wider diversified business.

Accordingly Moody's has developed several different methodologies to address the range of natural gas-related businesses and credits, of which *Natural Gas Pipelines* is just one.

Readers are referred to the following additional methodologies pertaining to natural gas-related credits:

[Regulated Electric and Gas Utilities, August 2009 \(118481\)](#)

[Regulated Electric and Gas Networks, August 2009 \(118786\)](#)

[Global Midstream Energy, December 2010 \(128994\)](#)

The rated universe includes 40 entities, of which 32 are domiciled in the US, 5 in Canada, one each in Argentina and Colombia, and one in Kazakhstan. They account for approximately US\$90 billion of total outstanding long-term debt instruments. In general, ratings used in this methodology are the senior unsecured rating for investment grade companies or the Corporate Family Rating for non-investment grade companies.

The critical nature of their services and stable revenues under their contracts lower business risk and enable most of these companies to obtain investment-grade ratings. The ratings in the sector ranges from A2 to B2, with 37 issuers (93% of this universe) currently carrying a stable rating outlook. The average rating is Baa2.

Ratings and debt levels for a subset of 31 of these entities, representing a majority of the universe¹ to which this methodology applies, are shown in the following table.

FIGURE 1
Rated Pipelines

Issuer	Rating	Outlook	Domicile	Total Debt
Alliance Pipeline L.P.	A3 (1)	Stable	US	627
Alliance Pipeline Limited Partnership	Baa1	Stable	Canada	1,215
ANR Pipeline Company	A3	Stable	US	432
Colorado Interstate Gas Company	Baa3	Stable	US	650
El Paso Natural Gas Company	Baa1	Stable	US	1,359
Florida Gas Transmission Company, LLC	Baa2	Stable	US	2,110
Gas Transmission Northwest LLC	A3	Stable	US	325
Gulf South Pipeline Company, LP	Baa1	Stable	US	1,070
Gulfstream Natural Gas System L.L.C.	Baa2	Stable	US	1,149
Iroquois Gas Transmission System, L.P.	A3	Stable	US	375
JSC KazTransGas	Baa3 (2)	Stable	Kazakhstan	661 (5)
Kern River Funding Corporation	A3	Stable	US	675
Maritimes & Northeast Pipeline Ltd Partnsh	A2 (1)	Stable	Canada	375
Maritimes & Northeast Pipeline, LLC	Ba1 (3)	Negative	US	439
Midcontinent Express Pipeline LLC	Ba1 (3)	Stable	US	809
NGPL PipeCo. LLC	Ba3 (3)	Negative	US	3,037
Northern Natural Gas Company	A2	Stable	US	950
Northwest Pipeline GP	Baa1	Stable	US	694
Panhandle Eastern Pipe Line Company, LP	Baa3	Stable	US	1,772
Questar Pipeline Company	A3	Stable	US	459
Rockies Express Pipeline LLC	Ba1 (3)	Stable	US	2,998
Ruby Pipeline, LLC	Baa3	Stable	US	1,399
Southeast Supply Header, LLC	Baa3	Stable	US	375
Southern Natural Gas Company	Baa3	Stable	US	1,210
Southern Star Central Corp.	Ba1	Stable	US	482
Tennessee Gas Pipeline Company	Baa1	Stable	US	2,205
Texas Eastern Transmission L.P.	Baa1	Stable	US	1,165
Texas Gas Transmission, LLC	Baa1	Stable	US	903
Transcontinental Gas Pipe Line Corporation	Baa1	Stable	US	1,354
Transportadora de Gas Internacional S.A. E.S.P	Baa3 (4)	Stable	Colombia	1,120
Transportadora de Gas del Sur S.A.	B3 (4)	Negative	Argentina	378

Total Debt (US\$ MM) as of 6/30/12.

- (1) Senior secured rating. In project finance, typically the fundamental rating reflecting the benefits of security and other enhancements.
 (2) LT Issuer Rating (Foreign Currency).
 (3) Corporate Family Rating.
 (4) Senior Unsecured (Foreign Currency).
 (5) As of 12/31/11.

¹ This subset excludes holding companies that make up a part of this universe.

About This Rating Methodology

Moody's approach to rating gas pipelines, as outlined in this methodology, incorporates the following steps.

1. Identification of the Key Rating Factors

The grid in this rating methodology focuses on four broad rating factors. Certain broad factors are comprised of sub-factors that provide further detail.

FIGURE 2

Natural Gas Pipelines

Broad Rating Factors	Factor Weighting	Rating Sub-Factor	Sub-factor Weighting
Factor 1: Market Position	15%	Demand Growth	5%
		Competition	5%
		Volume Risk & Throughput Trend	5%
Factor 2: Quality of Supply Sources	10%		10%
Factor 3: Contract Quality	30%	Firm Revenues	10%
		Contract Life	10%
		Shipper Quality / Recontracting Risk	10%
Factor 4: Financial Strength	45%	FFO / Int (1 yr)	15%
		FFO / Debt (1 yr)	15%
		RCF/ Debt (1 yr)	15%
Total	100%	Total	100%

2. Measurement or Estimation of the Key Rating Factors

We explain below how we generally calculate or estimate the sub-factors for each grid factor and also weigh each of these individual sub-factors. We also provide a rationale for using each sub-factor. The information used in assessing the sub-factors is generally found in or calculated from information in financial statements, derived from other observations, or estimated by Moody's analysts.

Moody's ratings are forward-looking and incorporate our expectations for future financial and operating performance. We use both historical and projected financial results in the rating process. Historical results help us understand patterns and trends for a company's performance as well as for peer comparison. We use historical data (in most cases, the last 12 months of reported results) in this document to illustrate the application of the rating grid. All of the quantitative credit metrics incorporate Moody's standard adjustments to the financial statements.

3. Mapping Factors to the Rating Categories

After estimating or calculating each sub-factor, we map the outcomes for each of the sub-factors to a broad Moody's rating category (Aaa, Aa, A, Baa, Ba, B, or Caa).

4. Determining the Overall Grid-Indicated Rating

To determine the overall grid-indicated rating, we convert each of the sub-factor ratings into a numeric value based upon the scale below.

FIGURE 3

Grid Indicated Rating

Aaa	Aa	A	Baa	Ba	B	Caa
1	3	6	9	12	15	18

The numerical score for each sub-factor is multiplied by the weight for that sub-factor with the results then summed to produce a composite weighted-factor score. The composite weighted factor score is then mapped back to an alphanumeric rating based on the ranges in the table below. For example, an issuer with a composite weighted factor score of 8.2 would have a Baa1 grid-indicated rating.

Grid Indicated Rating	Aggregate Weighted Total Factor Score
Aaa	$x < 1.5$
Aa1	$1.5 \leq x < 2.5$
Aa2	$2.5 \leq x < 3.5$
Aa3	$3.5 \leq x < 4.5$
A1	$4.5 \leq x < 5.5$
A2	$5.5 \leq x < 6.5$
A3	$6.5 \leq x < 7.5$
Baa1	$7.5 \leq x < 8.5$
Baa2	$8.5 \leq x < 9.5$
Baa3	$9.5 \leq x < 10.5$
Ba1	$10.5 \leq x < 11.5$
Ba2	$11.5 \leq x < 12.5$
Ba3	$12.5 \leq x < 13.5$
B1	$13.5 \leq x < 14.5$
B2	$14.5 \leq x < 15.5$
B3	$15.5 \leq x < 16.5$
Caa	$x \geq 16.5$

5. Limitations of the Grid and Other Rating Considerations

This section discusses limitations in the use of the grid to map against actual ratings and additional factors that are not included in the grid that can be important in determining ratings.

Discussion of the Key Rating Factors

Moody's analysis of gas pipelines focuses on four broad factors:

1. Market Position
2. Quality of Supply Sources
3. Contract Quality
4. Financial Strength

Factor 1: Market Position

Why It Matters

Market Position gauges the level of diversity in a pipeline's demand markets and the potential for internal growth. A strong economy and population growth increase demand for natural gas and for additional pipeline infrastructure, which would generate incremental revenues. Customers in such markets are more likely to renew their contracts. Access to a number of substantial markets reduces a pipeline's vulnerability to a downturn in the economy in a particular region as well as sensitivity to the basis differential between any two points, improving the value of a pipeline's capacity.

Market Position is important because unlike regulated electric and gas utilities and networks, pipelines can be exposed to a measure of competition with other pipelines. They typically do not hold a regulated monopoly position or a license to serve a particular franchise, and may exist in a region served by one or more other pipelines.

The level of competition could rise, such as in North America, where gas flow patterns and throughput are shifting due to new supply basins and pipeline expansions. In this regard, pipelines with a large, diverse system with access to multiple alternative markets have more flexibility to navigate the competitive landscape. Additionally, owning storage facilities and providing premium ancillary services could help a pipeline maintain its market position.

How We Measure Demand Growth For the Grid

We measure Demand Growth by the scale, diversity, and the economic health of the end-markets served. A strong economy coupled with population growth create the need for more natural gas and pipeline infrastructure. In addition, government policies and existing gas delivery infrastructure could enable or hinder gas consumption. The population in the end-market is one proxy of Demand Growth. For example, New York City, with 19 million people, scores an A, while Chicago, a more mature gas market with almost 10 million people, maps to Baa².

How We Measure Competition For the Grid

Pipelines face varying degrees of competition in the markets to which they deliver. A pure monopoly could conceivably score a Aaa, but a government-owned monopoly pipeline could be ranked as Aa or lower depending on whether it faces competition in serving international gas markets. Nevertheless, the high costs and logistical infeasibility of connecting to an alternative pipeline make many customers and markets captive to certain pipelines. For example, the oligopoly of four pipelines that access New York City scores as an A. Markets where more competition among multiple pipelines has long existed, such as on the Gulf Coast, would result in a Baa. A pipeline could score Ba or lower if it is losing market share, and consequently margins, to new or existing pipelines.

How We Measure Volume Risk & Throughput Trend for the Grid

The Volume Risk & Throughput Trend sub-factor is measured in terms of variability in annual throughput volumes. Sustaining exceptional throughput growth that would merit a Aaa would be unusual, since pipelines have a finite capacity, and would entail an extraordinary type of expansion. Most pipelines in the peer group are mature or run near capacity, seeing little change from year to year, and score as a Baa. A few that are expanding may score an A. Pipelines with wide swings in annual throughput would rate a Ba, and those facing declining throughput would score as a B or Caa.

² *Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2010 to July 1, 2011*, [US Census Bureau](#), October 27, 2012

FACTOR 1

Natural Gas Pipelines

Factor 1	Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Market Position (15%)	a) Demand Growth	5%	Exceptionally large, diverse, developed economic base and end-market, e.g., population >25,000,000	Exceptionally large, diverse, developed economic base and end-market, e.g., population >20,000,000	Very large, diverse, developed economic base and end-market, e.g., with population >15,000,000	Large, diverse economic base and end-market that is either developed/ mature or developing/growing, e.g., population >5,000,000	Medium-sized economic base and end-market that is either developed/ mature or undeveloped/growing, e.g., population >1,000,000	Small economic base and end-market that is either developed/ declining or undeveloped/growing, e.g., population >500,000	Very small economic base and end-market that is declining or undeveloped, e.g., population <500,000
	b) Competition	5%	No competition; no change in foreseeable future.	Very limited competition; no change in foreseeable future.	Well-established and stable competitive environment; little change in foreseeable future.	Stable competitive environment, but competition may intensify over the long term with gradual impact.	Competitive environment; may intensify over the medium term with gradual impact.	Changing competitive environment; likely to decrease margins over the medium term.	Rapidly changing competitive environment; likely to decrease margins over the short term.
	c) Volume Risk & Throughput Trend	5%	Nil long term volume risk; exceptionally strong commercial outlook, e.g., sustainable 50% increase in throughput over 3 yrs.	Modest long term volume risk; strong commercial outlook, e.g. sustainable 30% to 50% increase in throughput over 3 yrs.	Modest medium term volume risk; good commercial outlook, e.g. sustainable 10% to 30% increase in throughput over 3 yrs.	Limited medium term volume risk; good commercial outlook; pipe full or moderately increasing throughput, e.g. 0% to 10% over 3 yrs.	Material medium term volume risk; steadily decreasing throughput, e.g. 0% to -25% over 3 yrs.	Significant near term volume risk; rapidly decreasing or uncertain throughput, e.g. -25% to -50% over 3 yrs.	Extraordinarily decreasing or uncertain throughput, e.g. -50% or more over 3 yrs.

Factor 2: Quality of Supply Sources

Why It Matters

Access to large, diverse, and growing gas supplies is important in reducing a pipeline's vulnerability to a downturn in drilling activity in a particular region or by a particular producer, to supply disruptions caused by extreme weather, and to the natural declines in gas reserves over time.

Because gas is a depleting resource, pipelines must have continual access to new supply as a means to offset natural declines in volume and to sustain demand for their services. In the supply area, substantial and growing production thus enhances the value of a pipeline's capacity. Ownership of numerous interconnects with other pipelines provides more supply (as well as market) options for shippers and raises the value of a pipeline's capacity. Attractive supply markets imply organic expansion opportunities and, by extension, revenue growth to mitigate rising costs.

With the surge in shale gas and oil development, especially over the last several years, assessments of future production growth and the potential size of those developments are more dynamic than before. Hydraulic fracturing and horizontal drilling techniques are being improved and successfully applied to a growing legion of unconventional resource plays. These new supply areas have relatively short operating histories, which makes it more difficult to gauge their long-term growth potential with any great certainty. In addition, improved technologies are accelerating shifts in drilling activity from one area to another, further casting uncertainty as to the trajectory in future production volumes.

How We Measure Quality of Supply Sources for the Grid

The criteria we consider include the size and diversity of a pipeline's sources of supply and production volume trends. An indicator of Quality of Supply Sources is annual production volume in a supply region in terms of billion cubic feet per annum (BCF p.a.). Areas of substantial production that have superior access to markets are viewed more favorably as supporting future throughput on the pipeline and the value of its capacity.

We score most pipelines in our 31-pipe sample to be Baa quality, with access to multiple well-established supply regions. Within the Baa category, however, pipelines serving the Rockies, an area distant from the consuming markets and having a limited infrastructure for gas export, are less well positioned than pipelines in the Gulf Coast, an area that produces a similar amount of gas, but which is closer to the market and has an extensive pipeline network. The Marcellus Shale currently produces less gas than do the Rockies or the Gulf Coast, but pipelines there score an A, because of the area's superior prospects for production growth and access to nearby markets. Pipelines that have fewer or smaller than average supply sources would be a Ba. Those that rely on a supply source nearing the end of its economic life may be rated B or lower, depending on the pace of the decline and availability of replacement resources.

FACTOR 2

Natural Gas Pipelines

Factor 2	Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Quality of Supply Source (10%)	Supply Source	10%	Numerous supply areas with exceptionally high production e.g., >20,000 BCF p.a.	Numerous supply areas with very high production, e.g., >10,000BCF p.a.	Several supply areas with very high production, e.g., >5,000 BCF p.a. (or >1,000 BCF p.a. with very strong growth outlook); excellent access to markets	Some diversity in supply areas with substantial production, e.g., >1,000 BCF p.a. (or >500 BCF p.a. with very strong growth outlook); reasonable access to markets	Concentration in supply areas with moderate production, e.g., >500 BCF p.a. (or >250 BCF p.a. with strong growth outlook); some limitation in access to markets	Reliance on supply area with low/declining production, e.g., >250BCF p.a.	Reliance on supply area with very low/fast declining production, e.g., <250BCF p.a.

Factor 3: Contract Quality

Why It Matters

Although regulators may set tariffs that pipelines can charge, it is up to the pipeline to secure contracts with customers in order to generate revenue. Contract Quality thus is a reflection of how customers value a pipeline's services, and consequently, carries the highest weighting among the three qualitative factors in the grid.

The quality of a pipeline's contract portfolio will be all the more important rating consideration over the next few years in North America, as new shale supplies alter demand for gas transport services. A company with a longer contract life will be better able to see through this period of adjustment for the North American gas pipeline grid.

It is not unusual for a few shippers to account for a majority of a gas pipeline's revenues. Concentration risk can be mitigated, however, if those shippers are investment-grade utilities that are physically connected to the pipeline, thus effectively captive to it and more likely to renew. Pipelines of recent vintage have tended to be built for E&P companies that for the most part have had lower credit quality and a less certain long-term commitment to a pipeline than traditional utility shippers have had. Marketers typically have a short-term orientation and are less likely to commit long term under firm contracts.

Unless they benefit from some form of monopoly, pipelines could be subject to competition, so in order to maintain their market share and renew contracts at reasonable rates, they must innovate and provide reliable, cost-competitive services to suit their customers' needs. Contract renewal risk exists; however, pipelines in Moody's universe have successful records in getting their contracts renewed.

How We Measure Firm Revenues For the Grid

We measure the Firm Services sub-factor through the percentage of total revenues or capacity that is contracted for firm gas transportation and storage services. A positive indicator is a high proportion of revenues from firm services, rather than interruptible and other services that are paid only when used, therefore less predictable and more market-driven. In the US and Canada, firm revenues are stable, because fees are mostly fixed, plus a small variable component tied to volumes shipped. Most pipelines in our 31-pipe sample have revenues that are over 90% from firm services, and score as Aa under this sub-factor.

How We Measure Contract Life for the Grid

Contract Life is the weighted average number of years remaining on a pipeline's contracts. The average for Moody's peer group is 7 years, which maps to a low A.

How We Measure Shipper Quality / Re-contracting Risk for the Grid

For this publication, we used the weighted average rating of the top ten shippers as a proxy for Shipper Quality. These top shippers usually accounted for the majority of the revenues. The rest of the shippers were numerous and individually comprised immaterial portions of revenues, so that the pipeline would be almost indifferent to a contract disruption among these smaller shippers.

We estimate Re-contracting Risk by assessing how reliant major customers are to the pipeline, whether any viable alternative pipeline exists, and what the customers' long-term strategic interest is in holding that capacity. Most pipelines in Moody's pipeline sample score as A to Baa on Shipper Quality/Re-contracting Risk, reflecting the ratings of their core utility customers.

