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SOAH DOCKET NO. 473-23-21216
PUC DOCKET NO. 55067

APPLICATION OF ONCOR	**§**	**BEFORE THE STATE OFFICE**
ELECTRIC DELIVERY COMPANY	**§**	
LLC TO AMEND ITS CERTIFICATE	**§**	
OF CONVENIENCE AND	**§**	**OF**
NECESSITY FOR THE RAMHORN	**§**	
HILL – DUNHAM 345 KV	**§**	
TRANSMISSION LINE IN DENTON	**§**	
AND WISE COUNTIES	**§**	**ADMINISTRATIVE HEARINGS**

ERRATA TO THE DIRECT TESTIMONY OF T. BRIAN ALMON ON BEHALF OF EDGAR BRENT WATKINS AND MARY ANN LIVENGOOD, CO-TRUSTEES OF THE WATKINS FAMILY TRUST

TO THE HONORABLE ADMINISTRATIVE LAW JUDGES:

COMES NOW T. Brian Almon ("Almon") on behalf of Intervenors Edgar Brent Watkins and Mary Ann Livengood, Co-Trustees of the Watkins Family Trust, to submit the following errata to the Direct Testimony of T. Brian Almon.

On August 28, 2023 Oncor Electric Delivery Company ("Oncor") filed Erratta to the Application Attachment 1 and Attachment 3, which identified changes in certain environmental data for alternative link evaluation and route cost estimates. Some of the same environmental data and cost estimates were used in Almon's Direct Testimony. The following errata are necessary to correct the errors in Almon's Direct Testimony and are also reflected in the attached Exhibits A (redline copy) and B (clean copy):

- Page 7, Line 4 – replace $164,581,000 with $168,332,000
- Page 7, Line 5 – replace $237,423,000 with $238,602,000
- Page 7, Footnote 2 – add "after errata"
- Page 12, Line 14 – replace $172,744,000 with $176,285,000
- Page 12, Line 15 – replace $175,208,000 with $178,749,000
- Page 12, Footnote 13 – add "(after Oncor errata, *see* Oncor Ex. 24)"
- Page 15, Line 18 – replace 0.012% with 0.08%
- Page 15, Line 19 – replace Twelve-thousandths with Eight one-hundredths
- Page 17, Line 12 – replace 0.012% with 0.08%
- Page 17, Line 14 – replace 0.8 miles with 212 feet

- Page 35, Exhibit BA-4 – change the tabulated values for total cost of Routes 179, 179-Watkins and 179R.

Respectfully Submitted,

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ATTORNEYS FOR INTERVENORS

CERTIFICATE OF SERVICE

I certify a copy of this document is being filed in the Public Utility Commission's Interchange System and served on all parties of record as required by orders in this docket, the Commission's rules, and the Commission's First and Second Orders Suspending Rules issued on March 16, 2020 and July 16, 2020, in Project No. 50664.

_____
Tyler Topper

EXHIBIT A

SOAH DOCKET NO. 473-23-21216
PUC DOCKET NO. 55067

APPLICATION OF ONCOR ELECTRIC DELIVERY LLC TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY FOR THE RAMHORN HILL-DUNHAM 345 KV TRANSMISSION LINE IN DENTON AND WISE COUNTIES	§	BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY

OF

T. BRIAN ALMON

ON BEHALF OF

EDGAR BRENT WATKINS AND MARY ANN LIVENGOOD,
CO-TRUSTEES OF THE WATKINS FAMILY TRUST

JULY 31, 2023

DIRECT TESTIMONY OF T. BRIAN ALMON

TABLE OF CONTENTS

EXHIBITS

I. STATEMENT OF QUALIFICATIONS

Q. Please state your name, occupation and business address.

A. My name is T. Brian Almon. I am a consultant testifying on behalf of Watkins Family Trust in this case. My business address is 343 Bonnabel Blvd., Metairie, Louisiana, 70005.

Q. Please briefly outline your educational and professional background.

A. I have a Bachelor of Science degree in Mining Engineering and a Master of Business Administration degree. My forty-four years of professional experience include mine operating, mine planning, coal marketing to the electric utility industry, and regulating electric utilities. I retired from the Public Utility Commission of Texas (Commission) in December 2011 as the Director of Electric Transmission Analysis after 23 years of employment. During sixteen years of my employment with the Commission, I supervised a staff whose primary duty was to review and file recommendations on applications for amendments to certificate of convenience and necessity for transmission lines. A more detailed resume is provided in Exhibit BA-1. Each year I personally reviewed from eight to fifteen Certificate of Convenience and Necessity (CCN) applications as they were filed with the Commission. I also personally filed testimony on sixteen transmission line cases.