FACTOR 3

Natural Gas Pipelines

Factor 3	Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Contract Quality (30%)	a) Firm Revenues	10%	Firm agreements comprise 100% of revenues or capacity.	Firm agreements comprise 90 < 100% of revenues or capacity.	Firm agreements comprise 80 < 90% of revenues or capacity.	Firm agreements comprise 70 < 80% of revenues or capacity.	Firm agreements comprise 60 < 70% of revenues or capacity.	Firm agreements comprise 50 < 60% of revenues or capacity.	Firm agreements comprise < 50% of revenues or capacity.
	b) Contract Life	10%	Average remaining life of contract of > 30 yrs.	Average remaining life of contract of 15 to 30 yrs.	Average remaining life of contract of 7 to 15 yrs.	Average remaining life of contract of 5 to 7 yrs.	Average remaining life of contract of 3 to 5 yrs.	Average remaining life of contract of 2 to 3 yrs.	Average remaining life of contract of < 2 yrs.
	c) Shipper Quality / Re-contracting Risk	10%	Well-diversified portfolio of longstanding shippers with a weighted average rating of Aaa; certain to renew contracts	Well-diversified portfolio of longstanding shippers with a weighted average rating of Aa; highly likely to renew contracts	Reasonably diverse portfolio of longstanding shippers with a weighted average rating of A; likely to renew contracts	Concentrations in some shippers with a weighted average rating of Baa; a few may not renew contracts	Shippers with a weighted average rating of Ba; several may not renew contracts	Shippers with a weighted average rating of B; some will not renew contracts	Shippers with a weighted average rating of Caa; many will not renew contracts

Factor 4: Financial Strength

Why It Matters

Natural gas transmission is a regulated, asset-based business. Financial strength is necessary for a pipeline to attract capital at a reasonable cost to maintain competitive cost-of-service rates and to reinvest in the business. Older pipelines will need to make refurbishments to ensure their safety and to meet environmental requirements.

As single-asset businesses, the pipelines' financial statements tend to be straightforward; their capital structures, simple. Because they do not engage in the gas supply function, changes in working capital and regulatory assets and liabilities are less significant than they are typically for regulated utilities.

Once constructed, a pipeline needs little maintenance capital, so that they tend to generate excess cash flow absent any expansion projects. Generally, pipelines retain earnings to manage their capital structure within their targeted range and upstream free cash flow in the form of dividends and inter-company advances to their parent companies.

Most pipelines are privately-owned subsidiaries, so that their dividends can be irregular if, for example, they are self-financing a capital project. Increasingly in the US, however, pipelines are owned by publicly traded master limited partnerships (MLPs), which promise high payouts to their equity holders. Consequently, a pipeline's dividends may become more of a set cash requirement under MLP ownership. This methodology update adds the retained cash flow (funds flow from operations minus dividends) to debt ratio to capture a pipeline's financial flexibility and its owner's financial strategy.

Because the North American pipeline industry is in a period of flux, the current last 12 months' financial results are a better measure of performance now than before when 3-year historical averages were sufficient to cover an industry in steady-state. We will factor into our ratings changes in circumstances that could have a material effect on a pipeline's future results, for example, a rate case, an addition or a loss of a significant contract, an expansion project, a new financing, or new ownership.

How We Measure Financial Strength for the Grid

The funds flow from operations (FFO) interest coverage ratio is calculated by dividing annual FFO (net income plus non-cash items such as depreciation and deferred taxes excluding working capital changes) plus interest expense by interest expense.

The FFO to debt ratio is calculated by dividing annual FFO by total debt.

Retained cash flow to debt ratio is calculated by dividing annual FFO less dividends by total debt.

FACTOR 4

Natural Gas Pipelines

Factor 4	Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Financial Strength (45%)	a) FFO + Interest / Interest (1 yr)	15%	> 7x	6 - 7x	5 - 6x	4 - 5x	3 - 4x	2 - 3x	< 2x
	b) FFO / Debt (1 yr)	15%	> 60%	40 - 60%	25 - 40%	15 - 25%	10 - 15%	5 - 10%	< 5%
	c) FFO - Dividends / Debt (1 yr)	15%	> 35%	25 - 35%	18 - 25%	12 - 18%	6 - 12%	0 - 6%	< 0%

Limitations of the Grid and Other Rating Considerations

The rating methodology grid represents a decision to favor simplicity that enhances transparency and to avoid greater complexity that would enable the grid to map more closely to actual ratings. Accordingly, the four rating factors in the grid do not constitute an exhaustive treatment of all the considerations that are important for ratings of entities in the gas pipeline sector. In addition, our ratings incorporate expectations for future performance, while the financial information that is used to illustrate the mapping in the grid is mainly historical. In some cases, our expectations for future performance may be informed by confidential information that we cannot publish or otherwise disclose. In other cases, we estimate future results based upon past performance, industry trends or other factors. In either case, predicting the future is subject to the risk of substantial inaccuracy.

Assumptions that may cause our forward-looking expectations to be incorrect include unanticipated changes in any of the following factors: the macroeconomic environment and general financial market conditions, sector trends, new technology, regulatory and legal actions, as well as management's appetite for additional debt to finance capital expenditures.

In choosing metrics for this rating methodology grid, we did not explicitly include certain important factors that are common to all gas pipelines, such as the quality and experience of management, assessments of governance and the quality of financial reporting and information disclosure. The assessment of these factors can be highly subjective and vary over time. Therefore, ranking these factors by rating category in a grid would suggest too much precision in the relative ranking of particular issuers against all other issuers that are rated in various industry sectors. We note, however, these excluded factors do affect those that are included in the grid (such as management experience affecting the revenue performance of a pipeline over time).

Ratings may include additional factors that are difficult to quantify or that have a meaningful effect in differentiating credit quality only in some cases, but not all. Such factors include substantial leverage at the pipeline's parent company or ownership by an MLP. Changes in regulation, affecting tariffs, safety and environmental requirements as well as changes to drilling technology and areas of natural gas production, changing gas flow patterns on competing pipelines, and macroeconomic trends also affect ratings. While these are important considerations, it is not possible to precisely express these in the rating methodology grid without making the grid excessively complex and significantly less transparent. Ratings may also reflect circumstances in which the weighting of a particular factor will be substantially different from the weighting suggested by the grid.

Other Rating Considerations

Moody's considers other factors in addition to those discussed in this report, but in most cases understanding the framework presented herein will enable a good approximation of our view on the credit quality of issuers in the gas pipeline sector. Moody's considers additional factors, including future operating and financial performance, that may deviate from historic performance, the quality of management, governance, financial controls, event risk, and seasonality. The analysis of these factors remains an integral part of our rating process.

Management Quality

The quality of management is an important factor supporting the credit strength of a gas pipeline. We normally meet with the pipeline owner's senior executives to assess management's business strategies, policies, and philosophies, and evaluates management performance relative to performance of competitors and our projections as well as changes in technology and patterns of usage.

An established managerial record provides us with insight into management's likely future performance in stressed situations. This can be an indicator of management's tendency to stray significantly from what may be an effective current business philosophy, or conversely, to adopt changes where they are warranted by new sets of circumstances.

Financial Controls

We rely on the accuracy of audited financial statements to assign and monitor ratings. Such accuracy is only possible when companies have sufficient internal controls, including centralized operations, and consistency in accounting policies and procedures.

Weaknesses in the overall financial reporting processes, financial report restatements or delays in producing audited financial statements can be indications of a potential breakdown in internal controls.

Liquidity Management

Liquidity is usually not a concern for pipelines, which are stable generators of free cash flow, requiring little working capital and capital investment. Pipelines therefore often do not have their own bank lines, which would provide an alternative source of liquidity. Instead, they keep cash on hand and rely on money pool arrangements with their parent companies. Liquidity will be particularly important if the pipeline is undergoing a large, extended capital project, or if the parent company (now oftentimes an MLP) has capital requirements of its own that make cash upstreamed from the pipeline, in form of both dividends and advances, a more fixed cash requirement.

Event Risk

We also recognize the possibility that an unexpected event could cause a sudden and sharp decline in an issuer's fundamental creditworthiness. Typical special events include a change in ownership and in the credit quality of that owner, a recapitalization, or an unexpected change in tariffs or terms of a material contract.

Notching Considerations

While the factors and sub-factors within the grid are designed to include the key rating drivers reflecting the fundamental risks of gas pipelines, the grid alone cannot capture some of the wide-ranging factors that may impact the credit rating.

The notching factors are designed to adjust, either upwards or downwards, a pipeline's indicated rating based on other considerations not adequately addressed in the rating grid. Moody's analysts may or may not assign a notch upwards or downwards to a rating as this is a case-by-case assessment determined by a rating committee. Unless specifically provided for in this methodology, the extent of notching by a rating committee may exceed more than one notch since these considerations can potentially encompass a wide deviation from the assumptions incorporated in this methodology.

Project Finance: Rating Uplift from Structural Enhancements

Project finance may be a viable option for financing pipelines being developed currently or in the future. We believe that in the infrastructure sector in general, structural enhancements provided to financial creditors may provide valuable protection and be a source of rating uplift when compared to those issuers that do not grant such protections. These factors were recognized and articulated within a debt rating framework in Moody's rating methodologies for regulated electric and gas networks, operational toll roads and operational airports outside the US. We have employed the same factors in the same way within this rating methodology. The defined sources of ratings uplift, their potential characteristics and their measurement are identical in these methodologies and are as set out below.

We have classified the sources of rating uplift from creditor protection into three categories:

- a) Event Risk Protection
- b) Debt Structure and Liquidity Protection
- c) Control Afforded to Creditors

In each of these categories, we look at specific concessions made to creditors and score their effectiveness on a scale of five grades: "none"; "low"; "medium"; "high"; and "very high". Each grade is worth a fraction of or a whole rating notch ("none" = 0%; "low" = 25%; "medium" = 50%; "high" = 75%; and "very high" = 100%). In terms of the grid framework output, the sum of the scores of these categories is then rounded to produce 0 to 2 rating notches of uplift.

These categories of protection are fairly standard in project financings. Scoring the effectiveness of each of these protections for specific pipelines will be judged relative to comparable project financings. The effectiveness of these enhancements could also be re-calibrated over time, for example, giving more uplift during construction when the risks are higher, but less when the pipeline has established operations and is less distinguishable from corporate finance pipelines.

Debt structural features will be assessed in the context of the legal jurisdiction relevant to the issuer, as the value of certain contractual arrangements (e.g., security) may vary from jurisdiction to jurisdiction.

a) Event Risk Protection

In this category, we typically review restrictive covenants including:

- i. Restrictions on permitted business outside the core regulated business
- ii. Restrictions on acquisitions/disposals
- iii. Restrictions on investments
- iv. Restrictions on additional indebtedness

Project and other structured financings typically incorporate ring-fencing provisions designed to insulate the credit quality of the pipeline from that of its wider corporate family or shareholders. These provisions may be crucial in order for the rating of the pipeline to reflect exclusively its credit quality, assessed as described in this rating methodology. However, they do not enhance the pipeline's stand-alone credit quality (serving only to protect it) and therefore are not listed as a source of rating uplift.

b) Debt Structure and Liquidity Protection

Structural enhancements in this category address financial risks associated with liquidity, interest rate and refinancing risk. Typical arrangements include:

- i. Dedicated cash reserves to cover specific costs, for example liquidity facility covering scheduled interest payments, often for the next 6 months
- ii. No material refinancing risk (e.g., benefits of amortizing debt)

The different arrangements above may have different levels of bearing on our assessment of the effectiveness of creditor protection in this category, depending on the specific circumstances of the issuer. A fully amortizing debt structure, typical of project financings and typically associated with adequate reserving arrangements, is generally regarded as necessary to achieve a score of "very high" in this category.

c) Control Afforded to Creditors

Among the most typical structural features, financial covenants and security arrangements are included in this category, as they provide creditors with a degree of control over the company's financial and business decisions in downturns, which are not enjoyed under typical corporate funding arrangements. Specific structural features that we classify in this category include:

- i. Remedies to delay insolvency (e.g., security and intercreditor agreements, etc).
- ii. Restrictions on payments and distribution lock-ups (e.g., if metrics deteriorate below minimum required parameters).
- iii. Frequent and regular reports of creditors' technical advisers to sanction base case validity and compliance with contractual and financial obligations.

As for the previous category (Debt Structure and Liquidity Protection), the whole package of structural enhancements is assessed to gauge the overall effectiveness. For example, independent validation of compliance with financial ratio covenants may be an important consideration in assessing the effectiveness of such covenants. Creditor step-in rights should be specifically permitted under the legal framework as well as the finance documents.

We give value to security arrangements – typically in respect of the shares in a pipeline entity and project documents – as one albeit critical element of a wider package of concessions designed to improve creditors' ability to detect early potential problems and rectify them if possible (in the first instance by retaining cash surpluses within the company), or, if remedial action is not possible or fails, to maximize recovery prospects. As normally security is not allowed or is not enforceable on the regulated assets, a rating uplift is not generally achievable simply by granting security.

In conclusion, structural enhancements can deliver up to two notches of uplift from a fundamental rating if they are very comprehensive and effective. Sources of creditor protection can be regarded as very restrictive by management and shareholders as they can significantly constrain management's ability to pursue strategies and policies that they may perceive will enhance shareholder value, even though they may potentially result in higher risks for the company. Consequently, in many cases, protective arrangements granted to creditors are not as fully comprehensive as those required to obtain the maximum possible uplift.

Conclusion: Summary of the Grid-Indicated Rating Outcomes

North America

The grid-indicated ratings included in this publication are based on historical financial data to illustrate the application of the grid. The grid-indicated ratings for the 31 representative gas pipelines map to current assigned ratings as follows (see Appendix B for details):

- 12 pipelines map to their actual rating;
- 10 pipelines have a grid-indicated rating that is one alpha-numeric notch from its actual rating;
- 7 pipelines have a grid-indicated rating that is two alpha-numeric notches from its actual rating.
- 2 pipeline has a grid-indicated rating that is three alpha-numeric notches from its actual rating.

Outside North America

This methodology applies to three gas pipelines outside North America. The grid-indicated rating mapped to one notch below the Baa3 foreign currency senior unsecured rating of Colombian Transportadora de Gas Internacional S.A. E.S.P. The grid-indicated rating was three notches above the B3 foreign currency senior unsecured rating for Transportadora de Gas del Sur (TGS) and the Baa3 foreign currency issuer rating for JSC KazTransGas (JKT).

The methodology grid is calibrated based on a credit-neutral sovereign environment as is typical where the government is rated Aaa. Where country risks become more material it may be necessary to adjust the scorecard outcome accordingly.

In the case of TGS, the B3 foreign currency rating reflects the credit quality of the Argentine government (B3), which has frozen the pipeline's tariffs, while the grid-indicated rating is lifted by the strong cash flows from its unregulated natural gas liquids business.

For JKT, where a government-owned gas pipeline might be expected to receive extraordinary government support, we use this methodology to calibrate its Baseline Credit Assessment and then apply our methodology for Government-Related Issuers to give a further uplift for expected extraordinary governmental support. In the case of JKT, its Baa3 foreign currency issuer rating reflects indirect ownership and "high support" by the Government of Kazakhstan (Baa2 stable).

Appendix A: Natural Gas Pipeline Methodology Grid

FACTOR 1

Natural Gas Pipelines

Factor 1	Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Market Position (15%)	a) Demand Growth	5%	Exceptionally large, diverse, developed economic base and end-market, e.g., population >25,000,000	Exceptionally large, diverse, developed economic base and end-market, e.g., population >20,000,000	Very large, diverse, developed economic base and end-market, e.g., with population >15,000,000	Large, diverse economic base and end-market that is either developed/mature or developing/growing, e.g., population >5,000,000	Medium-sized economic base and end-market that is either developed/mature or undeveloped/growing, e.g., population >1,000,000	Small economic base and end-market that is either developed/declining or undeveloped/growing, e.g., population >500,000	Very small economic base and end-market that is declining or undeveloped, e.g., population <500,000
	b) Competition	5%	No competition; no change in foreseeable future.	Very limited competition; no change in foreseeable future.	Well-established and stable competitive environment; little change in foreseeable future.	Stable competitive environment, but competition may intensify over the long term with gradual impact.	Competitive environment; may intensify over the medium term with gradual impact.	Changing competitive environment; likely to decrease margins over the medium term.	Rapidly changing competitive environment; likely to decrease margins over the short term.
	c) Volume Risk & Throughput Trend	5%	Nil long term volume risk; exceptionally strong commercial outlook, e.g., sustainable 50% increase in throughput over 3 yrs.	Modest long term volume risk; strong commercial outlook, e.g. sustainable 30% to 50% increase in throughput over 3 yrs.	Modest medium term volume risk; good commercial outlook, e.g. sustainable 10% to 30% increase in throughput over 3 yrs.	Limited medium term volume risk; good commercial outlook; pipe full or moderately increasing throughput, e.g. 0% to 10% over 3 yrs.	Material medium term volume risk; steadily decreasing throughput, e.g. 0% to -25% over 3 yrs.	Significant near term volume risk; rapidly decreasing or uncertain throughput, e.g. -25% to -50% over 3 yrs.	Extraordinarily decreasing or uncertain throughput, e.g. -50% or more over 3 yrs.

FACTOR 2

Natural Gas Pipelines

Factor 2	Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Quality of Supply Source (10%)	Supply Source	10%	Numerous supply areas with exceptionally high production e.g., >20,000 BCF p.a.	Numerous supply areas with very high production, e.g., >10,000 BCF p.a.	Several supply areas with very high production, e.g., >5,000 BCF p.a. (or >1,000 BCF p.a. with very strong growth outlook); excellent access to markets	Some diversity in supply areas with substantial production, e.g., >1,000 BCF p.a. (or >500 BCF p.a. with very strong growth outlook); reasonable access to markets	Concentration in supply areas with moderate production, e.g., >500 BCF p.a. (or >250 BCF p.a. with strong growth outlook); some limitation in access to markets	Reliance on supply area with low/declining production, e.g., >250 BCF p.a.	Reliance on supply area with very low/fast declining production, e.g., <250 BCF p.a.

FACTOR 3

Natural Gas Pipelines

Factor 3	Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Contract Quality (30%)	a) Firm Revenues	10%	Firm agreements comprise 100% of revenues or capacity.	Firm agreements comprise 90 < 100% of revenues or capacity.	Firm agreements comprise 80 < 90% of revenues or capacity.	Firm agreements comprise 70 < 80% of revenues or capacity.	Firm agreements comprise 60 < 70% of revenues or capacity.	Firm agreements comprise 50 < 60% of revenues or capacity.	Firm agreements comprise < 50% of revenues or capacity.
	b) Contract Life	10%	Average remaining life of contract of > 30 yrs.	Average remaining life of contract of 15 to 30 yrs.	Average remaining life of contract of 7 to 15 yrs.	Average remaining life of contract of 5 to 7 yrs.	Average remaining life of contract of 3 to 5 yrs.	Average remaining life of contract of 2 to 3 yrs.	Average remaining life of contract of < 2 yrs.
	c) Shipper Quality / Re-contracting Risk	10%	Well-diversified portfolio of longstanding shippers with a weighted average rating of Aaa; certain to renew contracts	Well-diversified portfolio of longstanding shippers with a weighted average rating of Aa; highly likely to renew contracts	Reasonably diverse portfolio of longstanding shippers with a weighted average rating of A; likely to renew contracts	Concentrations in some shippers with a weighted average rating of Baa; a few may not renew contracts	Shippers with a weighted average rating of Ba; several may not renew contracts	Shippers with a weighted average rating of B; some will not renew contracts	Shippers with a weighted average rating of Caa; many will not renew contracts

FACTOR 4

Natural Gas Pipelines

Factor 4	Sub-Factor	Weight	Aaa	Aa	A	Baa	Ba	B	Caa
Financial Strength (45%)	a) FFO + Interest / Interest (1 yr)	15%	> 7x	6 - 7x	5 - 6x	4 - 5x	3 - 4x	2 - 3x	< 2x
	b) FFO / Debt (1 yr)	15%	> 60%	40 - 60%	25 - 40%	15 - 25%	10 - 15%	5 - 10%	< 5%
	c) FFO - Dividends / Debt (1 yr)	15%	> 35%	25 - 35%	18 - 25%	12 - 18%	6 - 12%	0 - 6%	< 0%

Appendix B: Observations and Outliers for Grid Mapping

Observations and Outliers			
Issuer	Rating	Outlook	Grid Indicated Rating
Alliance Pipeline L.P.	A3 (1)	Stable	Baa2
Alliance Pipeline Limited Partnership	Baa1	Stable	Baa3
ANR Pipeline Company	A3	Stable	A3
Colorado Interstate Gas Company	Baa3	Stable	Baa2
El Paso Natural Gas Company	Baa1	Stable	Baa3
Florida Gas Transmission Company, LLC	Baa2	Stable	Baa1
Gas Transmission Northwest LLC	A3	Stable	Baa1
Gulf South Pipeline Company, LP	Baa1	Stable	Baa1
Gulfstream Natural Gas System L.L.C.	Baa2	Stable	Baa2
Iroquois Gas Transmission System, L.P.	A3	Stable	Baa1
JSC KazTransGas	Baa3 (2)	Stable	A3
Kern River Funding Corporation	A3	Stable	A2
Maritimes & Northeast Pipeline Ltd Partnsh	A2 (1)	Stable	Baa2
Maritimes & Northeast Pipeline, LLC	Ba1 (3)	Negative	Ba1
Midcontinent Express Pipeline LLC	Ba1 (3)	Stable	Ba1
NGPL PipeCo. LLC	Ba3 (3)	Negative	Ba3
Northern Natural Gas Company	A2	Stable	A3
Northwest Pipeline GP	Baa1	Stable	A3
Panhandle Eastern Pipe Line Company, LP	Baa3	Stable	Baa2
Questar Pipeline Company	A3	Stable	A3
Rockies Express Pipeline LLC	Ba1 (3)	Stable	Ba1
Ruby Pipeline, LLC	Baa3	Stable	Ba2
Southeast Supply Header, LLC	Baa3	Stable	Baa3
Southern Natural Gas Company	Baa3	Stable	Baa1
Southern Star Central Corp.	Ba1	Stable	Ba1
Tennessee Gas Pipeline Company	Baa1	Stable	Baa1
Texas Eastern Transmission L.P.	Baa1	Stable	A2
Texas Gas Transmission, LLC	Baa1	Stable	Baa1
Transcontinental Gas Pipe Line Corporation	Baa1	Stable	A2
Transportadora de Gas Internacional S.A. E.S.P.	Baa3 (4)	Stable	Ba1
Transportadora de Gas del Sur S.A.	B3 (4)	Negative	Ba3

(1) Senior secured rating. In project finance, typically the fundamental rating reflecting the benefits of security and other enhancements.

(2) LT Issuer Rating (Foreign Currency).

(3) Corporate Family Rating.

(4) Senior Unsecured (Foreign Currency).

Factor 1: Outlier Discussion

Market Position

Positive outliers on the Market Position factor include pipelines in the southeastern US, where there is above-average demand growth, or those that have recently completed large expansions, but whose ratings are suppressed by a leveraged parent company. Florida Gas Transmission exemplifies such a positive outlier, as it is the dominant gas supplier to Florida, an isolated market that has the most growth potential in North America, and it recently completed yet another phase of expansion. All three pipelines outside of North America are positive outliers due to their strong competitive positions, which are limited by the credit quality of their countries. Negative outliers include regionally concentrated pipelines that have recently seen throughput declines from increased competition (Gas Transmission Northwest) or decreasing gas supplies (Maritimes and Northeast Pipeline LP).

Factor 2: Outlier Discussion

Quality of Supply Sources

The negative outliers on the Quality of Supply Sources factor include pipelines, such as Northern Natural and Questar, which have fairly average supply profiles but very strong balance sheets. The Maritimes & Northeast pipelines are also negative, because the gas field it was built to serve is fast declining. Structural enhancements that are part of the pipelines' project financing offset these negative supply trends.

Factor 3: Outlier Discussion

Contract Quality

All outliers in the Contract Quality factor are positive. The positive outliers usually involve A-rated utility customers that have entered into decade-long contracts that are substantially for firm services, and include a number of southeastern pipelines such as Southern Natural and Southeast Supply Header.

Factor 4: Outlier Discussion

Financial Strength

Most North American outliers in the Financial Strength factor are negative. These are mostly pipelines of recent vintage, such as Ruby and Rockies Express, or those that have recently changed ownership, such as NGPL. These negative outliers show pipeline owners' increased willingness to put more debt on these stable assets. Outside North America, two out of three pipelines are positive outliers, because their strong financial ratios are limited by the credit quality of their countries. Transportadora de Gas Internacional is the single negative outlier, due to the large capital expenditure program that is temporarily weakening its financial performance.

Appendix C: Overview of Gas Pipelines in North America and Key Credit Issues Over the Intermediate Term

The shale gas phenomenon, the biggest change for the North American pipeline sector over the last three years, has been credit positive because it has spurred organic growth.³ Pipelines have experienced rising throughput and revenues by connecting to new supplies. In the second half of this decade, pipelines will also see revenue growth from gas-fired power generation particularly in regulated power markets.

North American gas resources have proven to be robust, and natural gas as the current fuel of choice is good for the pipeline industry in the long term. In the interim, over the next few years, however, we expect some pipelines' business risk to rise, as the ever-faster pace of development in many areas has raised uncertainty as supply shifts have become more dynamic, upending the reason why some pipelines were built.

During this period of adjustment over the next few years, we believe that the pipeline industry will effectively mitigate this increased business risk through diversification, long-term contracts, and rate cases. We believe that the risk of a pipeline asset becoming stranded is low, considering the long lead time afforded by multi-year contracts and the industry's good track record in its commercial activities.

Pipelines will see new demand from power generation, but it will take several years to materialize. New power revenues will be concentrated in regulated electric markets, like the southeastern US, where utilities are willing to enter into long-term contracts. Merchant power generators in unregulated markets are less likely to do so. Significant changes will need to be made between the gas and electric industries for pipelines to realize the full potential from gas-fired power generation.

³ For more information about trends in the North American pipeline industry, refer to our Special Comment [Gas Pipeline Navigate Shifts in Supply and Demand](#), July 2012.

Moody's Related Research

Special Comments:

- » [Gas Pipelines Navigate Shifts in Supply and Demand, July 2012 \(143576\)](#)
- » [US Electric Power Generation Volumes: Slow Shift in Electric Generation Mix Favors Natural Gas, Renewables at the Expense of Coal, June 2012 \(141980\)](#)
- » [Low Natural Gas Prices Herald Long-Term Changes in US Energy Infrastructure, April 2012 \(140797\)](#)
- » [Pipeline Safety Costs Rising As Alternative Rate Designs Sought, April 2012 \(137329\)](#)
- » [Anemic Pipeline ROE Trends Reduce Risk of FERC Pipeline Rate Investigations: Cash flow metrics holding steady as North American pipeline grid reconfigures, January 2012 \(136950\)](#)
- » [US Natural Gas: Low Prices Pose Little Trouble for Midwest Natural Gas Companies, May 2011 \(133445\)](#)
- » [Marcellus Stokes Pipeline Competition for the New York Gas Market, June 2010 \(125833\)](#)

Issuer Comments:

- » [Spectra Energy Signs Agreement for Pipeline Expansion, a Credit Positive, January 2012 \(139336\)](#)
- » [US Regulatory Support for NiSource Pipeline Modernization Is Credit Positive, April 2012 \(141694\)](#)
- » [TransCanada's Rate Request Meets Opposition, a Credit Negative, June 2012 \(142942\)](#)

Industry Outlooks:

- » [Global Independent Exploration and Production: High Oil Prices Spur E&P Companies to Push Liquids Production, May 2012 \(141678\)](#)
- » [North American Midstream Sector: Booming Demand for New Oil and NGL Infrastructure Trumps Weak Natural Gas Prices, March 2012 \(140955\)](#)
- » [US Regulated Utilities: Stable Despite Rising Headline Rhetoric, January 2012 \(137878\)](#)

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

» contacts continued from page 1

Analyst Contacts:**NEW YORK** +1.212.553.1653Stuart Miller +1.212.553.7991
Vice President – Senior Credit Officer
stuart.miller@moodys.comPeter Speer +1.212.553.4565
Vice President – Senior Credit Officer
peter.speer@moodys.comNatividad Martel +1.212.553.4561
Assistant Vice President – Analyst
natividad.martel@moodys.comJohn Grause +1.212.553.7214
Analyst
john.grause@moodys.com**TORONTO** +1.416.214.1635David Brandt +1.416.214.3864
Vice President – Senior Credit Officer
david.brandt@moodys.com**BUENOS AIRES** +54.911.5129.2600Daniela Cuan +54.911.5129.2617
Vice President – Senior Analyst
daniela.cuan@moodys.com**MOSCOW** +7.495.228.6060Julia Pribytkova +7.495.228.6071
Vice President – Senior Analyst
julia.pribytkova@moodys.com

Report Number: 146415

Author
Mihoko Manabe, CFA**Production Associate**
Eri Watanabe**Associate Analysts**
Maurizio Asperti
Lesley Ritter**Editor**
Robert Cox

© 2012 Moody's Investors Service, Inc. and/or its licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S INVESTORS SERVICE, INC. ("MIS") AND ITS AFFILIATES ARE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND CREDIT RATINGS AND RESEARCH PUBLICATIONS PUBLISHED BY MOODY'S ("MOODY'S PUBLICATIONS") MAY INCLUDE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL, FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS AND MOODY'S OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. CREDIT RATINGS AND MOODY'S PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. NEITHER CREDIT RATINGS NOR MOODY'S PUBLICATIONS COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS AND PUBLISHES MOODY'S PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process. Under no circumstances shall MOODY'S have any liability to any person or entity for (a) any loss or damage in whole or in part caused by, resulting from, or relating to, any error negligent or otherwise) or other circumstance or contingency within or outside the control of MOODY'S or any of its directors, officers, employees or agents in connection with the procurement, collection, compilation, analysis, interpretation, communication, publication or delivery of any such information, or (b) any direct, indirect, special, consequential, compensatory or incidental damages whatsoever (including without limitation, lost profits), even if MOODY'S is advised in advance of the possibility of such damages, resulting from the use of or inability to use, any such information. The ratings, financial reporting analysis, projections, and other observations, if any, constituting part of the information contained herein are, and must be construed solely as, statements of opinion and not statements of fact or recommendations to purchase, sell or hold any securities. Each user of the information contained herein must make its own study and evaluation of each security it may consider purchasing, holding or selling.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY SUCH RATING OR OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

MIS, a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MIS have, prior to assignment of any rating, agreed to pay to MIS for appraisal and rating services rendered by it fees ranging from \$1,500 to approximately \$2,500,000. MCO and MIS also maintain policies and procedures to address the independence of MIS's ratings and rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold ratings from MIS and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moodys.com under the heading "Shareholder Relations – Corporate Governance – Director and Shareholder Affiliation Policy."

Any publication into Australia of this document is by MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657, which holds Australian Financial Services License no. 336969. This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001.

Notwithstanding the foregoing, credit ratings assigned on and after October 1, 2010 by Moody's Japan K.K. ("MJKK") are MJKK's current opinions of the relative future credit risk of entities, credit commitments, or debt or debt-like securities. In such a case, "MIS" in the foregoing statements shall be deemed to be replaced with "MJKK". MJKK is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO.

This credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors. It would be dangerous for retail investors to make any investment decision based on this credit rating. If in doubt you should contact your financial or other professional adviser.

Approved Natural Gas Rate Cases

Date	Company	State	Common Equity
			Ratio
1/15/20	MDU Resources Group Inc.	WY	51.25
1/16/20	Consolidated Edison Co. of NY, Inc.	NY	48.00
1/24/20	Roanoke Gas Co.	VA	59.64
2/3/20	Cascade Natural Gas Corp.	WA	49.10
2/24/20	Atmos Energy Corp.	KS	56.32
2/25/20	Questar Gas Co.	UT	55.00
2/28/20	Fitchburg Gas and Electric Light Co.	MA	52.45
3/25/20	Avista Corp.	WA	48.50
3/26/20	Northern Utilities, Inc.	ME	50.00
4/21/20	Atmos Energy Corp.	TX	60.12
5/19/20	Black Hills Colorado Gas, Inc.	CO	50.15
6/16/20	CenterPoint Energy Resources Corp.	TX	56.95
7/8/20	Puget Sound Energy, Inc.	WA	48.50
8/4/20	Texas Gas Service Co., Inc.	TX	59.00
8/21/20	Questar Gas Co.	WY	55.00
9/14/20	Chattanooga Gas Co.	TN	49.23
9/23/20	South Jersey Gas Co.	NJ	54.00
9/25/20	Southwest Gas Corp.	NV	49.26
9/25/20	Southwest Gas Corp.	NV	49.26
10/7/20	Eversource Gas Co. of Mass.	MA	53.25
10/12/20	Public Service Co. of Colorado	CO	55.62
10/16/20	Northwest Natural Gas Company	OR	50.00
10/30/20	NSTAR Gas Company	MA	54.77
11/7/20	Columbia Gas of Maryland, Corp.	MD	52.63
11/19/20	New York State Electric & Gas Corp.	NY	48.00
11/19/20	Rochester Gas and Electric Corp.	NY	48.00
11/24/20	Madison Gas and Electric Company	WI	55.00
12/9/20	Southwest Gas Corporation	AZ	51.10
12/10/20	Avista Corporation	OR	50.00
12/16/20	Baltimore Gas and Electric Co.	MD	52.00
12/16/20	New Mexico Gas Company, Inc.	NM	52.00
12/21/20	Mountaineer Gas Company	WV	50.60
12/23/20	Wisconsin Power and Light Co.	WI	52.53
1/1/21	Atlanta Gas Light Co.	GA	56.00
1/6/21	Delmarva Power & Light Co.	DE	50.37
1/6/21	Cascade Natural Gas Corp.	OR	50.00
1/13/21	Ameren Illinois Co.	IL	52.00
1/26/21	Black Hills/Nebraska Gas Utility Co.	NE	50.00
2/16/21	Piedmont Natural Gas Co. Inc.	TN	50.50
2/19/21	Columbia Gas of Pennsylvania Inc.	PA	54.19

Approved Natural Gas Rate Cases

Date	Company	State	Common Equity
			Ratio
2/24/21	Washington Gas Light Co.	DC	52.10
3/25/21	Southwest Gas Corp.	CA	52.00
3/25/21	Southwest Gas Corp.	CA	52.00
3/25/21	Southwest Gas Corp.	CA	52.00
4/9/21	Washington Gas Light Co.	MD	52.03
5/5/21	MDU Resources Group Inc.	ND	50.31
5/18/21	Cascade Natural Gas Corp.	WA	49.10
5/19/21	Corning Natural Gas Corp.	NY	48.00
6/17/21	PECO Energy Co.	PA	53.38
7/19/21	Atmos Energy Corp.	TN	59.88
7/27/21	Hope Gas Inc.	WV	46.26
7/30/21	Liberty Utilities Corp.	NH	52.00
8/12/21	Brooklyn Union Gas Co.	NY	48.00
8/12/21	KeySpan Gas East Corp.	NY	48.00
9/1/21	Avista Corp.	ID	50.00
9/8/21	North Shore Gas Co.	IL	51.58
9/14/21	Virginia Natural Gas Inc.	VA	51.89
9/27/21	Avista Corp.	WA	48.50
9/30/21	Boston Gas Co.	MA	53.44
10/27/21	Spire Missouri Inc.	MO	49.86
11/17/21	New Jersey Natural Gas Co.	NJ	54.00
11/18/21	Atlanta Gas Light Co.	GA	56.00
11/18/21	Northern Illinois Gas Co.	IL	54.46
11/18/21	Central Hudson Gas & Elec. Corp.	NY	50.00
11/18/21	Northern States Power Co.	WI	52.50
11/18/21	Wisconsin Power and Light Co.	WI	52.50
11/23/21	Madison Gas and Electric Co.	WI	55.00
11/30/21	Oklahoma Natural Gas Co.	OK	58.55
12/3/21	Columbia Gas of Maryland Inc.	MD	52.95
12/13/21	Black Hills Colorado Gas Inc.	CO	50.26
12/16/21	Mountaineer Gas Co.	WV	52.90
12/28/21	Black Hills Iowa Gas Utility Co.	IA	50.01
12/28/21	Columbia Gas of Kentucky Inc.	KY	52.64
12/28/21	Duke Energy Kentucky Inc.	KY	51.34
1/6/22	Piedmont Natural Gas Co. Inc.	NC	51.60
1/20/22	Niagara Mohawk Power Corp.	NY	48.00
1/21/22	Public Service Co. of NC, Inc.	NC	51.60
3/22/22	Southwest Gas Corp.	NV	50.00
3/22/22	Southwest Gas Corp.	NV	50.00
Average			51.96

Spread Calculation for the Cost of Debt

Date	Five Year Yield	Basis point Spread	Indicated Yield
May 17, 2017	1.76%	135	3.111%
May 27, 2022	2.71%	135	4.061%
		Rounded to	4.06%

Investment Risk Measures

Company Name	Value Line ¹						S&P ³	Moody's ³
	Safety	Beta	Fin. Stren.	Earnings Pred.	Stability Rank	Quality ² Ranking	Bond Rating	Bond Rating
1 Atmos Energy Corp.	1	0.80	A+	100	95	A	A-	A1
2 Chesapeake Util.	2	0.75	A	95	90	A	NA	NA
3 New Jersey Res.	2	0.95	A+	55	85	A	NA	A1
4 N.W. Natural	3	0.80	A	10	85	B+	A+	Baa1
5 One Gas, Inc.	2	0.80	B++	100	95	NA	BBB+	A3
6 South Jersey Inds.	3	1.00	B++	70	50	B	BBB	A3
7 Southwest Gas	3	0.90	A	90	80	A	BBB-	Baa2
8 Spire Inc.	2	0.80	B++	45	90	A-	A-	Baa2
9 UGI Corp.	2	1.05	B++	90	80	A	NA	NA
Average	2.2	0.87		73	83			

Sources:

¹ Value Line Reports for May 27, 2022.