Q. Have you previously testified as an expert before the Commission?

A. Yes. A list of the dockets in which I have testified is provided in Exhibit BA-2.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony in this proceeding?

A. My testimony evaluates the application of Oncor Electric Delivery LLC (Oncor) for the proposed transmission line project described as the Ramhorn Hill-Dunham 345 kV transmission line.

Q. What law, regulations and Commission orders have you used in making your evaluation and arriving at your conclusions and recommendations?

A. For my evaluation, I have referred to PURA § 37.056, P.U.C. SUBST. R. 25.101(b)(3) and the Order of Referral and Preliminary Order in this proceeding. My testimony is also based on my knowledge of commission precedent regarding transmission line CCNs.

Q. How is your testimony organized?

A. My testimony begins in Section I with a statement of my qualifications. In Section II, I discuss the purpose of my testimony. Section III presents a summary of my conclusions and recommendations for this proceeding. In Section IV, I describe the transmission project submitted by Oncor. In Section V, I discuss my evaluation of the 74 alternative routes submitted by Oncor for the Ramhorn Hill-Dunham 345 kV transmission line. In Section VI, I conclude my testimony with a presentation of alternative routes with a comparison to Route 179. This section includes additional information concerning my conclusion and recommendation for the administrative law judges (Judges) and the Commission.

Q. Have you prepared any exhibits related to your testimony?

A. Yes. They are attached to my testimony.

Q. Were these exhibits prepared by you or under your supervision?

A. Yes.

Q. What did you rely upon to reach your conclusions?

A. I have relied upon the Application, Testimony and Responses to Request for Information (RFI) filed by Oncor. Included in the Application is Attachment No. 1 - Environmental Assessment and Alternative Route Analysis (EA) prepared by Halff Associates, Inc. (Halff).

III. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Q. Please summarize the conclusions that you have reached as a result of your analysis.

A. I conclude the following:

1. Oncor presented an adequate number of geographically diverse alternative routes in their application for the proposed Ramhorn Hill-Dunham 345 kV transmission line.
2. Oncor considered the routing criteria as defined by PURA and the PUCT Substantive Rules in its route assessment for the Ramhorn Hill-Dunham 345 kV transmission line.
3. Alternative Route 179-Watkins best addresses the requirements of PURA and the PUCT Substantive Rules when compared to Oncor's "best-meets" Route 179.
4. Alternative Route 179R provides a route that is shorter and has a higher percentage of the length following existing compatible rights-of way than Route 179.

5. The combination of links V1, V3, and V4 should be used in place of link V2 in any route selected by the Judges and Commission.

Q. What is your recommendation?

A. I recommend that the Judges and the Commission approve Alternative Route 179-Watkins as the route that best addresses the requirements of PURA and the PUCT Substantive Rules. As an alternative, in lieu of Route 179, the Judges and the Commission should select Alternative Route 179R which is shorter than Route 179 by 724 feet and has 3% more of its route following existing compatible right-of-way compared to Route 179. Finally, if the Judges and the Commission want to consider *any* alternative route that includes Link V2, I recommend the substitution of links V1, V3, and V4 in place of link V2 in any route that would otherwise use link V2.

IV. PROJECT DESCRIPTION

Q. What is your understanding of the project in the Oncor application?

A. Oncor proposes to plan and construct a new double-circuit 345 kV transmission line to be built on triple-circuit capable monopole structures between the proposed Ramhorn Hill Switch and the proposed Dunham Switch in Denton and Wise Counties. The structures of the proposed transmission line will have two 345 kV circuits with a vacant third circuit position for a future 138 kV circuit. The proposed project will also include the new Ramhorn Hill Switch and the new Dunham Switch. Depending on the route approved by the Commission, the length of the proposed transmission project is

approximately 20 to 23 miles. Typical structure heights will range from 120 to 175 feet.[1]

Q. What is the estimated cost of the proposed transmission project?

A. The estimated cost of the transmission Project is between ~~$164,581,000~~$168,332,000 and ~~$237,423,000~~$238,602,000 depending on the route selected by the Commission.[2] Additional costs associated with the proposed Project include the two new switches (Ramhorn Hill and Dunham) with estimated cost of $33,510,000 and $41,348,000 respectively.[3] The cost of the new switches is the same for all of the proposed alternative routes.