² CFRA Stock Report, May 20, 2022.

³ S&P Global Market Intelligence, downloaded on May 23, 2022.

DCF ANALYSIS

Company	Yield ¹	Value Line Historical ^{2,4}						Value Line ² Forecast			Yahoo ³
		EPS 10-Yr	DPS 10-Yr	BPS 10-Yr	EPS 5-Yr	DPS 5-Yr	BPS 5-Yr	EPS 5-Yr	DPS 5-Yr	BPS 5-Yr	EPS 5-Yr
1 Atmos Energy Corp.	2.5	8.5	5.5	8.5	8.5	8.0	11.0	7.5	7.0	7.5	7.7
2 Chesapeake Util.	1.5	9.5	6.5	9.5	9.0	7.5	11.0	8.0	8.0	7.0	7.0
3 New Jersey Res.	3.3	5.0	6.5	7.5	2.5	6.5	7.0	4.5	5.0	4.0	6.0
4 N.W. Natural	3.8	-1.5	1.5	1.0	1.5	0.5	NMF	6.0	0.5	5.5	3.7
5 One Gas, Inc.	3.0	NMF	NMF	NMF	10.0	14.5	3.0	6.0	6.5	8.5	5.0
6 South Jersey Inds.	3.9	1.5	6.5	5.5	-1.5	4.0	2.5	10.0	3.5	4.0	5.2
7 Southwest Gas	3.2	7.5	8.5	6.0	5.5	8.0	7.0	8.0	5.0	6.0	4.0
8 Spire Inc.	3.9	2.0	4.5	6.5	2.5	6.0	4.5	9.0	5.0	7.0	4.3
9 UGI Corp.	3.8	5.5	8.0	7.0	6.0	8.0	6.0	7.0	3.5	9.5	7.0
Average	3.2	5.6	5.9	6.4	5.7	7.0	6.5	7.3	4.9	6.6	5.5
Average DCF Result		8.8	9.1	9.6	8.9	10.2	9.7	10.5	8.1	9.8	8.7

Source:

1. Value Line Investment Survey, Summary and Index from March 4, 2022 to May 20, 2022.
2. Value Line Investment Survey, Standard Edition, May 27, 2022.
3. Yahoo Earnings Forecast as of May 9, 2022.
4. Negative values are excluded from analysis.

REGRESSION ANALYSIS OF APPROVED RETURNS ON EQUITY
 FOR LOCAL NATURAL GAS DISTRIBUTION UTILITIES

		[A] General Rate Case Gas Utility Approved ROE ¹	[B] Moody's A-Rated Bond Yields ²	[C]=[A]-[B] Gas Utility Risk Premium
	Year			
1	2007	10.22%	6.05%	4.17%
2	2008	10.39%	6.51%	3.88%
3	2009	10.22%	6.04%	4.19%
4	2010	10.15%	5.47%	4.68%
5	2011	9.91%	5.04%	4.87%
6	2012	9.93%	4.13%	5.80%
7	2013	9.68%	4.48%	5.20%
8	2014	9.78%	4.28%	5.50%
9	2015	9.60%	4.12%	5.49%
10	2016	9.53%	3.93%	5.60%
11	2017	9.73%	4.00%	5.73%
12	2018	9.59%	4.25%	5.34%
13	2019	9.73%	3.77%	5.96%
14	2020	9.47%	3.02%	6.46%
15	2021	9.56%	3.11%	6.45%
16	2022	9.38%	3.66%	5.72%
			Average	5.32%

Sources:

¹ S&P Global Market Intelligence, Regulatory Research Associates, "Major Rate Case Decisions," May 2, 2022.

² Mergent Bond Record, May 2022.

REGRESSION ANALYSIS OF ALLOWED RETURNS ON EQUITY
FOR LOCAL NATURAL GAS DISTRIBUTION UTILITIES

<i>Regression Statistics</i>	
Multiple R	0.92328782
R Square	0.8524604
Adjusted R Square	0.84192186
Standard Error	0.00120446
Observations	16

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.000117349	0.000117	80.8898	3.41632E-07
Residual	14	2.03102E-05	1.45E-06		
Total	15	0.000137659			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.08601635	0.001370769	62.75042	1.5E-18
X Variable 1	0.26790991	0.029788042	8.993875	3.4E-07

A-Rated Public Utility Bond Yield ¹	
Dec-21	3.13%
Jan-22	3.33%
Feb-22	3.68%
Mar-22	3.98%
Apr-22	4.32%
May-22	4.75%
Average	3.87%

Predicted Cost of Equity **9.64%**

Note:

Predicted Cost of Equity of 9.64% = 0.0860164 + 0.2679099 x 3.87%.

Source:

¹ Mergent Bond Record, May 2022.

Comparable Earnings Analysis¹

Company Name	2017	2018	2019	2020	2021	Average	
						Last 3 Years	Last 5 Years
1 Atmos Energy	9.80%	9.30%	8.90%	8.50%	8.40%	8.60%	8.98%
2 Chesapeake Util.	9.00%	10.90%	10.90%	10.10%	10.80%	10.60%	10.34%
3 New Jersey Res.	12.10%	16.90%	11.30%	10.60%	12.70%	11.53%	12.72%
4 N.W. Natural	NMF	8.80%	7.50%	7.90%	8.40%	7.93%	8.15%
5 One Gas, Inc.	8.20%	8.40%	8.80%	8.80%	8.80%	8.80%	8.60%
6 South Jersey Inds.	8.20%	9.20%	7.20%	9.80%	9.00%	8.67%	8.68%
7 Southwest Gas	9.60%	8.10%	8.50%	8.70%	6.80%	8.00%	8.34%
8 Spire Inc.	8.10%	9.50%	7.90%	3.20%	10.60%	7.23%	7.86%
9 UGI Corp.	12.90%	13.20%	10.80%	13.60%	7.70%	10.70%	11.64%
Average	9.74%	10.48%	9.09%	9.02%	9.24%	9.12%	9.51%
Median	9.30%	9.30%	8.80%	8.80%	8.80%	8.80%	9.00%

Sources:

¹ Value Line Investment Survey, Standard Edition, May 27, 2022.

Cost of Equity Summary

<hr/>		
<u>DCF Method</u>		
Based on Average Historical		9.38%
Based on Historical & Forecasted Growth Rates		9.34%
Based on Predicted Growth Rates		9.28%
	Average	9.33%
<hr/>		
Risk Premium Method		9.64%
	Average ¹	9.48%

Note:

¹. 9.48% = average of 9.33% and 9.64%.

Investment Risk Measures

Company Name	Value Line ¹						S&P ³	Moody's ³
	Safety	Beta	Fin. Stren.	Earning s Pred.	Stability Rank	Quality ² Ranking	Bond Rating	Bond Rating
1 Kinder Morgan, Inc.	3	1.15	B	25	75	B	BBB	Baa2
2 Pembina Pipeline	3	1.10	B++	15	60	A-	BBB	NA
3 TC Energy Corp.	3	1.05	B++	15	85	B+	BBB+	Baa1
4 Willams Cos.	3	1.20	B	75	65	B	BBB	Baa2
Average	3.0	1.13		33	71			

¹ Value Line Reports for May 27, 2022.

² CFRA Stock Report, May 20, 2022.

³ S&P Global Market Intelligence, downloaded on May 23, 2022.

Cardinal Pipeline Company, LLC.
Overall Cost of Capital
as of December 31, 2022

Item	Ratios	Cost Rate	Weighted Cost Rate	Pre-Tax Cost of Capital
Long-Term Debt	48.04%	4.06%	1.95%	1.95%
Common Equity	51.96%	9.48%	4.93%	6.40%
Total	100.00%		6.88%	8.36%

Pre-Tax Interest Coverage 4.3

Cardinal Pipeline Company, LLC
Overall Cost of Capital
as of December 31, 2021

Item	Ratios	Cost Rate	Weighted Cost Rate	Pre-Tax Cost of Capital ¹
Long-Term Deb	48.04%	4.96%	2.38%	2.39%
Common Equity	51.96%	9.55%	4.96%	6.45%
Total	100.00%		7.34%	8.84%

Pre-Tax Interest Coverage² 3.7

Note:

¹ Also includes gross up for Regulatory Fee.

² 3.7 = 8.84% / 2.39%.

Docket No. G-39, Subs 46 and 47
 Johnson Exhibit I
 Schedule 1

CARDINAL PIPELINE COMPANY, LLC
 Docket No. G-39, Sub 47
**RECONCILIATION OF GROSS REVENUE INCREASE REQUESTED BY
 THE COMPANY TO THE PUBLIC STAFF AMOUNT**
 For The Test Year Ended December 31, 2021

<u>Line No.</u>	<u>Item</u>	<u>Amount</u>
1	Decrease in revenue requirement filed by the Company	\$919,530
2	Additonal revenue requirement decrease per rounding and NCUC method	<u>0</u>
3	Adjusted revenue requirement filed by the Company	<u>\$919,530</u>
Gross revenue impact of Public Staff adjustments:		
4	Change in return on equity from 11.04% to 9.48%	(601,561)
5	Change in equity ratio from 59.23% to 51.96%	(417,449)
6	Change in debt cost from 5.25% to 4.06%	(326,789)
7	Rounding error in LT debt rate and ROE in company exhibits	0
8	Plant in service updates and related items @ March 31, 2022	(52,741)
9	Adjustment to amortize EDIT (reverse south georgia adjustment)	(163,597)
10	Adjustment for updated working capital	(964)
11	Adjustment for updated ADIT	12,625
12	Rounding errors	<u>(8,458)</u>
13	Total Public Staff adjustments (Sum of L4 thru L14)	<u>(1,558,934)</u>
14	Public Staff Recommended decrease (L3 + L15)	<u><u>(\$639,404)</u></u>

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
COMPUTATION OF COST OF SERVICE
For The Test Year Ended December 31, 2021

Docket No. G-39, Subs 46 and 47
Johnson Exhibit I
Schedule 1a

Line No.	Item	After Public Staff Adjustments (a)	Rate Increase (Decrease) (b)	After Rate Adjustment (c)
<u>Operating Revenues</u>				
1	Transportation of gas	\$11,719,365	(\$639,404)	\$11,079,961
2	Other operating revenues	0		0
3	Total operating revenues (L1 + L2)	<u>11,719,365</u>	<u>(639,404)</u>	<u>11,079,961</u>
<u>Operating Expenses</u>				
4	Operating and maintenance	2,377,586		2,377,586
5	Depreciation	4,057,012		4,057,012
6	Pipeline integrity deferral	82,411		82,411
7	General taxes	540,251	(831)	539,420
8	Income taxes	974,451	(146,712)	827,739
8	EDIT Amortization	(678,052)		(678,052)
9	Total operating expenses (Sum of L4 thru L8)	<u>7,353,659</u>	<u>(147,543)</u>	<u>7,206,115</u>
10	Net operating income for a return (L3 - L9)	<u>\$4,365,706</u>	<u>(\$491,861)</u>	<u>\$3,873,846</u>
<u>Rate Base</u>				
11	Plant in service	\$156,586,972		\$156,586,972
12	Accumulated depreciation	(74,320,707)		(74,320,707)
13	Net plant in service (L11 + L12)	<u>82,266,265</u>	0	<u>82,266,265</u>
14	Working capital	334,821		334,821
15	Accumulated deferred income taxes	(26,264,333)		(26,264,333)
16	Original cost rate base (Sum of L13 thru L15)	<u>\$56,336,753</u>	<u>\$0</u>	<u>\$56,336,753</u>

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
CALCULATION OF GROSS REVENUE EFFECT FACTORS
For The Test Year Ended December 31, 2021

Docket No. G-39, Subs 46 and 47
Johnson Exhibit I
Schedule 1b

Line No.	Item	Capital Structure (a)	[1] Cost Rates (b)	[2] Retention Factors (c)	Gross Revenue Effect (d)
Rate Base Factor:					
1	Long-term debt	48.04%	4.06%	0.9987000 [3]	0.019530 [5]
2	Short-term debt	0.00%	0.00%	0.9987000 [3]	0.000000 [5]
3	Common equity	51.96%	9.48%	0.7692487 [4]	0.064034 [5]
4	Total (Sum of L1 thru L3)	<u>100.00%</u>			<u>0.083564</u>
Net Income Factor:					
5	Total revenue			<u>1.0000000</u>	<u>1.0000000</u>
6	Uncollectibles			0.0000000 [6]	0.0000000 [6]
7	Balance (L5 - L6)			<u>1.0000000</u>	<u>1.0000000</u>
8	Regulatory fee (L7 x .0013%)			0.0000000	0.0013000
9	Balance (L7 - L8)			<u>1.0000000</u>	<u>0.9987000</u>
10	State income tax (L9 x 2.5%)			0.0250000	0.0249675
11	Balance (L9 - L10)			<u>0.9750000</u>	<u>0.9737325</u>
12	Federal income tax (L11 x 21%)			0.2047500	0.2044838
13	Retention (Gross up) factor (L11 - L12)			<u>0.7702500</u>	<u>0.7692487</u>

[1] Exhibit I, Schedule 4, Column (a).

[2] Exhibit I, Schedule 4, Column (f).

[3] Line 9.

[4] Line 13.

[5] Column (a) x column (b).

[6] Cardinal does not have uncollectibles.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
ORIGINAL COST RATE BASE
For The Test Year Ended December 31, 2021

Line No.	Item	Under Present Rates					After Public Staff Adjustments [5]
		Per Company After Pro Forma Adjustment [1] (a)	Correct Company Misclassification	Plant Update @ March 31, 2022 (b)	Working Capital Update [4] (c)	ADIT Update [4] (c)	
1	Plant in service	\$156,513,852	\$0	\$73,120 [2]			\$156,586,972
2	Accumulated depreciation	(72,552,544)	(\$803,313)	(\$964,850) [3]			(74,320,707)
3	Net plant in service (Sum of L1 thru L3)	83,961,308	(803,313)	(891,730)	0	0	\$82,266,265
4	Allowance for working capital	346,360	0	0	(11,539)		334,821
5	Accumulated deferred income taxes	(26,746,459)	331,039	0		151,087	(26,264,333)
6	Original cost rate base (Sum of L3 thru L5)	<u>\$57,561,209</u>	<u>(\$472,274)</u>	<u>(\$891,730)</u>	<u>(\$11,539)</u>	<u>\$151,087</u>	<u>\$56,336,753</u>
	Revenue requirement effect			(\$74,517)	(\$964)	\$12,625	

[1] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (d), Line 13 thru Line 17.

[2] Exhibit I, Schedule 2-1, column (a), line 3.

[3] Exhibit I, Schedule 2-1, column (a), line 8.

[4] Per Company Update @ March 31, 2022.

[5] Sum of columns (a) through (c).

Cardinal Pipeline Company, LLC
 Docket No. G-39, Sub 47
SUPPORT FOR UPDATED PLANT IN SERVICE AND RATE BASE
 For The Test Year Ended December 31, 2021

Docket No. G-39, Subs 46 and 47
 Johnson Exhibit I
 Schedule 2-1

Line No.	Item	Amount	
		(a)	
<u>Plant in Service:</u>			
1	Plant in service update @ March 31, 2022	\$156,586,972	[1]
2	Less plant in service per Company application as of December 31, 2021	156,513,852	[2]
3	Public Staff's adjustment to plant in service (L1 - L2)	<u>\$73,120</u>	
<u>Accumulated Depreciation:</u>			
4	Accumulated depreciation per books March 31, 2022	(\$74,375,309)	[1]
5	Less accumulated reserve removal of ARO	<u>54,602</u>	[1]
6	Accumulated Depreciation per Public Staff (SUM L4 thru L7)	(\$74,320,707)	
7	Accumulated depreciation per Company filing	<u>(73,355,857)</u>	[3]
8	Public Staff's adjustment to accumulated depreciation (L8 -L9)	<u>(\$964,850)</u>	
<u>Depreciation Expense:</u>			
9	Per Public Staff at March 31, 2022	4,057,012	[1]
10	Per Company application	<u>4,048,466</u>	[4]
11	Adjustment to depreciation expense (L11 - L12)	\$8,546	
<u>Property Taxes:</u>			
12	Net Plant in Service adjustment @ March 31, 2022	73,120	[5]
13	2022 average North Carolina property tax rate	<u>0.008095</u>	[6]
14	Property taxes (L14 x L15)	<u>\$592</u>	

- [1] Per Company update @ March 31, 2022, with correction of misclassifications..
- [2] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (d), Line 13 + Column (e), Line 13..
- [3] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (d), Line 14.
- [4] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (d), Line 4 + Column (e), Line 4.
- [5] Line 3.
- [6] Company's actual property tax rate per DR 18-2.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
NET OPERATING INCOME FOR A RETURN
For The Test Year Ended December 31, 2021

Docket No. G-39, Subs 46 and 47
Johnson Exhibit I
Schedule 3

Line No.	Item	Public Staff Adjustments				Public Staff Adjustments			
		After Company Pro Forma Adjustments [1] (a)	Correct Misclassification of Company Adjustments (b)	Plant Update @ March 31 2022 (c)	Amortize EDIT (d)	Interest Synchronization (e)	After Public Staff Adjustments [7] (f)	Rate Decrease (g)	After Rate Decrease (h)
Operating Revenues									
1	Transportation of gas	\$11,719,365	\$0				\$11,719,365		\$11,079,961
2	Other operating revenues	\$0	0				-		-
3	Total operating revenues (L1 + L2)	<u>11 719 365</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>11 719 365</u>	<u>(639 404)</u>	<u>11 079 961</u>
Operating Expenses									
4	Operating and maintenance	\$2,360,976	16,610				2,377,586		2,377,586
5	Depreciation	\$3,856,754	191,712	8,546 [2]			4,057,012		4,057,012
6	Regulatory debit (credit)	\$0	0				-		-
7	General taxes	\$523,228	16,431	592 [3]			540,251	(895)	539,356
8	Income taxes	989,760	(73,738)	(2,099) [4]		37,538 [4]	974,451	(146,697)	827,754
9	EDIT Amortization	(528,451)	13,783		(163,384) [5]		(678,052)		(678,052)
10	Pipeline Integrity Deferral	0	82,411				82,411		82,411
11	Accretion Expense	0	0						
12	Total operating expenses (Sum of L4 thru L8)	<u>7,202,267</u>	<u>247,209</u>	<u>7,038</u>	<u>(125,847)</u>	<u>22,990</u>	<u>7,353,659</u>	<u>(147,592)</u>	<u>7,206,067</u>
13	Net operating income for a return (L3 - L9)	<u>\$4 517 098</u>	<u>(\$247 209)</u>	<u>(\$7 038)</u>	<u>\$125 847</u>	<u>(\$22 990)</u>	<u>\$4 365 706</u>	<u>(\$491 812)</u>	<u>\$3 873 895</u>
	Revenue requirement effect		(\$321,365)	(\$9,150)	\$163,597	(\$29,886)			

- [1] Miller Exhibit (KM-002), Schedule 8, p. 1, column (d).
[2] Exhibit I, Schedule 2-2, column (a), line 11.
[3] Exhibit I, Schedule 2-2, column (a), line 14.
[4] Sum of lines 3 thru 8, times composite tax rate.
[5] Exhibit I, Schedule 3-1, line 13.
[6] Exhibit I, Schedule 3-4, line 6.
[7] Company's proforma adjusted operating revenues X 0.14%
[7] Exhibit I, Schedule 3-2, line 4.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
NET OPERATING INCOME FOR A RETURN PER COMPANY
For The Test Year Ended December 31, 2021

Docket No. G-39, Subs 46 and 47
Johnson Exhibit I
Schedule 3a

Line No.	Item	COMPANY PRO FORMA ADJUSTMENTS							Total Company Pro Forma Adjustments (i)	After Company Pro Forma Adjustments (j)	
		Per Company Books (a)	Include Decreased Normalized Revenues (b)	Decreased O&M Expenses (c)	ARO Depreciation Expense (d)	Removal of Regulatory Debit/Credit (e)	EDIT Amortization (f)	Removal of Accretion Expense (g)			Company Interest Synchronization (h)
Operating Revenues											
1	Transportation of gas	\$11,786,686	(\$67,321) [2]							(\$67,321)	\$11,719,365
2	Other operating revenues									\$0	-
3	Total operating revenues (L1 + L2)	<u>11,786,686</u>	<u>(67,321)</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>(67,321)</u>	<u>11,719,365</u>
Operating Expenses											
4	Operating and maintenance	2,391,583		(30,607) [4]						(\$30,607)	2,360,976
5	Depreciation	3,846,736			10,018 [5]					\$10,018	3,856,754
6	Regulatory debit (credit)	40,565				(40,565) [6]				(\$40,565)	-
7	General taxes	523,228								\$0	523,228
8	EDIT Amortization	(713,556)					185,105 [7]			\$185,105	(528,451)
9	Pipeline Integrity Deferral	0								\$0	-
10	Accretion expense (ARO)	37,546						(37,546) [8]		(\$37,546)	-
11	Income taxes	971,861	(15,467) [3]	7,032 [3]	(2,302) [3]	9,320	(42,528) [3]	8,626 [3]	53,218 [9]	\$17,899	989,760
12	Total operating expenses (Sum of L4 thru L9)	<u>7,097,963</u>	<u>(15,467)</u>	<u>(23,575)</u>	<u>7,716</u>	<u>(31,245)</u>	<u>142,577</u>	<u>(28,920)</u>	<u>53,218</u>	<u>104,304</u>	<u>7,202,267</u>
13	Net operating income for a return (L3 - L10)	<u>\$4,688,723</u>	<u>(\$51,854)</u>	<u>\$23,575</u>	<u>(\$7,716)</u>	<u>\$31,245</u>	<u>(\$142,577)</u>	<u>\$28,920</u>	<u>(\$53,218)</u>	<u>(\$171,625)</u>	<u>\$4,517,098</u>

[1] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (B), Line 1 thru Line 10.

[2] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (C), Line 1.

[3] Sum of lines 3 thru 9, times composite tax rate.

[4] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (C), Line 3.

[5] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (C), Line 4.

[6] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (C), Line 5.

[7] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (C), Line 8.

[9] Exhibit I, Schedule 3b, line 6.

[10] Sum of columns (b) thru (h).

[11] Sum of columns (a) thru (j).

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
COMPANY INTEREST SYNCHRONIZATION ADJUSTMENT
For The Test Year Ended December 31, 2021

Docket No. G-39, Subs 46 and 47
Johnson Exhibit I
Schedule 3b

<u>Line No.</u>	<u>Item</u>	<u>Amount</u>
1	Interest expense assigned per book tax computation	\$1,430,503 [1]
2	Interest expense assigned to rate base per Miller Exhibit, Statement H-3	<u>1,198,868 [2]</u>
3	Difference in interest expense tax deduction (L2 - L1)	<u>(231,635)</u>
4	Adjustment to state income taxes (L3 x 2.5%)	<u>5,791</u>
5	Adjustment to federal income taxes (L3 - L4 x 21%)	<u>47,427</u>
6	Total adjustment to income taxes (L4 + L5)	<u><u>\$53,218</u></u>

[1] Miller Exhibit (KM-002), Statement H-3 of Item 4, column (B), line 3.

[2] Miller Exhibit (KM-002), Schedule 8, Page 2 of 3, Column (G), Line 1

Cardinal Pipeline Company
Docket No. G-39, Sub 47
Computation of Income Taxes Per Company Filing
For The Test Year Ended December 31, 2021

Line No.	Line No.	Item	Per Books	[1] Company Adjustments	Before Rate Increase	Proposed Increase	After Proposed Increase
1	1	Revenue	\$11,786,686	(\$67,321)	\$11,719,365	\$919,530	\$12,638,895
2	2	Operating and maintenance	2,391,583	(\$13,997)	2,377,586		2,377,586
3	3	Depreciation	3,846,736	201,730	4,048,466		4,048,466
4	4	Regulatory debit	40,565	(40,565)	-		-
		EDIT Amortization	(713,556)	198,888	(514,668)		(514,668)
		Pipeline Integrity Deferral	-	82,411	82,411		82,411
5	5	Accretion expense	37,546	(37,546)	-		-
6	6	General taxes	523,228	16,431	539,659		539,659
7	7	Income before interest & taxes	5,660,584	(474,673)	5,185,911	919,530	6,105,441
8	8	Other income/expense	-	0	-	0	-
9	9	Interest expense	(1,430,503)	231,635	(1,198,868)		(1,198,868)
10	10	Book state taxable income	4,230,081	(243,038)	3,987,043	919,530	4,906,573
11	11	State taxes @ 2.5%	105,752	(6,076)	99,676	22,988	122,664
12	12	Book federal taxable income	4,124,329	(236,962)	3,887,367	896,542	4,783,909
13	13	Federal taxes @ 21%	866,109	(49,762)	816,347	188,274	1,004,621
14	14	Total income taxes	971,861	(\$55,838)	916,023	\$211,262	\$1,127,285
15	15	Other income tax adjustment (L7)		-			
16	16	Composite income tax rate		22.975%			
17	17	Other adjustment to income taxes		\$0			

[1] Miller Exhibit (KM-002), Schedule 8.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
AMORTIZE EDIT - REVERSE SOUTH GEORGIA
For The Test Year Ended December 31, 2021

Docket No. G-39, Subs 46 and 47
Johnson Exhibit I
Schedule 3-1

Line No.	Item	Amount
1	Regulatory Liability - Principle Balance	10,527,845 [1]
2	Tax Gross Up	3,209,172
3	Total Regulatory Liability - Income Tax Rate Reduction 1/	<u>13,737,017 [2]</u>
	<u>Average Remaining Life (ARL)</u>	
4	Depreciable Plant	156,513,852 [3]
5	Less Accumulated Depreciation Reserve	<u>(74,320,707) [4]</u>
6	Total Net Depreciable Plant	82,193,145 [5]
7	Depreciation Expense	4,057,012 [6]
8	Total ARL (Years)	20.26 [7]
9	PrincipAL Amortization	(519,649) [8]
10	Gross Up Amount	<u>(158,403) [9]</u>
11	Total RSG Amortization per Public Staff	(678,052) [10]
12	Total RSG Amortization per Company	<u>514,668 [11]</u>
13	Public Staff adjustment	<u><u>(163,384) [12]</u></u>

[1] Exhibit (KM-002), Statement H-3(a) Column (B).

[2] Sum of L1 + L2

[3] Exhibit (KM-002), Statement C, Column (B), the sum of depreciable intangible plant and transmission pl

[4] Company March 31, 2022 updated Statement D.

[5] Sum of L4 + L5

[6] Exhibit I, Schedule 2-2, column (a), line 11.

[7] Sum of L6/L7

[8] Sum of L1/L8

[9] Sum of L2/L8

[10] Sum of L3/L8

[11] Sum of L11 + L12

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
PUBLIC STAFF INTEREST SYNCHRONIZATION ADJUSTMENT
For The Test Year Ended December 31, 2021

Docket No. G-39, Subs 46 and 47
Johnson Exhibit I
Schedule 3-2

<u>Line No.</u>	<u>Item</u>	<u>Amount</u>
1	Interest expense assigned to rate base per Company	\$1,198,868 [1]
2	Interest expense assigned to rate base per Public Staff	<u>1,098,806 [2]</u>
3	Difference in interest expense tax deduction (L2 - L1)	<u>(100,062)</u>
4	Adjustment to state income taxes (L3 x 2.5%)	<u>2,502</u>
5	Adjustment to federal income taxes (L3 - L4 x 21%)	<u>20,488</u>
6	Total adjustment to income taxes (L4 + L5)	<u><u>\$22,990</u></u>

[1] Miller Exhibit (KM-002), Schedule 8, Page 2 of 3, Column G, Line 1

[2] Exhibit I, Schedule 4, Column (h), Line 1 + Line 2.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
RETURN ON EQUITY AND ORIGINAL COST RATE BASE
For The Test Year Ended December 31, 2021

Line No.	Item	Before Settlement Increase					After Settlement Increase				
		Capitalization Ratios [1] (a)	Original Cost Rate Base (b)	Embedded Cost/Return % (c)	Weighted Cost/Return % (d)	Net Operating Income (e)	Embedded Cost/Return % [1] (f)	Weighted Cost/Return % (g)	Net Operating Income (h)		
1	Long-term debt	48.04%	\$27,064,176 [2]	4.06% [1]	1.95% [5]	\$1,098,806 [7]	4.06%	1.95% [10]	\$1,098,806 [12]		
2	Short-term debt	0.00%	0 [2]	0.00% [1]	0.00% [5]	0 [7]	0.00%	0.00% [10]	\$0 [12]		
3	Common equity	<u>51.96%</u>	<u>29,272,577</u> [2]	11.16% [4]	<u>5.80%</u> [5]	<u>3,266,901</u> [8]	9.48%	<u>4.93%</u> [10]	<u>\$2,775,040</u> [12]		
4	Totals (Sum of L1 thru L3)	<u>100.00%</u>	<u>\$56,336,753</u> [3]		<u>7.75%</u> [6]	<u>\$4,365,706</u> [9]		<u>6.88%</u> [11]	<u>\$3,873,846</u> [13]		

- [1] Per Public Staff Witness [Hinton](#).
[2] Column (a) x Column (b), Line 4.
[3] Exhibit II, Schedule 2, Column (c), Line 9.
[4] Column (e) / Column (b).
[5] Column (a) x Column (c).
[6] Column (e), Line 4 / Column (b), Line 4.
[7] Column (b) x Column (c).

- [8] Column (e), Line 4 - Line 1 - Line 2.
[9] Exhibit II, Schedule 3, Column (d), Line 11.
[10] Column (a) x Column (f).
[11] Column (h), Line 4 / Column (b), Line 4.
[12] Column (b) x Column (f).
[13] Sum of Line 1 thru L3.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
CALCULATION OF INCREASE (DECREASE) IN
REVENUE REQUIREMENT
For The Test Year Ended December 31, 2021

Docket No. G-39, Subs 46 and 47
Johnson Exhibit I
Schedule 5

<u>Line No.</u>	<u>Item</u>	<u>Amount</u>
1	Common equity portion of rate base	\$29,272,577 [1]
2	Rate of return required on common equity	<u>9.48%</u> [2]
3	Income required for return on common equity (L1 x L2)	2,775,040
4	Less: income available	<u>3,266,901</u> [3]
5	Income increase (decrease) (L3 - L4)	(491,860)
6	Retention factor	<u>0.7692487</u> [4]
7	Gross revenue increase (decrease) (L5 / L6)	<u><u>(\$639,404)</u></u>

[1] Exhibit I, Schedule 4, Column (b), Line 3.

[2] Provided by Public Staff Witness Hinton.

[3] Exhibit I, Schedule 4, Column (e), Line 3.

[4] Exhibit I, Schedule 1b, Column (d), Line 13.

Settlement Exhibit A
Schedule 1

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
**RECONCILIATION OF GROSS REVENUE INCREASE REQUESTED BY
THE COMPANY TO THE SETTLEMENT AGREEMENT AMOUNT**
For The Test Year Ended December 31, 2021

Line No.	Item	Amount
1	Increase in revenue requirement filed by the Company	\$919,530
2	Additonal revenue requirement decrease per rounding and NCUC method	0
3	Adjusted revenue requirement filed by the Company	\$919,530
Gross revenue impact of Settlement adjustments:		
4	Change in return on equity from 11.04% to 9.55%	(574,567)
5	Change in equity ratio from 59.23% to 51.96%	(417,449)
6	Change in debt cost from 5.25% to 4.96%	(79,637)
7	Adjustment to regulatory fee under present rates	(1,198)
8	Plant in service updates and related items @ March 31, 2022	(52,618)
9	Adjustment to amortize EDIT (reverse south georgia adjustment)	(3,989)
10	Adjustment for updated working capital	1,020
11	Adjustment for updated ADIT	13,351
12	Rounding errors	(9,186)
13	Total Settlement adjustments (Sum of L4 thru L14)	(1,124,273)
14	Settlement Recommended decrease (L3 + L15)	(\$204,743)

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
COMPUTATION OF COST OF SERVICE
For The Test Year Ended December 31, 2021

Settlement Exhibit A
Schedule 1a

OFFICIAL COPY
Jul 04 2022

Line No.	Item	After Settlement Adjustments (a)	Rate Increase (Decrease) (b)	After Rate Adjustment (c)
<u>Operating Revenues</u>				
1	Transportation of gas	\$11,719,365	(\$204,743)	\$11,514,622
2	Other operating revenues	0		0
3	Total operating revenues (L1 + L2)	<u>11,719,365</u>	<u>(204,743)</u>	<u>11,514,622</u>
<u>Operating Expenses</u>				
4	Operating and maintenance	2,377,586		2,377,586
5	Depreciation	4,060,108		4,060,108
6	Pipeline integrity deferral	82,411		82,411
7	General taxes	539,104	(266)	538,837
8	Income taxes	881,259	(46,979)	834,280
8	EDIT Amortization	(518,652)		(518,652)
9	Total operating expenses (Sum of L4 thru L8)	<u>7,421,816</u>	<u>(47,245)</u>	<u>7,374,571</u>
10	Net operating income for a return (L3 - L9)	<u>\$4,297,549</u>	<u>(\$157,498)</u>	<u>\$4,140,051</u>
<u>Rate Base</u>				
11	Plant in service	\$156,592,986		\$156,592,986
12	Accumulated depreciation	(74,320,708)		(74,320,708)
13	Net plant in service (L11 + L12)	<u>82,272,278</u>	0	<u>82,272,278</u>
14	Working capital	357,899		357,899
15	Accumulated deferred income taxes	(26,264,333)		(26,264,333)
16	Original cost rate base (Sum of L13 thru L15)	<u>\$56,365,844</u>	<u>\$0</u>	<u>\$56,365,844</u>

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
CALCULATION OF GROSS REVENUE EFFECT FACTORS
For The Test Year Ended December 31, 2021

Settlement Exhibit A
Schedule 1b

Line No.	Item	Capital Structure [1] (a)	Cost Rates [2] (b)	Retention Factors (c)	Gross Revenue Effect (d)
Rate Base Factor:					
1	Long-term debt	48.04%	4.96%	0.9987000 [3]	0.023859 [5]
2	Short-term debt	0.00%	0.00%	0.9987000 [3]	0.000000 [5]
3	Common equity	51.96%	9.55%	0.7692487 [4]	0.064507 [5]
4	Total (Sum of L1 thru L3)	<u>100.00%</u>			<u>0.088366</u>
Net Income Factor:					
				<u>Per Company</u>	<u>Per Settlement</u>
5	Total revenue			1.0000000	1.0000000
6	Uncollectibles			0.0000000 [6]	0.0000000 [6]
7	Balance (L5 - L6)			1.0000000	1.0000000
8	Regulatory fee (L7 x .0013%)			0.0000000	0.0013000
9	Balance (L7 - L8)			1.0000000	0.9987000
10	State income tax (L9 x 2.5%)			0.0250000	0.0249675
11	Balance (L9 - L10)			0.9750000	0.9737325
12	Federal income tax (L11 x 21%)			0.2047500	0.2044838
13	Retention (Gross up) factor (L11 - L12)			<u>0.7702500</u>	<u>0.7692487</u>

[1] Settlement Exhibit A, Schedule 4, Column (a).

[2] Settlement Exhibit A, Schedule 4, Column (f).

[3] Line 9.

[4] Line 13.

[5] Column (a) x column (b).