Q. How did Halff support the Oncor application?

A. Oncor retained Halff to perform and prepare an Environmental Assessment for the Proposed Transmission Line Project (EA) for the proposed Project.[4] Halff responsibility for the Project included managing all elements of the preparation of the EA including data acquisition through analysis of the alternative routes.[5] Halff initially identified 221 preliminary alternative routes for evaluation. Seventy-four (74) primary alternative routes that represent an adequate number of reasonable and geographically differentiated primary alternative routes were selected by Oncor for further evaluation.[6]

Q. Do you conclude that Oncor's procedures and evaluations provided a suitable number of alternative routes for the consideration of the Commission?

[1] Application, page 4.

[2] Perkins testimony, page 9 (after errata).

[3] Zapletal testimony, pages 9-10.

[4] Marusak testimony, page 3.

[5] Marusak testimony, page 4.

[6] Perkins testimony, page 9.

A. Yes. I conclude that Oncor with input from Halff performed a reasonable and comprehensive evaluation that addressed all the requirements of PURA and the PUCT Substantive Rules and provided a suitable number of alternative routes.

V. ROUTE SELECTION BY ONCOR

Q. How did Halff evaluate the preliminary alternative routes?

A. Halff used 35 objective criteria that encompass applicable portions of the statute and the rules to evaluate the 221 alternative routes.[7]

Q. Are the criteria used by Halff ranked by importance?

A. No. Each CCN application has unique features that are evaluated generally using criteria that are normally presented in a CCN filing.

Q. Did Halff recommend an alternative route to Oncor?

A. No. Based primarily on an evaluation of the 35 objective criteria, Hallf identified 221 preliminary alternative routes. The evaluation of the 221 preliminary alternative routes was provided to Oncor in the Environmental Assessment and Alternative Route Analysis (EA).

Q. Does Oncor agree with Halff's selection of 221 preliminary alternative routes?

A. Yes. Oncor uses the data for the 221 preliminary alternative routes and the cost estimates for each route to select the 74 primary alternative routes for further evaluation.[8]

Q. What is the result of Oncor's evaluation of the 74 primary alternative routes?

[7] Appendix E. Table 7-2.

[8] Perkins testimony, page 8-9.

A. After reviewing the results of Halff's evaluation for the 74 primary alternative routes in addition to considering estimated costs and other factors including engineering and construction constraints, as well as agency and landowner concerns, Oncor selected Route 179 as the route that best meets the requirements of Texas Utilities Code 37.056(c)(4((A)-(D) and 16 TAC 25.101.[9]

Q. Why does Oncor consider Route 179 the route that best addresses the requirements of PURA and the Commission Substantive Rules?

A. Oncor lists 20 criteria to demonstrate why Route 179 was selected as the route that best addresses the requirements of PURA and the Commission Substantive Rules.[10]

1. Length of alternate route
2. Cost
3. Number of habitable structures
4. Paralleling existing compatible rights-of-way
5. Length of route through commercial/industrial areas
6. Length of route crossing cropland/hay meadow and rangeland pasture
7. Length of route crossing upland woodlands and riparian areas
8. Length of route crossing potential wetlands
9. Number of stream crossings
10. Length of route parallel to streams
11. Length of route across lakes or ponds
12. Number of known rare/unique plant locations within route ROW
13. Number of recorded cultural resource sites crossed

[9] Perkins testimony, page 9.

[10] Exhibit BJP-5

14. Number of recorded cultural resource sites within 1,000 feet of centerline
15. Number of FAA-registered airports with a runway greater than 3,200 feet within 20,000 feet of the centerline along its entire length
16. Number of FAA-registered airports with no runway greater than 3,200 feet within 10,000 feet of the centerline along its entire length
17. Number of heliports located within 5,000 feet of its centerline
18. Number of FM and other electronic installations within 2,000 feet of its centerline
19. Number of crosses over U.S. and State Highways
20. Number of crosses over FM county roads or other streets

Q. Are some of the original criteria not used by Oncor because the values are zero and therefore do not offer anything to the evaluation?

A. Yes. The following criteria have a zero value for all the 74 primary routes and therefore are not used in the final evaluation by Oncor.[11]

1. Length of route across agricultural cropland with mobile irrigation systems
2. Length of route through known habitat of endangered or threatened species
3. Number of private airstrips within 10,000 feet of the route centerline
4. Number of commercial AM radio transmitters located within 10,000 feet of the route centerline

Q. From your evaluation, which route do you conclude best addresses the requirements of PURA and the Commission Substantive Rules?