[6] Cardinal does not have uncollectibles.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
ORIGINAL COST RATE BASE
For The Test Year Ended December 31, 2021

Settlement Exhibit A
Schedule 2

Under Present Rates							
Line No.	Item	Per Company After Pro Forma Adjustment [1] (a)	Correct Company Misclassification	Plant Update @ March 31, 2022 (b)	Working Capital Update [4] (c)	ADIT Update [4] (c)	After Settlement Adjustments [5] (d)
1	Plant in service	\$156,513,852	\$0	\$79,134 [2]			\$156,592,986
2	Accumulated depreciation	(72,552,544)	(\$803,313)	(\$964,851) [3]			(74,320,708)
3	Net plant in service (Sum of L1 thru L3)	83,961,308	(803,313)	(885,717)	0	0	\$82,272,278
4	Allowance for working capital	346,360	0	0	11,539		357,899
5	Accumulated deferred income taxes	(26,746,459)	331,039	0		151,087	(26,264,333)
6	Original cost rate base (Sum of L3 thru L5)	<u>\$57,561,209</u>	<u>(\$472,274)</u>	<u>(\$885,717)</u>	<u>\$11,539</u>	<u>\$151,087</u>	<u>\$56,365,844</u>
	Revenue requirement effect			(\$78,267)	\$1,020	\$13,351	

[1] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (d), Line 13 thru Line 17.

[2] Settlement Exhibit A, Schedule 2-1, column (a), line 3.

[3] Settlement Exhibit A, Schedule 2-1, column (a), line 8.

[4] Per Company Update @ March 31, 2022.

[5] Sum of columns (a) through (c).

Cardinal Pipeline Company, LLC
Docket No. G-39, Sub 47
SUPPORT FOR UPDATED PLANT IN SERVICE AND RATE BASE
For The Test Year Ended December 31, 2021

Settlement Exhibit A
Schedule 2-1

Line No.	<u>Item</u>	<u>Amount</u> (a)	
<u>Plant in Service:</u>			
1	Plant in service update @ March 31, 2022	\$156,592,986	[1]
2	Less plant in service per Company application as of December 31, 2021	156,513,852	[2]
3	Public Staff's adjustment to plant in service (L1 - L2)	<u>\$79,134</u>	
<u>Accumulated Depreciation:</u>			
4	Accumulated depreciation per books March 31, 2022	(\$74,375,310)	[1]
5	Less accumulated reserve removal of ARO	<u>54,602</u>	[1]
6	Accumulated Depreciation per Public Staff (SUM L4 thru L7)	(\$74,320,708)	
7	Accumulated depreciation per Company filing	<u>(73,355,857)</u>	[3]
8	Public Staff's adjustment to accumulated depreciation (L8 -L9)	<u>(\$964,851)</u>	
<u>Depreciation Expense:</u>			
9	Per Public Staff at March 31, 2022	4,060,108	[1]
10	Per Company application	<u>4,048,466</u>	[4]
11	Adjustment to depreciation expense (L11 - L12)	\$11,642	
<u>Property Taxes:</u>			
12	Net Plant in Service adjustment @ March 31, 2022	79,134	[5]
13	2022 average North Carolina property tax rate	<u>0.008095</u>	[6]
14	Property taxes (L14 x L15)	<u>\$641</u>	

[1] Per Company update @ March 31, 2022, with correction of misclassifications..

[2] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (d), Line 13 + Column (e), Line 13..

[3] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (d), Line 14.

[4] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (d), Line 4 + Column (e), Line 4.

[5] Line 3.

[6] Company's actual property tax rate per DR 18-2.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
NET OPERATING INCOME FOR A RETURN
For The Test Year Ended December 31, 2021

Settl

Line No.	Item	Settlement Adjustments					Settlement Adjustments		
		After Company Pro Forma Adjustments [1] (a)	Correct Misclassification of Company Adjustments (b)	Plant Update @ March 31, 2022 (c)	Amortize EDIT (d)	Reg Fee Adjustment (e)	Interest Synchronization (f)	After Public Staff Adjustments [7] (g)	Rate Decrease (h)
Operating Revenues:									
1	Transportation of gas	\$11,719,365	\$0					\$11,719,365	(\$204,743) [8]
2	Other operating revenues	\$0	0					-	
3	Total operating revenues (L1 + L2)	<u>11,719,365</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>11,719,365</u>	<u>(204,743)</u>
Operating Expenses:									
4	Operating and maintenance	\$2,360,976	16,610					2,377,586	
5	Depreciation	\$3,856,754	191,712	11,642 [2]				4,060,108	
6	Regulatory debit (credit)	\$0	0					-	
7	General taxes	\$523,228	16,431	641 [3]		(1,196)		539,104	(266)
8	Income taxes	989,760	(73,738)	(2,822) [4]	915	275 [4]	(33,132) [6]	881,259	(46,979)
9	EDIT Amortization	(528,451)	13,783		(3,984)			(518,652)	
10	Pipeline Integrity Deferral	0	82,411					82,411	
11	Accretion Expense	0	0					-	
12	Total operating expenses (Sum of L4 thru L8)	<u>7,202,267</u>	<u>247,209</u>	<u>9,461</u>	<u>(3,069)</u>	<u>(921)</u>	<u>(33,132)</u>	<u>7,421,816</u>	<u>(47,245)</u>
13	Net operating income for a return (L3 - L9)	<u>\$4,517,098</u>	<u>(\$247,209)</u>	<u>(\$9,461)</u>	<u>\$3,069</u>	<u>\$921</u>	<u>\$33,132</u>	<u>\$4,297,549</u>	<u>(\$157,498)</u>
Revenue requirement effect			(\$321,365)	(\$12,299)	\$3,989	(\$1,198)	\$43,071		

- [1] Miller Exhibit (KM-002), Schedule 8, p. 1, column (d).
[2] Settlement Exhibit A, Schedule 2-2, column (a), line 11.
[3] Settlement Exhibit A, Schedule 2-2, column (a), line 14.
[4] Sum of lines 3 thru 8, times composite tax rate.
[5] Settlement Exhibit A, Schedule 3-1, line 13.
[6] Settlement Exhibit A, Schedule 3-4, line 6.
[7] Company's proforma adjusted operating revenues X 0.13%
[8] Settlement Exhibit A, Schedule 5, line 7.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
NET OPERATING INCOME FOR A RETURN
For The Test Year Ended December 31, 2021

lement Exhibit A
Schedule 3

Line No.	Item	After Rate Decrease (h)
Operating Revenues:		
1	Transportation of gas	\$11,514,622
2	Other operating revenues	
3	Total operating revenues (L1 + L2)	11,514,622
Operating Expenses:		
4	Operating and maintenance	2,377,586
5	Depreciation	4,060,108
6	Regulatory debit (credit)	-
7	General taxes	538,837
8	Income taxes	834,280
9	EDIT Amortization	(518,652)
10	Pipeline Integrity Deferral	82,411
11	Accretion Expense	
12	Total operating expenses (Sum of L4 thru L8)	7,374,571
13	Net operating income for a return (L3 - L9)	\$4,140,051

Revenue requirement effect

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
NET OPERATING INCOME FOR A RETURN PER COMPANY
For The Test Year Ended December 31, 2021

Settlement Exhibit A
Schedule 3a

Line No.	Item	COMPANY PRO FORMA ADJUSTMENTS							Total Company Pro Forma Adjustments (i)	After Company Pro Forma Adjustments (j)	
		Per Company Books (a)	Include Decreased Normalized Revenues (b)	Decreased O&M Expenses (c)	ARO Depreciation Expense (d)	Removal of Regulatory Debit/Credit (e)	EDIT Amortization (f)	Removal of Accretion Expense (g)			Company Interest Synchronization (h)
Operating Revenues:											
1	Transportation of gas	\$11,786,686	(\$67,321) [2]							(\$67,321)	\$11,719,365
2	Other operating revenues									\$0	-
3	Total operating revenues (L1 + L2)	<u>11,786,686</u>	<u>(67,321)</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>(67,321)</u>	<u>11,719,365</u>
Operating Expenses:											
4	Operating and maintenance	2,391,583		(30,607) [4]						(\$30,607)	2,360,976
5	Depreciation	3,846,736			10,018 [5]					\$10,018	3,856,754
6	Regulatory debit (credit)	40,565				(40,565) [6]				(\$40,565)	-
7	General taxes	523,228								\$0	523,228
8	EDIT Amortization	(713,556)					185,105 [7]			\$185,105	(528,451)
9	Pipeline Integrity Deferral	0								\$0	-
10	Accretion expense (ARO)	37,546						(37,546) [8]		(\$37,546)	-
11	Income taxes	<u>971,861</u>	<u>(15,467)</u> [3]	<u>7,032</u> [3]	<u>(2,302)</u> [3]	<u>9,320</u>	<u>(42,528)</u> [3]	<u>8,626</u> [3]	<u>53,218</u> [9]	<u>\$17,899</u>	<u>989,760</u>
12	Total operating expenses (Sum of L4 thru L9)	<u>7,097,963</u>	<u>(15,467)</u>	<u>(23,575)</u>	<u>7,716</u>	<u>(31,245)</u>	<u>142,577</u>	<u>(28,920)</u>	<u>53,218</u>	<u>104,304</u>	<u>7,202,267</u>
13	Net operating income for a return (L3 - L10)	<u>\$4,688,723</u>	<u>(\$51,854)</u>	<u>\$23,575</u>	<u>(\$7,716)</u>	<u>\$31,245</u>	<u>(\$142,577)</u>	<u>\$28,920</u>	<u>(\$53,218)</u>	<u>(\$171,625)</u>	<u>\$4,517,098</u>

[1] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (B), Line 1 thru Line 10.

[2] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (C), Line 1.

[3] Sum of lines 3 thru 9, times composite tax rate.

[4] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (C), Line 3.

[5] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (C), Line 4.

[6] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (C), Line 5.

[7] Miller Exhibit (KM-002), Schedule 8, Page 1 of 3, Column (C), Line 8.

[9] Settlement Exhibit A, Schedule 3b, line 6.

[10] Sum of columns (b) thru (h).

[11] Sum of columns (a) thru (j).

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
COMPANY INTEREST SYNCHRONIZATION ADJUSTMENT
For The Test Year Ended December 31, 2021

Settlement Exhibit A
Schedule 3b

<u>Line No.</u>	<u>Item</u>	<u>Amount</u>
1	Interest expense assigned per book tax computation	\$1,430,503 [1]
2	Interest expense assigned to rate base per Miller Exhibit, Statement H-3	<u>1,198,868</u> [2]
3	Difference in interest expense tax deduction (L2 - L1)	<u>(231,635)</u>
4	Adjustment to state income taxes (L3 x 2.5%)	<u>5,791</u>
5	Adjustment to federal income taxes (L3 - L4 x 21%)	<u>47,427</u>
6	Total adjustment to income taxes (L4 + L5)	<u>\$53,218</u>

[1] Miller Exhibit (KM-002), Statement H-3 of Item 4, column (B), line 3.

[2] Miller Exhibit (KM-002), Schedule 8, Page 2 of 3, Column (G), Line 1

Settlement Exhibit A
Schedule 3c

Cardinal Pipeline Company
Docket No. G-39, Sub 47
Computation of Income Taxes Per Company Filing
For The Test Year Ended December 31, 2021

Line No.	Line No.	Item	Per Books	[1] Company Adjustments	Before Rate Increase	Proposed Increase	After Proposed Increase
1	1	Revenue	\$11,786,686	(\$67,321)	\$11,719,365	\$919,530	\$12,638,895
2	2	Operating and maintenance	2,391,583	(\$13,997)	2,377,586		2,377,586
3	3	Depreciation	3,846,736	201,730	4,048,466		4,048,466
4	4	Regulatory debit	40,565	(40,565)	-		-
		EDIT Amortization	(713,556)	198,888	(514,668)		(514,668)
		Pipeline Integrity Deferral	-	82,411	82,411		82,411
5	5	Accretion expense	37,546	(37,546)	-		-
6	6	General taxes	523,228	16,431	539,659		539,659
7	7	Income before interest & taxes	5,660,584	(474,673)	5,185,911	919,530	6,105,441
8	8	Other income/expense	-	0	-	0	-
9	9	Interest expense	(1,430,503)	231,635	(1,198,868)		(1,198,868)
10	10	Book state taxable income	4,230,081	(243,038)	3,987,043	919,530	4,906,573
11	11	State taxes @ 2.5%	105,752	(6,076)	99,676	22,988	122,664
12	12	Book federal taxable income	4,124,329	(236,962)	3,887,367	896,542	4,783,909
13	13	Federal taxes @ 21%	866,109	(49,762)	816,347	188,274	1,004,621
14	14	Total income taxes	971,861	(\$55,838)	916,023	\$211,262	\$1,127,285
15	15	Other income tax adjustment (L7)		-			
16	16	Composite income tax rate		22.975%			
17	17	Other adjustment to income taxes		\$0			

[1] Miller Exhibit (KM-002), Schedule 8.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
AMORTIZE EDIT - REVERSE SOUTH GEORGIA
For The Test Year Ended December 31, 2021

Settlement Exhibit A
Schedule 3-1

Line No.	Item	Amount
1	Regulatory Liability - Principle Balance	10,527,845 [1]
2	Tax Gross Up	3,209,172 [4]
3	Total Regulatory Liability - Income Tax Rate Reduction 1/	13,737,017 [2]
<u>Average Remaining Life (ARL)</u>		
4	Depreciable Plant	154,928,374 [3]
5	Less Accumulated Depreciation Reserve	(71,831,208) [4]
6	Total Net Depreciable Plant	83,097,166 [5]
7	Depreciation Expense	3,137,399 [6]
8	Total ARL (Years)	26.49 [7]
9	PrincipAL Amortization	(397,487) [8]
10	Gross Up Amount	(121,165) [9]
11	Total RSG Amortization per Public Staff	(518,652) [10]
12	Total RSG Amortization per Company	514,668 [1]
13	Settlement adjustment	(3,984) [12]

[1] Exhibit (KM-002), Statement H-3(a) Column (B).

[2] Sum of L1 + L2

[3] Exhibit (KM-002), Statement C, Column (B), the sum of depreciable intangible plant and transmission plant.

[4] Company March 31, 2022 updated Statement D.

[5] Sum of L4 + L5

[6] Settlement Exhibit A, Schedule 2-2, column (a), line 11.

[7] Sum of L6/L7

[8] Sum of L1/L8

[9] Sum of L2/L8

[10] Sum of L3/L8

[11] Sum of L11 + L12

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
PUBLIC STAFF INTEREST SYNCHRONIZATION ADJUSTMENT
For The Test Year Ended December 31, 2021

Settlement Exhibit A
Schedule 3-2

<u>Line No.</u>	<u>Item</u>	<u>Amount</u>
1	Interest expense assigned to rate base per Company	\$1,198,868 [1]
2	Interest expense assigned to rate base per Public Staff	<u>1,343,076 [2]</u>
3	Difference in interest expense tax deduction (L2 - L1)	<u>144,208</u>
4	Adjustment to state income taxes (L3 x 2.5%)	<u>(3,605)</u>
5	Adjustment to federal income taxes (L3 - L4 x 21%)	<u>(29,527)</u>
6	Total adjustment to income taxes (L4 + L5)	<u><u>(\$33,132)</u></u>

[1] Miller Exhibit (KM-002), Schedule 8, Page 2 of 3, Column G, Line 1

[2] Settlement Exhibit A, Schedule 4, Column (h), Line 1 + Line 2.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
RETURN ON EQUITY AND ORIGINAL COST RATE BASE
For The Test Year Ended December 31, 2021

Settlement Exhibit A
Schedule 4

Line No.	Item	Before Settlement Increase					After Settlement Increase			
		Capitalization Ratios [1]	Original Cost Rate Base	Embedded Cost/Return %	Weighted Cost/Return %	Net Operating Income	Embedded Cost/Return % [1]	Weighted Cost/Return %	Net Operating Income	
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	
1	Long-term debt	48.04%	\$27,078,151 [2]	4.96% [1]	2.38% [5]	\$1,343,076 [7]	4.96%	2.38% [10]	\$1,343,076 [12]	
2	Short-term debt	0.00%	0 [2]	0.00% [1]	0.00% [5]	0 [7]	0.00%	0.00% [10]	\$0 [12]	
3	Common equity	<u>51.96%</u>	<u>29,287,693 [2]</u>	10.09% [4]	<u>5.24% [5]</u>	<u>2,954,473 [8]</u>	9.55%	<u>4.96% [10]</u>	<u>\$2,796,975 [12]</u>	
4	Totals (Sum of L1 thru L3)	<u>100.00%</u>	<u>\$56,365,844 [3]</u>		<u>7.62% [6]</u>	<u>\$4,297,549 [9]</u>		<u>7.34% [11]</u>	<u>\$4,140,051 [13]</u>	

[1] Per Public Staff Witness [Hinton](#).

[2] Column (a) x Column (b), Line 4.

[3] Settlement Exhibit A, Schedule 2, Column (c), Line 9.

[4] Column (e) / Column (b).

[5] Column (a) x Column (c).

[6] Column (e), Line 4 / Column (b), Line 4.

[7] Column (b) x Column (c).

[8] Column (e), Line 4 - Line 1 - Line 2.

[9] Settlement Exhibit A, Schedule 3, Column (d), Line 11.

[10] Column (a) x Column (f).

[11] Column (h), Line 4 / Column (b), Line 4.

[12] Column (b) x Column (f).

[13] Sum of Line 1 thru L3.

CARDINAL PIPELINE COMPANY, LLC
Docket No. G-39, Sub 47
CALCULATION OF INCREASE (DECREASE) IN
REVENUE REQUIREMENT
For The Test Year Ended December 31, 2021

Settlement Exhibit A
Schedule 5

<u>Line No.</u>	<u>Item</u>	<u>Amount</u>
1	Common equity portion of rate base	\$29,287,693 [1]
2	Rate of return required on common equity	<u>9.55% [2]</u>
3	Income required for return on common equity (L1 x L2)	2,796,975
4	Less: income available	<u>2,954,473 [3]</u>
5	Income increase (decrease) (L3 - L4)	(157,498)
6	Retention factor	<u>0.7692487 [4]</u>
7	Gross revenue increase (decrease) (L5 / L6)	<u><u>(\$204,743)</u></u>

[1] Settlement Exhibit A, Schedule 4, Column (b), Line 3.

[2] Provided by Public Staff Witness Hinton.

[3] Settlement Exhibit A, Schedule 4, Column (e), Line 3.

[4] Settlement Exhibit A, Schedule 1b, Column (d), Line 13.

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. G-39, SUB 46
DOCKET NO. G-39, SUB 47

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. G-39, SUB 46)	
)	
In the Matter of)	
Cardinal Pipeline Company, LLC)	
Depreciation Rate Study as of)	
December 31, 2020)	SETTLEMENT AGREEMENT
)	AND STIPULATION
DOCKET NO. G-39, SUB 47)	
)	
In the Matter of)	
Application of Cardinal Pipeline)	
Company, LLC for an Adjustment in)	
its Rates and Charges)	

Pursuant to Section 62-69 of the North Carolina General Statutes and Rule R1-24(c) of the Rules and Regulations of the North Carolina Utilities Commission (Commission), Cardinal Pipeline Company, LLC (Cardinal or the Company), Piedmont Natural Gas Company, Inc. (Piedmont), and the Public Staff – North Carolina Utilities Commission (Public Staff), hereinafter collectively referred to as the “Stipulating Parties”, submit the following Settlement Agreement and Stipulation (Stipulation) for the Commission’s consideration. The Stipulating Parties stipulate and agree as follows:

1. **Background**. The events leading to the execution of this Stipulation are as follows:

A. On October 26, 2021, in Docket No. G-39, Sub 46 (Sub 46 Docket), Cardinal filed a Depreciation Rate Study (2021 Depreciation Rate Study) pursuant to Commission Rule R6-80, which requires each natural gas utility to submit a depreciation study for Commission approval every five years. Cardinal stated that its existing depreciation rates were contained in Cardinal's Depreciation Rate Study as of December 31, 2015 and were implemented in Docket No. G-39, Sub 38, Cardinal's last general rate case, effective August 1, 2017.

B. On February 11, 2022, Cardinal gave notice of its intent to file a general rate case. Cardinal also filed on this date a Request for Waivers of certain Commission requirements pertaining to Item 25 and Item 26 of the G-1 filing and waiver of Commission Rule R1-17 (b)(13)(d) requirement to publish notice to its customers in local newspapers. The Commission granted this request on April 4, 2022.

C. On March 15, 2022, Cardinal filed an application (Sub 47 Rate Case Application) in Docket No. G-39, Sub 47 (Sub 47 Rate Case Docket), seeking approval of: (1) an adjustment in its rates; (2) revised and updated amortizations and recovery of certain regulatory assets accrued since the Company's last general rate case; (3) the flowback of certain regulatory liabilities arising from excess deferred income taxes (EDIT) associated with the Tax Cuts and Jobs Act of 2017 and state income tax reductions; (4) authority to place certain pipeline integrity management costs in a deferred account for proposed future collection; (5) a request for deferred accounting treatment of cybersecurity

expenses; and (6) other updates and revisions to Cardinal's rate schedules. Cardinal's Sub 47 Rate Case Application included a request for approval to implement the depreciation rate changes included in its 2021 Depreciation Rate Study. The test year used was the twelve-month period ending on December 31, 2021. Included with that filing was certain information and data required by NCUC Form G-1; the direct testimony and exhibits of (1) Kerri H. Miller, Lead Regulatory Analyst Cardinal Operating Company, LLC, as Operator of Cardinal; (2) Michael P. Cousino, a tax analyst, (3) David J. Haag, an economist; and (4) Steven R. Fall, an energy consultant.

D. On March 28, 2022, the Public Staff filed a motion to consolidate Cardinal's Sub 46 Docket and Sub 47 Rate Case Docket, which was approved by Commission Order dated April 4, 2022.

E. On March 29, 2022, Piedmont filed a petition to intervene, which was granted by Commission Order on April 4, 2022.

F. On March 31, 2022, PSNC filed a petition to intervene, which was granted by Commission Order on April 4, 2022.

G. On April 5, 2022, the Public Staff filed a letter requesting the Commission to declare Cardinal's rate increase application a general rate case and suspend rates for up to 270 days from April 14, 2022, the date on which rates would otherwise go into effect.

H. On April 7, 2022, the Commission issued its Order Establishing General Rate Case and Suspending Rates.

I. On April 27, 2022, the Public Staff filed a letter and motion recommending that Cardinal's Sub 47 Rate Case Application be set for hearing and the Commission establish deadlines for petitions to intervene and file testimony, establish discovery rules, and require notice to customers.

J. On May 2, 2022, the Commission issued an Order Scheduling Investigation, Establishing Intervention and Testimony Due Dates and Discovery Guidelines, and Requiring Notice.

K. On June 10, 2022, the Public Staff filed the direct testimony and exhibits of witnesses: Roxie McCullar, Public Staff Depreciation Consultant, and John R. Hinton, Director of the Public Staff Economic Research Division. The Public Staff also filed a motion requesting Commission authorization for an extension of time until June 13, 2022, to file the direct testimony and exhibits of intervenors including the direct testimony and exhibits of the Public Staff's engineering and accounting witnesses and extend the time for the filing of Cardinal's rebuttal testimony and exhibits, if any, to June 27, 2022. This motion was granted on June 10, 2022.

L. On June 13, 2022, the Public Staff filed the direct testimony and exhibits of Neha Patel, Manager of the Natural Gas Section of the Public Staff Energy Division and Sonja R. Johnson, Manager for Natural Gas and Transportation with the Public Staff Accounting Division.

M. On June 27, 2022, Cardinal filed the Rebuttal Testimony of David J. Haag and Kerri H. Miller.

N. Subsequent to the filing of Cardinal's Sub 47 Rate Case Application in this docket, the Public Staff examined Cardinal's books and records and engaged in substantial discovery regarding the matters addressed by Cardinal's Sub 47 Rate Case Application. Following the completion of the Public Staff's investigation, a settlement conference was convened, as well as numerous conference calls, and the Stipulating Parties were able to arrive at a settlement of all the issues, the terms of which are reflected in this Stipulation and the exhibits attached hereto.

2. **Test Period.** The test period for this rate case is the twelve-month period ending on December 31, 2021, updated and adjusted for certain changes or circumstances occurring or becoming known through March 31, 2022.

3. **Rate Base.** The Stipulating Parties agree to adjust the estimated plant in service and related rate base components filed by Cardinal to reflect actual plant in service updates as of March 31, 2022. The Stipulating Parties further agree that the original cost rate base used and useful in providing service in North Carolina is \$56,365,846, consisting of gas plant in service of \$156,592,986 and working capital of \$357,899 reduced by accumulated depreciation of (\$74,320,708) and accumulated deferred income taxes of (\$26,264,333).

4. **Revenue Requirement.**

A. The Stipulating Parties agree to a total annual cost of service and revenue requirement for Cardinal of \$11,514,624. This represents a (\$204,741) decrease in revenue requirement from the end of period revenues filed by

Cardinal in this proceeding and a \$1,124,271 reduction from the \$919,530 increase in revenue requirement filed by Cardinal.

B. The Stipulating Parties agree that the net increase in depreciation expense should be \$11,642 from the \$4,048,466 filed by Cardinal to reflect the adjustment for actual plant in service as of March 31, 2022, and to incorporate the effect of the new depreciation rates. The Stipulating Parties agree that the annual level of depreciation expense to be used in this proceeding is \$4,060,108.

C. The overall level of operating expenses appropriate for use in this proceeding is \$7,374,573 as shown on Exhibit A (Total Settlement Cost of Service less Total Overall Return on Rate Base).

D. The hypothetical capital structure appropriate for use in this proceeding consists of 51.96% common equity and 48.04% debt (at a debt cost rate of 4.96%) as shown on Exhibit A.

E. The rate of return on common equity ("ROE") that the Company should be allowed an opportunity to earn is 9.55%, as shown on Exhibit A. This agreed level of ROE represents a significant compromise by each of the Stipulating Parties from their respective litigation positions. This agreed-upon ROE is deemed by each Stipulating Party to be a reasonable ROE for use in this proceeding that will provide the Company with a reasonable opportunity, by sound management, to (1) produce a fair return for its shareholders, and a just and reasonable result for its customers considering changing economic conditions and other factors; (2) maintain the Company's facilities and services in

accordance with the reasonable requirements of its customers in the territory covered by its franchise; and (3) compete in the market for capital funds on terms that are fair to its customers and to its existing investors. Each of the Stipulating Parties further agrees that such agreed-upon ROE, together with the agreed-upon capital structure and adjustments to the Company's rate base and operating expenses, results in a revenue requirement that is just and reasonable to the Company's customers in light of changing economic conditions.

F. The weighted overall rate of return that the Company should be allowed an opportunity to earn on its rate base is 7.34%, as shown on Exhibit A. Furthermore, this rate should be used by the Company as its AFUDC rate. The calculation of revenue requirements related to AFUDC shall take into account both the tax deductibility of the weighted debt component of the overall rate of return and the tax non-deductibility of the weighted equity component of the overall rate of return. AFUDC accrued shall be adjusted as appropriate for income taxes.

G. The Stipulating Parties agree that taxes other than income should be adjusted for property taxes based on the aforementioned adjustments to plant in service and for the regulatory fee based on the agreed-to revenue requirement. The appropriate annual level of taxes other than income to be used in this proceeding under proposed rates is \$538,838.

H. The Stipulating Parties agree that income taxes should be determined using the North Carolina state income tax rate of 2.5% and the federal income tax rate of 21%, and that the composite state and federal income

tax rate is 22.975%. The Stipulating Parties also agree that income taxes should be calculated based on the overall return amount (less the interest and debt component) determined in this proceeding.

I. The revenues generated by the rates shown on Exhibit B will produce the revenue requirement established in this Stipulation.

5. Cost of Service and Rate Design.

A. The Stipulating Parties agree to the allocation methodology employed by the Company in determining the cost of service applicable to each zone as shown on Exhibit A and the specific rates as shown on Exhibit B, which are attached hereto and incorporated by reference herein.

B. The Stipulating Parties agree to the zonal allocation factors as shown on Exhibit A.

C. The Stipulating Parties agree that total cost of service is \$11,514,624, a reduction of (\$1,124,271) from the cost of service included in Cardinal's Application, utilizing the rate of return agreed to by the Stipulating Parties.

D. Through the rates and charges approved in this Stipulation, the Company should be authorized to decrease its annual level of operating revenues by (\$204,741) per year from the end of test period revenue filed by Cardinal in this proceeding.

6. **Depreciation Rate Study and Depreciation Expense.**

The Stipulating Parties agree to the depreciation rates submitted in the 2021 Depreciation Rate Study filed by the Company in the Sub 46 Docket, as modified by adjustments to the Depreciation and Negative Salvage rates recommended by Public Staff witness McCullar. Using the recommended rates, the Stipulating Parties agree to an updated annualized depreciation expense amount of \$4,060,108. The Stipulating Parties agree that effective on the first day of the month following Commission order approving this Stipulation, Cardinal will adopt the depreciation rates, as revised by Public Staff witness McCullar, reflected in the 2021 Depreciation Rate Study.

7. **Income Taxes & Excess Deferred Income Taxes (“EDIT”) Amortization**

A. Income Taxes. The Stipulating Parties agree to reflect the Income Taxes and EDIT Amortization as separate line items in the Total Cost of Service.

B. EDIT Amortization. The Stipulating Parties agree that the unamortized balance of EDIT as of December 31, 2021 is \$13,737,017, and is comprised of two regulatory liabilities: (1) EDIT as a result of the decrease in the Federal Corporate Income Tax Rate from the Tax Cut and Jobs Act of 2017, and (2) EDIT as a result of the decrease in the North Carolina State Corporate Income Tax Rate from 3% to 2.5% for taxable years beginning on or after January 1, 2019.

i. The Stipulating Parties agree that using the Reverse South

Georgia method using updated Depreciable Plant and Reserve from the Company's March 31, 2022 update results in an Average Remaining Life of 26.49 years and a total annual amortization of the two regulatory liabilities of \$518,652.

ii. The Stipulating Parties agree that if any aspect of the amortization of the EDIT as provided in this Stipulation (and approved by the Commission pursuant to its approval of this Stipulation) is found to be in violation of tax normalization principles set forth in the Internal Revenue Code (IRC) and applicable Treasury Regulations thereunder such that Cardinal would be precluded from the full use of accelerated depreciation, Cardinal shall have the right to immediately modify, on a provisional basis and subject to later approval by the Commission, its accounting and rates for amortization of EDIT, as and to the extent necessary to maintain compliance with the tax normalization principles of the Internal Revenue Code (IRC) and applicable Treasury Regulations thereunder and, thus, to remain eligible to use accelerated depreciation without interruption. Cardinal shall then expeditiously apply to the Commission for approval of the accounting and rate modifications. It is the recommendation of the Stipulating Parties that the Commission include the provisions of this paragraph in its Order approving this Stipulation in this proceeding and indicate that this protection will continue to be in effect after the termination of the Docket No. G-39, Subs 46 and 47 rate period and in future rate periods until the two regulatory liabilities are fully amortized.

C. EDIT Amortization From Docket No. G-39, Sub 38. The Stipulating Parties agree to continue the amortization of the EDIT associated with the North Carolina corporate income tax changes over a 5-year period starting in 2017, as proposed in Paragraph 5 of the Joint Stipulation approved by the Commission on July 27, 2017 in Docket No. G-39, Sub 38 (July 27 Order). However, in order to accomplish the complete flow back of that EDIT while not over- or under-amortizing that amount agreed to, and approved, in the July 27 Order, the Stipulating Parties agree that Cardinal will, within 30 days of the effective date of rates in this proceeding, refund to its shippers the applicable amount of unamortized EDIT balance in accordance with the schedule shown in Exhibit C. If the effective date of rates in this proceeding is on or after September 1, 2022, Cardinal will establish a regulatory asset for the applicable amount of over-amortized EDIT, and defer collection, without carrying costs, to Cardinal's next general rate proceeding.

8. Taxes Other (Property Taxes) and Adjustment for Regulatory Fee.

The Stipulating Parties agree that the regulatory fee amount should be calculated based on the total revenue requirement determined in this proceeding, at a rate of 0.13%. This results in a regulatory fee expense of \$15,235 and total Taxes Other Than Income Taxes of \$539,104 under present rates. Under the rates agreed to by the Stipulating Parties, the regulatory fee expense is \$14,969 and total Taxes Other Than Income Taxes is \$538,838.

9. Operating and Maintenance (O&M) Expenses. The Stipulating Parties

agree to O&M Expense of \$2,377,587.

10. **Annual Billing Determinants.** The Stipulating Parties agree that the annual billing determinants for Zones 1A, 1B, and 2 will be the determinants reflected on Exhibit_(KM-002), Statement I-2 of Cardinal's Sub 47 Rate Case Application for those zones.

11. **AFUDC.** The Stipulating Parties agree that the Company will use an AFUDC rate of 7.34%, adjusted as appropriate to reflect the tax deductibility of interest expense, effective on the date rates are approved in this proceeding.

12. **Pipeline Integrity O & M Deferral.** The Stipulating Parties agree that Cardinal's request to defer certain pipeline integrity O&M expenses (Pipeline Integrity Expenses) is appropriate. The Stipulating Parties agree that Cardinal should be allowed to defer pipeline assessment costs for amounts paid for services provided by independent contractors and outside consultants that are necessary (1) for compliance with the United States Department of Transportation regulations and (2) to ensure the safety and integrity of the Cardinal pipeline. The Stipulating Parties also agree that authorization to defer the pipeline integrity costs would remain in effect through the effective date of rates in Cardinal's next general rate case. The Stipulating Parties further agree that, consistent with prior Commission orders, Cardinal will not defer internal payroll costs or other internal O&M expenses. The Stipulating Parties agree on an annual amortization of \$82,411 for Pipeline Integrity Expenses incurred during Cardinal's 2018 assessment.

13. **Cybersecurity Deferral Request.** The Stipulating Parties agree that

since anticipated cybersecurity expenses are not measurable at this time to any degree of certainty, and thus cannot currently be evaluated as to whether their final amount would justify deferral, it would be premature to consider approval of deferral in this Stipulation. Therefore, the Stipulating Parties agree that if Cardinal still wishes to defer these costs when they are actually incurred and are measurable, it should, within six months of the implementation of the new cybersecurity mitigation measures or in the Company's next general rate case following the implementation, whichever comes first, apply for authorization to defer and amortize the cybersecurity-related costs. Additionally, amortization of these costs shall begin, if approved, immediately upon the incurrence of the costs (unless the Commission finds, in its discretion, that the costs are too significant to begin amortization before future rates are approved). In the following general rate case, rates shall be based on the amount remaining to be amortized at that time. The Stipulating Parties also agree that the Commission find that in order to be deferred, the costs must meet the two-prong test (extraordinariness and magnitude) sometimes applied by the Commission in its evaluation of deferral requests, or such other criteria that the Commission may find appropriate and reasonable at that point in time.

14. Next Rate Case Filing. Cardinal agrees to file its next rate case no later than March 15, 2027. Cardinal also agrees to provide the Stipulating Parties with a rough outline of the rate case, including the period selected as the test year for the rate case, one month prior to the filing date. Consistent with the Stipulation, the Stipulating Parties agree not to initiate a show cause proceeding relating to

Cardinal's rates and charges before its next rate case filing; provided, however, that the Stipulating Parties are not constrained in any way in their ability to seek changes to, or make filings with the Commission, including complaint proceedings, related to, Cardinal's terms and conditions of service or operating practices as a consequence of the foregoing show cause moratorium.

15. **Effective Date of Rates.** The effective date of the rates set forth in this Stipulation shall be the first day of the month following the date of the Commission's order approving this Stipulation.

16. **Agreement to Support Settlement; Non-Waiver.**

The Stipulating Parties, and their agents, witnesses, and representatives, will act in good faith to support the reasonableness of this Stipulation in any hearing before the Commission and any proposed order or brief in this docket; provided, however, that the settlement of any issue pursuant to this Stipulation shall not be cited as precedent by any of the Stipulating Parties in any other proceeding or docket before this Commission or on appeal before the North Carolina Court of Appeals or North Carolina Supreme Court. The provisions of this Stipulation do not necessarily reflect any position asserted by any of the Stipulating Parties. Rather, they reflect a settlement among the Stipulating Parties as to all issues, and no Stipulating Party waives the right to assert any position in any future docket before the Commission.