A. I conclude that Alternative Route 179-Watkins best addresses the requirements of PURA and the Commission Substantive Rules when considering the 74 primary alternative routes and possible modifications.

[11] Appendix E – Table 7-2 of EA.

Q. Did you use the same routing criteria and other factors to perform your evaluation of the 74 primary alternative routes and the development of your recommended route?

A. Yes.

Q. Why do you conclude that an alternative route to the 74 routes presented by Oncor be considered by the Judge and the Commission?

A. I conclude that Alternative Route 179-Watkins has very similar criteria values as Route 179 and should be considered by the Commission.

The significant advantages of Alternative Route 179-Watkins are:

- 0.86 mile shorter than Route 179
- less expensive by $2,464,000 than Route 179
- parallels existing compatible rights-of-way (23%) the same as Route 179
- has only one more habitable structure than Route 179

VI. EVALUATION OF ALTERNATIVE ROUTES

Q. Can a party to this proceeding suggest an alternative route that has not been proposed by Oncor?

A. Yes. Additional routes utilizing the route links presented by Oncor in its filing can be used to create a new alternative route or routes.

Q. Have you developed another alternative route using the same route links initially developed by Halff?

A. Yes. Alternative Route 179-Watkins utilizes the following links developed by Halff and used by Oncor: A0-A4-B1-B61-B62-C1-C21-C23-C7-E2-E1-E6-G1-G3-H41-H42-H8-I8-J3-K1-L5-L4-L3-L2-M1-M5-R2-R5-U3-V3-V4-Z.

Q. What links of Alternative Route 179-Watkins are different from Route 179?

A. Alternative Route 179-Watkins uses Links M5, R2, R5, U3, V3 and V4 in place of links M2, M3, R4 and V2 (see Exhibit BA-3).

Q. Why do you conclude that Alternative Route 179-Watkins better meets the requirements of PURA and the Commission Substantive Rules?

A. When considering the 20 criteria used by Oncor in its evaluation, and giving slightly greater weight to criteria such as length, cost, habitable structures and total paralleling, Alternative Route 179-Watkins compares more favorably than Route 179 as provided in the following discussion using the significant factors used by Oncor witness Perkins.[12]

- The length of Alternative Route 179-Watkins is approximately 20.9 miles and approximately 0.9 miles shorter than Route 179 at approximately 21.8 miles.
- The estimated cost of Alternative Route 179-Watkins is ~~$172,744,000~~$176,285,000 which is $2,464,000 less than the estimated cost of ~~$175,208,000~~$178,749,000 for Route 179.[13]
- There are 98 habitable structures within 500 feet of the centerline of Alternative Route 179-Watkins which is only one more than the 97 habitable structures for Route 179.
- Alternative Route 179-Watkins parallels existing compatible corridors for 23% of its length compared to the same percentage (23) for Route 179.
- Alternative Route 179-Watkins has 4,551 feet of its route through commercial/industrial areas compared to 4,607 feet for Route 179.

[12] Exhibit BA-4.

[13] Response to Watkins RFI Set No. 1, Question No. 1-10b (after Oncor errata, *see* Oncor Ex. 24).

- Alternative Route 179-Watkins crosses 22,691 feet of cropland/hay meadow and crosses 58,417 feet of rangeland pasture compared to 20,248 feet and 22,691 feet respectively for Route 179.
- Alternative Route 179-Watkins crosses 11,311 feet of upland woodlands and crosses 11,536 feet of riparian areas compared to 10,126 feet and 7,162 feet respectively for Route 179.
- Neither Alternative Route 179-Watkins or Route 179 cross potential wetlands.
- Alternative Route 179-Watkins crosses 28 streams compared to 27 streams for Route 179.
- The length of Alternative Route 179-Watkins that is parallel to streams (within 100 feet) is 695 feet compared to 1,351 feet for Route 179.
- The length of Alternative Route 179-Watkins across lakes or ponds (open waters) is 1,867 compared to 1,704 feet for Route 179.
- Both Alternative Route 179-Watkins and Route 179 have the same value for the following criteria:
  - Number of known rare/unique plant locations within the route right-of-way
  - Number of recorded cultural resource sites crossed by its centerline
  - Number of recorded cultural resources sites within 1,000 feet of centerline
  - Number of FAA-registered airports with at least one runway more than 3,200 feet in length within 20,000 feet of route

- Number of FAA-registered airports with no runway greater than 3,200 feet in length within 10,000 feet of the route centerline
- Number of heliports located within 5,000 feet of the route centerline
- Number of FM, microwave and other electronic installations within 2,000 feet of the route centerline
- Number of U.S. or State Highway crossings by the route

- Alternative Route 179-Watkins crosses ten FM, county roads or other streets whereas Route 179 crosses eleven roads and streets.[14]
- Both Alternative Routes 179-Watkins and 179 have been judged by Oncor to be feasible from an engineering perspective based on currently known conditions.[15]

Although not included in Oncor's 20 criteria, but still important is the fact that Alternative Route 179-Watkins has an estimated length of right-of-way within the foreground visual zone of park/recreational areas of 41,157 feet compared to 45,369 feet for Route 179.

Q. If the Commission is interested in comparing Oncor's "best meets" Route 179 with a route that is shorter and with a higher percentage of the length following existing compatible rights-of-way what do you recommend?

A. I recommend that the Commission consider Alternative Route 179R.

[14] Response to Watkins RFI Set No. 1, Question No. 1-10a.

[15] Exhibit BJP-5, page 4 and response to Question No 1-10c of Watkins RFI No. 1

Q. What are the apparent differences between Route 179 and Alternative Route 179R that would make Alternative Route 179R a better selection for meeting the requirements of PURA and the Commission Substantive Rules?

A. The apparent differences between Routes 179 and 179R are:

- Alternative Route 179R is shorter than Route 179 by 724 feet.
- Alternative Route 179R parallels railroads for 4,261 feet of its length compared to 0 feet for Route 179.
- Alternative Route 179R parallels existing public roads/highways for 8,040 feet of its length compared to 6,591 feet for Route 179.
- Alternative Route 179R parallels apparent property boundaries for 25,094 feet of its length compared to 20,834 feet for Route 179.
- Alternative Route 179R has 27% of its route following existing compatible right-of-way compared to 23% for Route 179. This difference equates to Alternative Route 179R following existing compatible right-of-way for 0.79 miles more than Route 179 while also being 0.14 miles shorter than Route 179.
- Alternative Route 179R has only three more habitable structures than Route 179.
- Alternative Route 179R costs only $203,000 or ~~0.012%~~0.08% more than Route 179. ~~Twelve thousandths~~Eight one-hundredths of one percent is a *de minimis* amount and well within any margin of error and/or contingency amount in the cost estimates provided by Oncor.
- Alternative Route 179R parallels streams for 695 feet of its length compared to 1,351 feet for Route 179.

- Alternative Route 179R has an estimated length of right-of-way within the foreground visual zone of park/recreational areas for 41,157 feet compared to 45,369 feet for Route 179.

All other criteria have similar individual values for the two routes (Routes 179 and 179R).

Q. What are the links that are used in Alternative Route 179R?

A. Alternative Route 179R utilizes the following links developed by Halff and used by Oncor: A0-A4-B1-B61-B62-C1-C21-C23-C7-E2-E1-E6-G1-G3-H41-H42-H8-I8-J3-K1-L5-L4-L3-L2-M1-M2-M3-R4-V1-V3-V4-Z.

Q. In summary what are the differences in links for Route 179, Alternative Route 179-Watkins, and Alternative Route 179R?

A. The differences in links for the three routes are:

- Route 179 uses links M2, M3, R4 and V2.
- Alternative Route 179-Watkins uses links M5, R2, R5, U3, V3 and V4.
- Alternative Route 179R uses links M2, M3, R4, V1, V3, and V4.

All three routes originate at the terminus of link M1 and terminate at link Z.

The comparison of the criteria for Route 179, Alternative Route 179-Watkins and Alternative Route 179R is presented in Exhibit BA-4.

Q. Do you have a recommendation if the Commission wants to consider an alternative route that includes link V2.

A. Yes. If the Commission considers a route using link V2, I recommend that the Commission compare the advantages of using the combination of links V1, V3, and V4 instead of link V2.

The use of the combination of links V1, V3, and V4 compare more favorably than the use of link V2 in any proposed route and will better address the requirements of PURA and the PUCT Substantive Rules.