17. **Introduction/Withdrawal of Testimony and Waiver of Cross-Examination.** The Stipulating Parties agree that all pre-filed testimony and exhibits of the Stipulating Parties, including any supplemental testimony filed in

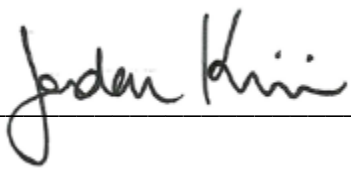
support of this Stipulation, may be introduced into evidence without objection, and the Stipulating Parties waive their respective right to cross-examine all of the other Stipulating Parties' witnesses with respect to pre-filed testimony and exhibits addressing issues resolved by this Stipulation. If questions should be asked by any non-Stipulating Party or a Commissioner, the Stipulating Parties may present testimony and/or exhibits to respond to such questions and may cross-examine any witnesses with respect to such testimony and/or exhibits; provided, however, that such testimony, exhibits, and/or cross-examination shall not be inconsistent with this Stipulation. The Stipulating Parties further agree that the Company and the Public Staff will file supplemental testimony in support of the Stipulation provided that such testimony shall not be inconsistent with this Stipulation.

18. Binding Only if Entire Stipulation Accepted. This Stipulation is the product of give-and-take negotiations and reflects various concessions made by each Stipulating Party as to the items herein. On balance, the Stipulating Parties believe the Stipulation provides a reasonable resolution of the contested issues when considered in its entirety. No portion of this Stipulation shall be binding on the Stipulating Parties unless the entire Stipulation is accepted by the Commission. The terms and conditions set forth above represent, in full, the agreement of the Stipulating Parties. If the Commission rejects any part of this Stipulation or approves this Stipulation subject to any change or condition or if the Commission's approval of this Stipulation is rejected or conditioned by a reviewing court, the Stipulating Parties agree to meet and discuss the applicable

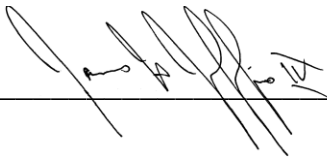
Commission or court order within five (5) business days of its issuance and to attempt, in good faith, to determine if they are willing to modify the Stipulation consistent with the order. No Stipulating Party shall withdraw from the Stipulation prior to complying with the foregoing sentence. If any Stipulating Party withdraws from the Stipulation, each Stipulating Party retains the right to seek additional procedures before the Commission, including cross-examination of witnesses, with respect to issues addressed by the Stipulation and shall not be bound or prejudiced by the terms and conditions of the Stipulation.

The foregoing is agreed and stipulated to, this the 1st day of July, 2022.

Cardinal Pipeline Company, LLC
By its Operator
Cardinal Operating Company, LLC

By:  _____

Piedmont Natural Gas Company, Inc.

By:  _____

Public Staff – North Carolina Utilities Commission

By: A handwritten signature in blue ink, appearing to read "James C. Halt", is written over a horizontal line. The signature is cursive and fluid.

Schedule of Exhibits

Exhibit A – Cost of Service by Zone

Exhibit B – Settlement Rates

Exhibit C – EDIT Refund Table

Exhibit A

Cardinal Pipeline Company, LLC
Docket No. G-39, Sub 47
Settlement Cost of Service by Zone

Item	Zone 1			Zone 2			Total
	Demand (\$)	Commodity (\$)	Total (\$)	Demand (\$)	Commodity (\$)	Total (\$)	
Plant	28,171,495		28,171,495	128,421,492		128,421,492	156,592,986
Accumulated Depreciation	(18,776,338)		(18,776,338)	(55,544,370)		(55,544,370)	(74,320,708)
Net Plant	9,395,157	0	9,395,157	72,877,121	0	72,877,121	82,272,278
Materials & Supplies	[2] 64,386		64,386	293,513		293,513	357,899
Deferred Income Taxes	(2,158,537)		(2,158,537)	(24,105,795)		(24,105,795)	(26,264,333)
Rate Base	7,301,006	0	7,301,006	49,064,839	0	49,064,839	56,365,846
Overall Return on Rate Base			536,256			3,603,795	4,140,051
O&M Expenses	[1] 307,897		307,897	2,069,689		2,069,689	2,377,587
Pipeline Integrity Deferral	[1] 10,672		10,672	71,739		71,739	82,411
Depreciation			702,026	3,358,082		3,358,082	4,060,108
General Taxes	[1] 69,780		69,780	469,058		469,058	538,838
Income Taxes	[1] 108,039		108,039	726,242		726,242	834,281
EDIT Amortization	[1] (67,165)		(67,165)	(451,486)		(451,486)	(518,652)
Settlement Cost of Service	1,667,505	0	1,667,505	9,847,118	0	9,847,118	11,514,624

[1] Rate Base Zonal Allocation Factors:

Zone 1 Rate Base	7,301,006	12.95%
Zone 2 Rate Base	49,064,839	87.05%
Total	56,365,845	100.00%

[2] Allocated between zones based on Gross Plant Factor:

Zone 1	28,171,495	17.99%
Zone 2	128,421,492	82.01%
	156,592,986	100.00%

Hypothetical Capital Structure:

	Percent of Capital	Cost	Weighted Cost of Capital
Common Equity	51.96%	9.55%	4.96%
Debt	48.04%	4.96%	2.38%
Total Capital	100.00%		7.34%

**Cardinal Pipeline Company, LLC
Docket No. G-39, Sub 47
Settlement Rates**

Item	Zone 1 A		Zone 1 B		Zone 2		Total
	Demand	Commodity	Demand	Commodity	Demand	Commodity	
Revenues Generated	\$593,527	\$0	\$1,073,978	\$0	\$9,847,118	\$0	\$11,514,623
Annual Billing Determinants							
Demand (Mcf)	720,000		840,000		3,987,240		
Demand (Dt)	745,200		869,400		4,126,800		
Commodity (Dt)		0		0		0	
Rates							
Monthly Demand (\$/Mcf)	\$0.82434		\$1.27855		\$2.46966		
Monthly Demand (\$/Dt)	\$0.79647		\$1.23531		\$2.38614		
Daily Demand (\$/Dt)	\$0.02619		\$0.04061		\$0.07845		
Commodity (\$/Dt)		\$0.00000		\$0.00000		\$0.00000	
Daily Electric Power Rate	\$0.00047		\$0.00047		\$0.00047		
Excess CFT 100% Load Factor (dt)							
Zone 1A	\$0.02619						
Zone 1B	\$0.04061						
Zone 2	\$0.07845						
Zone 1 COS Split							
Zone 1A	35.5937%						
Zone 1B	64.4063%						

Cardinal Pipeline Company, LLC
Docket No. G-39, Sub 47
EDIT Refund Table

Effective Date of Rates	Total Unamortized EDIT Balance
May 1, 2022	(154,887)
June 1, 2022	(110,849)
July 1, 2022	(66,811)
August 1, 2022	(22,773)
September 1, 2022	21,265
October 1, 2022	65,303
November 1, 2022	109,341
December 1, 2022	153,379
January 1, 2023	197,417
February 1, 2023	241,455

Cardinal Pipeline Company, LLC
Summary of Depreciation Rates and Annual Accrual Amounts
As of December 31, 2020

Account	Description	12/31/20 Investment	Current Approved				Cardinal Pipeline Proposed					Public Staff Proposed					
			Plant Rate	Salvage Rate	Total Rate	Accrual Amount	Plant Rate	Salvage Rate	Total Rate	Accrual Amount	Difference from Current	Plant Rate	Salvage Rate	Total Rate	Accrual Amount	Difference from Current	Difference from Company
	A	B	C		D	E		F		G	H		I	J	K		
Intangible Plant																	
302.00	Intangible Plant - Franchises	176,783	4.00%	0.00%	4.00%	7,071	0.55%	0.00%	0.55%	972	(6,099)	0.56%	0.00%	0.56%	990	(6,081)	18
303.00	Misc. Intangible Plant	898,093	2.00%	0.19%	2.19%	19,668	1.57%	0.00%	1.57%	14,100	(5,568)	1.64%	0.00%	1.64%	14,729	(4,940)	629
	Subtotal Intangible Plant	1,074,876			2.49%	26,740			1.40%	15,072	(11,667)			1.46%	15,719	(11,021)	646
Transmission Plant																	
365.11	Land	658,661	0.00%	0.00%	0.00%	0	0.00%	0.00%	0.00%	0	0	0.00%	0.00%	0.00%	0	0	0
365.12	Land Rights	96,745	2.00%	0.00%	2.00%	1,935	1.93%	0.00%	1.93%	1,867	(68)	1.91%	0.00%	1.91%	1,848	(87)	(19)
365.20	Rights of Way	4,011,679	2.00%	0.00%	2.00%	80,234	1.90%	0.07%	1.97%	79,030	(1,204)	1.92%	0.07%	1.99%	79,832	(401)	802
366.10	Compressor Station S & I	2,673,056	2.86%	0.14%	3.00%	80,192	3.03%	0.48%	3.51%	93,824	13,633	3.02%	0.47%	3.49%	93,290	13,098	(535)
366.20	M & R Station S & I	1,428,304	2.50%	0.13%	2.63%	37,564	2.60%	0.25%	2.85%	40,707	3,142	2.61%	0.26%	2.87%	40,992	3,428	286
367.00	Mains	100,830,092	2.00%	0.20%	2.20%	2,218,262	1.75%	0.75%	2.50%	2,520,752	302,490	1.75%	0.76%	2.51%	2,530,835	312,573	10,083
368.00	Compressor Station Equipment	35,393,767	3.03%	0.00%	3.03%	1,072,431	2.63%	0.31%	2.94%	1,040,577	(31,854)	2.62%	0.30%	2.92%	1,033,498	(38,933)	(7,079)
369.00	Meas & Reg Station Equipment	8,764,591	3.03%	0.15%	3.18%	278,714	2.13%	0.36%	2.49%	218,238	(60,476)	2.17%	0.37%	2.54%	222,621	(56,093)	4,382
	Subtotal Transmission	153,856,895			2.45%	3,769,332			2.60%	3,994,996	225,664			2.60%	4,002,916	233,584	7,921
General Plant																	
390.00	Struct. & Impr. - Office Bldg																
	Fully Accrued	5,269			0.00%	0			0.00%	0				0.00%	0		
	Amortized	0			0.00%	0			10.00%	0				10.00%	0		
	Total Struct. & Impr. - Office Bldg	5,269				0			0.00%	0	0			0.00%	0	0	0
391.00	Office Furniture & Equipment																
	OFF001- Tower Office Furniture & Equip	32,228			8.33%	2,685			10.00%	3,223	538			10.00%	3,223	538	0
	DPC001-Data Process & Comp. Equip.	0			25.00%	0			12.50%	0	0			12.50%	0	0	0
	DEV001-Developed Software																
	Fully Accrued	843,871			0.00%	0			0.00%	0				0.00%	0		
	Amortized	113,252			7.69%	8,709			6.67%	7,550				6.67%	7,550		
	DEV001-Developed Software	957,123			0.91%	8,709			0.79%	7,550	(1,159)			0.79%	7,550	(1,159)	0
392.10	Transportation Equipment																
	Fully Accrued	3,761			0.00%	0			0.00%	0				0.00%	0		
	Amortized	0			18.00%	0			16.67%	0				16.67%	0		
	Transportation Equipment	3,761			0.00%	0			0.00%	0	0			0.00%	0	0	0
394.00	Tools Shop & Garage Equipment	565,711			8.33%	47,124			5.00%	28,286	(18,838)			5.00%	28,286	(18,838)	0
396.00	Power Operated Equipment																
	Fully Accrued	10,649			0.00%	0			0.00%	0				0.00%	0		
	Amortized	31,910			7.92%	2,527			10.00%	3,191				10.00%	3,191		
	Power Operated Equipment	42,559			5.94%	2,527			7.50%	3,191	664			7.50%	3,191	664	0
397.00	Communication Equipment																
	Fully Accrued	142,401			0.00%	0			0.00%	0				0.00%	0		
	Amortized	31,632			7.14%	2,259			4.35%	1,375				4.35%	1,375		
	Communication Equipment	174,033			1.30%	2,259			0.79%	1,375	(883)			0.79%	1,375	(883)	0
	Subtotal General Plant	1,780,683			3.55%	63,303			2.45%	43,625	(19,678)			2.45%	43,625	(19,678)	0
Total		156,712,455			2.46%	3,859,374			2.59%	4,053,693	194,318			2.59%	4,062,260	202,885	8,567

Cardinal Pipeline Company, LLC
 Calculation of Depreciation Rates
 As of December 31, 2020

Account	Description	12/31/20 Investment	12/31/20 Book Reserve	12/31/20		Net Plant to be Recovered	Rem. Life	Annual Accrual	Annual Rate
				Book Future Negative Net Salvage Reserve	Estimated Future Negative Net Salvage				
A									
Intangible Plant									
302.00	Intangible Plant - Franchises	176,783	(149,054)	0		27,729	28.1	987	0.56%
303.00	Misc. Intangible Plant	898,093	(509,204)	(6,257)		382,632	26.0	14,717	1.64%
	Subtotal Intangible Plant	1,074,876	(658,258)	(6,257)	0	410,362		15,703	1.46%
Transmission Plant									
365.11	Land	658,661	0	0		658,661	0.0	0	0.00%
365.12	Land Rights	96,745	(48,210)	0		48,535	26.2	1,852	1.91%
365.20	Rights of Way	4,011,679	(1,990,158)	0	79,756	2,101,277	26.3	79,896	1.99%
366.10	Compressor Station S & I	2,673,056	(599,867)	(13,722)	339,294	2,398,761	25.7	93,337	3.49%
366.20	M & R Station S & I	1,428,304	(537,455)	(6,808)	95,416	979,457	23.9	40,981	2.87%
367.00	Mains	100,830,092	(50,908,281)	(1,008,248)	22,728,998	71,642,561	28.3	2,531,539	2.51%
368.00	Compressor Station Equipment	35,393,767	(8,859,071)	1,874	3,053,647	29,590,217	28.6	1,034,623	2.92%
369.00	Meas & Reg Station Equipment	8,764,591	(3,674,653)	11,623	858,746	5,960,308	26.8	222,400	2.54%
	Subtotal Transmission	153,856,895	(66,617,694)	(1,015,281)	27,155,857	113,379,778		4,004,629	2.60%
General Plant									
390.00	Struct. & Impr. - Office Bldg								
	Fully Accrued	5,269	(5,269)					0	0.00%
	Amortized	0						0	10.00%
	Struct. & Impr. - Office Bldg	5,269	(5,269)					0	0.00%
391.00	Office Furniture & Equipment								
	OFF001- Tower Office Furniture & Equip	32,228	(32,228)					3,223	10.00%
	DPC001-Data Process & Comp. Equip.	0	0					0	12.50%
	DEV001-Developed Software								
	Fully Accrued	843,871	(843,871)					0	0.00%
	Amortized	113,252	(58,237)					7,550	6.67%
	DEV001-Developed Software	957,123	(902,108)					7,550	0.79%
392.10	Transportation Equipment								
	Fully Accrued	3,761	(3,761)					0	0.00%
	Amortized	0	0					0	16.67%
	Transportation Equipment	3,761	(3,761)					0	0.00%
394.00	Tools Shop & Garage Equipment	565,711	(345,372)					28,286	5.00%
396.00	Power Operated Equipment								
	Fully Accrued	10,649	(10,649)					0	0.00%
	Amortized	31,910	(25,015)					3,191	10.00%
	Power Operated Equipment	42,559	(35,664)					3,191	7.50%
397.00	Communication Equipment								
	Fully Accrued	10,649	(10,649)					0	0.00%
	Amortized	31,910	(25,015)					1,387	4.35%
	Communication Equipment	42,559	(35,664)					1,387	3.26%
	Subtotal General Plant	1,606,650	(1,324,402)			0		42,250	2.63%
Total		156,580,980	(68,636,018)	(1,021,537)	27,155,857	113,790,139		4,063,970	2.60%

**Cardinal Pipeline Company, LLC
 Current and Proposed Parameters
 As of December 31, 2020**

Account	Description	Current Approved			Cardinal Pipeline Proposed				Public Staff Proposed					
		Proj Life	Iowa Curve Shape	Future Net Salvage	AYFR	Proj Life	Iowa Curve Shape	Rem. Life	Future Net Salvage	AYFR	Proj Life	Iowa Curve Shape	Rem. Life	Future Net Salvage
A														
Intangible Plant														
302.00	Intangible Plant - Franchises	25	SQ	0%	01-2050	85	R3	28.6	0%	01-2050	85	R3	28.1	0%
303.00	Misc. Intangible Plant	50	R4	-9.5%	01-2050	60	L3	27.6	0%	01-2050	60	L3	26.0	0%
Transmission Plant														
365.11	Land													
365.12	Land Rights	50	R5	0%	01-2050	65	R2	26.4	0%	01-2050	65	R2	26.2	0%
365.20	Rights of Way	50	R5	0%	01-2050	65	R2	26.8	-2%	01-2050	65	R2	26.3	-2%
366.10	Compressor Station S & I	35	R3	-5%	01-2050	45	R2	25.7	-12%	01-2050	45	R2	25.7	-13%
366.20	M & R Station S & I	40	R3	-5%	01-2050	45	R2	24.2	-6%	01-2050	45	R2	23.9	-7%
367.00	Mains	50	R4	-10%	01-2050	75	R4	28.6	-20%	01-2050	75	R4	28.3	-23%
368.00	Compressor Station Equipment	33	R3	0%	01-2050	85	R3	28.6	-9%	01-2050	85	R3	28.6	-9%
369.00	Meas & Reg Station Equipment	33	R2	-5%	01-2050	60	L3	27.6	-10%	01-2050	60	L3	26.8	-10%
General Plant														
390.00	Struct. & Impr. - Office Bldg					10	SQ		0%		10	SQ		0%
391.00	Office Furniture & Equipment													
	OFF001- Tower Office Furniture & Equip	12	S2	0%		10	SQ		0%		10	SQ		0%
	DPC001-Data Process & Comp. Equip.	4	S2	0%		8	SQ		0%		8	SQ		0%
	DEV001-Developed Software	13	S4	0%		15	SQ		0%		15	SQ		0%
392.10	Transportation Equipment	5	S2	10%		6	SQ		0%		6	SQ		0%
394.00	Tools Shop & Garage Equipment	12	S2	0%		20	SQ		0%		20	SQ		0%
396.00	Power Operated Equipment	12	S3	5%		10	SQ		0%		10	SQ		0%
397.00	Communication Equipment	14	R3	0%		23	SQ		0%		23	SQ		0%