Q. How does the combination of links V1, V3, and V4 compare to link V2?

A. When considering the significant criteria of length, number of habitable structures, compatible right-of-way, and cost, the combination of links V1, V3, and V4 compare very favorably to link V2. The combination of links V1, V3, and V4:

- ✓ is shorter by 724 feet than link V2
- ✓ has 51% of its length along compatible ROW compared to 0% for link V2
- ✓ has only three more habitable structures than V2
- ✓ is only ~~0.012%~~0.08% more expensive than V2 ($203,000)[16]

In addition, the combination of links V1, V3, and V4, while being 724 feet shorter than V2, also has ~~0.8 miles~~212 feet less of its length within the foreground visual zone of park/recreational areas as well as having 656 less feet parallel to streams (51% less feet parallel to streams compared to V2).

Q. Does this conclude your testimony?

A. Yes.

[16] Exhibit BA-5

EXHIBIT BA-1

Qualifications of T. Brian Almon

EXHIBIT BA-1

QUALIFICATIONS

OF

T. BRIAN ALMON

I received a Bachelor of Science in Mining Engineering from the University of Arizona in 1967 and a Master of Business Administration degree from the same university in 1973. I also attended Virginia Polytechnic Institute and State University for postgraduate studies in mining engineering during 1968 and 1969. I have attended seminars on coal supply agreements, economic evaluation of mining projects, and regulation of electric utilities.

After receiving my BS degree, I was employed with New Jersey Zinc Company as a Mine Engineer (Austinville, Virginia). In 1970, I joined the Anaconda Company as an Assistant Shift Foreman at the Twin Buttes copper mine (Sahuarita, Arizona). After completion of my MBA degree, I was employed by El Paso Coal Company (El Paso, Texas), a subsidiary of El Paso Natural Gas Company, in several positions: Development Engineer, Senior Development Engineer, Administrator of Technical Staff, Administrator of Technical Staff & Coal Marketing, and Manager of Coal Marketing and Technical Services.

As an engineer, my responsibilities included planning and cost estimating for surface coal mines. As administrator and manager, I was responsible for economic evaluation of coal projects, coal analyses, computer program development, forecasting the fuel needs of electric utilities, and marketing El Paso Coal Company's coal properties located in four western states.

In 1980 I joined Tenneco Coal Company (Houston, Texas) as Manager of Coal Marketing with responsibility for marketing Texas and Mississippi lignite to electric utilities. My duties included the determination of future fuel needs for the electric utilities in Texas. I followed very closely the activities of utilities and competing coal companies. I also tracked prices of competing fuels and coal transportation.

In May 1988, I began my employment with the Commission as a Fuel Engineer. My duties included evaluating utility fuel procurement management practices, forecasting short and long-term fuel prices, recommending depreciation rates and fuel inventory levels, and supporting Commission projects in the fuel area. In December 1993, I became Manager of Engineering with responsibility over fuel, power plant engineering, and transmission line siting. On October 1, 1995, as part of an agency-wide reorganization, I assumed the responsibility for fuel as Assistant Director of Fuel Analysis. On January 9, 1998, I assumed the responsibility for fuel and engineering as an Assistant Director in the Electric Industry Analysis Division. When I retired from the PUCT in December, 2011, my title was Director of the Electric Transmission Analysis Section in the Infrastructure and Reliability Division with essentially the same duties.

EXHIBIT BA-2

List of Dockets Containing Testimony of T. Brian Almon

EXHIBIT BA-2
LIST OF DOCKETS CONTAINING TESTIMONY OF
T. BRIAN ALMON

PUC DOCKET NUMBER	DESCRIPTION
49603	Application of Upshur Rural Electric Cooperative Corporation to Amend Its Certificate of Convenience and Necessity for a 138-kv Transmission Line in Harrison County (Hallsville-Gum Springs) [Direct Testimony – Route Selection] (January 27, 2020) [Rebuttal Testimony – Route Selection] (February 19, 2020)
48909	Joint Application of Oncor Electric Delivery Company LLC and the City of Lubbock, Acting by and through Lubbock Power & Light for a Certificate of Convenience and Necessity for the Proposed Wadsworth to New Oliver to Farmland 345-Kv Transmission Line in Lubbock and Lynn Counties and the Proposed Southeast to New Oliver to Oliver 115-Kv Transmission Line in Lubbock County [Direct Testimony – Route Selection] (May 7, 2019) [Rebuttal Testimony – Route Selection] (June 21, 2019)
48668	Joint Application of Sharyland Utilities, L.P. and City of Lubbock Acting by and through Lubbock Power & Light for a Certificate of Convenience and Necessity for the Proposed Abernathy to Wadsworth 345 kV Transmission Line in Hale and Lubbock Counties, Texas [Direct Testimony – Route Selection] (March 13, 2019)
48625	Joint Application of Sharyland Utilities, L.P. and City of Lubbock Acting by and through Lubbock Power & Light for a Certificate of Convenience and Necessity for the Proposed Ogallala to Abernathy 345 KV Transmission Line in Castro, Hale, and Swisher Counties, Texas [Direct Testimony – Route Selection] (February 15, 2019) [Rebuttal Testimony – Route Selection] (March 22, 2019)
46429	Application of Brazos Electric Power Cooperative, Inc. for Amendment to its Certificate of Convenience and Necessity for a 138-kv Transmission Line in Collin County [Direct Testimony - Route Adequacy] (March 3, 2017) [Direct Testimony – Route Selection] (April 28, 2017) [Rebuttal Testimony – Route Selection] (June 13, 2017)
46042	Application of Southwestern Public Service Company to Amend its Certificate of Convenience and Necessity for a Proposed 345-KV Transmission Line within Hale, Hockley, Lubbock, Terry, and Yoakum Counties (TUCO to Yoakum) [Direct Testimony – Route Selection] (December 5, 2016) [Rebuttal Testimony – Route Selection] (December 16, 2016)
45170	Application of Brazos Electric Power Cooperative, Inc. to Amend a Certificate of Convenience and Necessity for a 138-kV Double Circuit Transmission Line in Collin and Denton Counties [Direct Testimony – Route Selection] (February 22, 2016)
44837	Application of AEP Texas Central to Amend a Certificate of Convenience and Necessity for a Proposed 138-kV Transmission Line in Bee County and Goliad County, Texas [Direct Testimony – Route Selection] (December 7, 2015)

[Rebuttal Testimony – Route Selection] (February 2, 2016)

44547 Application of Centerpoint Energy Houston Electric, LLC to Amend a Certificate of Convenience and Necessity for a Proposed 345-kV Transmission Line Within Grimes, Harris, and Waller Counties
[Direct Testimony – Route Adequacy] (June 15, 2015)
[Direct Testimony – Route selection] (July 13, 2015)
[Rebuttal Testimony – Route selection] (July 31, 2015)

43878 Application of Brazos Electric Power Cooperative, Inc. To Amend a Certificate of Convenience and Necessity for a 138-kV Double Circuit Transmission Line in Collin and Denton Counties
[Direct Testimony – Route selection] (July 26, 2015

43599 Application of LCRA Transmission Services Corporation to Amend its Certificate of Convenience and Necessity for the Proposed Blumenthal Substation and 138-KV Transmission Line Project in Blanco, Gillespie, and Kendall Counties, Texas
[Direct Testimony – Route selection]
(April 6, 2015)

41606 Joint Application of Electric Transmission Texas, LLC and Sharyland Utilities to Amend its Certificate of Convenience and Necessity for the North Edinburg to Loma Alta Double-Circuit 345-KV Transmission Line in Hidalgo and Cameron Counties, Texas
[Direct Testimony – Route adequacy]
(September 17, 2013)

38743 Application of Electric Transmission Texas, LLC to Amend its Certificate of Convenience and necessity for the Tesla to Edith Clarke to Clear Crossing to West Shackelford 345-kV CREZ Transmission Line in Childress, Cottle, Hardeman, Foard, Knox, Hasdell, Jones, and Shackelford Counties
[Direct Testimony – Route selection]
(January 7, 2011)

38480 Application of Texas-New Mexico Power Company for Authority to Change Rates
[Direct Testimony – Self-insurance & storm hardening]
(November 15, 2010)

38354 Application of LCRA Transmission Services Corporation to Amend its Certificate of Convenience and Necessity for the McCamey D to Kendall to Gillespie 345-kV CREZ Transmission Line in Schleicher, Mason, Gillespie, Kerr and Kendall Counties
[Direct Testimony – Route Selection
(October 11, 2010)

38339 Application of CenterPoint Energy Houston, LLC for Authority to Change Rates
[Direct Testimony – Self-insurance]
(September 17, 2010)

38230 Application of Lone Star Transmission, LLC for a Certificate of Convenience and Necessity for the Central A to Central C to Sam Smith/Navarro Proposed CREZ Transmission Line
[Direct Testimony – Route Selection]
(August 26, 2010)

38361 Application of El Paso Electric Company to Reconcile Fuel Costs (Severed from PUC Docket 37690)
[Direct Testimony – Recovery of Mine Closing Costs]
(July 16, 2010)

37744 Application of Entergy Texas, Inc. For Authority to Change Rates and Reconcile Fuel Costs
[Direct Testimony – Coal supply for Nelson 6 power plant and third-party power contract]
(June 16, 2010)

37162 Application of Southwestern Electric Power Company for Authority to Reconcile Fuel Costs
[Direct Testimony – Performance of Pirkey and Dolet Hills power plants]
(May 13, 2010)

37448 Application of LCRA Transmission Services Corporation to Amend its Certificate of Convenience and Necessity for the Gillespie to Newton 345-kV CRES Transmission Line in Gillespie, Llano, San Saba, Burnet, and Lampasas Counties, Texas
[Direct Testimony – Route Selection]
(January 20, 2010)

36025 Application of Texas-New Mexico Power Company for Authority to Change Rates
[Direct Testimony – Self-insurance]
(June 3, 2009)

35665 Commission Staff's Petition for Selection of Entities Responsible for Transmission Improvements Necessary to Deliver Renewable Energy from Competitive Renewable Energy Zones
[Direct Testimony – Assignment of TSP for CREZ Projects]
(October 28, 2008)
[Rebuttal Testimony – Priority & default projects and proposed joint venture]
(November 14, 2008)

35763 Application of Southwestern Public Service Company for Authority to Change Rates, to Reconcile Fuel and Purchased Power Costs for 2006 and 2007, and to Provide a Credit for Fuel Cost Savings
[Direct Testimony – Storm restoration and reserve amount]
(October 21, 2008)

34800 Application of Entergy Gulf States, Inc. for Authority to Change Rates and to Reconcile Fuel Costs
[Direct Testimony – Revenue Requirement and Fuel Phases]
(April 18, 2008)

34077 Joint Report and Application of Oncor Electric Delivery Company and Texas Energy Future Holdings Limited Partnership Pursuant to PURA §14.101
[Direct Testimony – Reliability Standard]
(September 21, 2007)
[Direct Testimony – Support of Stipulation]
(October 24, 2007)

33672 Commission Staff's Petition for Designation of Competitive Renewable Energy Zones
[Direct Testimony – Designation of CREZ in Texas]
(April 24, 2007)
[Rebuttal Testimony – Designation of CREZ in Texas]
(May 21, 2007)
[Corrected Direct and Rebuttal Testimony]
(June 4, 2007)

33309 Application of AEP Texas Central Company for Authority to Change Rates
[Direct Testimony – Self Insurance Plan and Catastrophe Reserve]
(March 23, 2007)

32766 Application of Southwestern Public Service Company for: (1) Authority to Change Rates; (2) Reconciliation of its Fuel Costs for 2004 and 2005; (3) Authority to Revise the Semi-Annual Formulae Originally Approved in Docket No. 27751 Used to Adjust its Fuel Factors; and (4) Related Relief [Direct Testimony – Coal Issues]
(January 12, 2007)

32018 Notice of Violation by TXU Electric Delivery of PURA §38.005, Relating to Electric Service Reliability Measures and P.U.C. Subst. R. 25.52, Relating to Reliability and Continuity of Service
[Direct Testimony – Appropriate Penalty] (July 13, 2006)

31824 Application of the Electric Reliability Council of Texas for Approval of the ERCOT System Administrative Fee
[Direct Testimony – Review of Technical Expenditures]
(January 23, 2006)

31064 Application of AEP Texas North Company and Taylor Electric Cooperative, Inc. for Clarification of Service Area Boundary in Taylor County
[Direct Testimony – Boundary Determination]
(November 8, 2005)

30143 Petition of El Paso Electric Company to Reconcile Fuel Costs
[Direct Testimony – Purchased Power and Off-system Sales]
(March 2, 2005)

29801 Application of Southwestern Public Service Company for Reconciliation of its Fuel Costs for 2002 and 2003, A Finding of Special Circumstances and Related Relief
[Direct Testimony – Coal Inventory and Wheeling Expenses]
(November 2, 2004)

28813 Petition to Inquire into the Reasonableness of the Rates and Services of Cap Rock Energy Corporation
[Direct Testimony – Funding Catastrophe Reserve]
(September 13, 2004)

29526 Application of Centerpoint Energy Houston Electric LLC, Reliant Energy Retail Services, LLC and Texas Genco LP to Determine Stranded Costs and Other True-Up Balances Pursuant to PURA §39.262
[Direct Testimony – Environmental Cleanup Costs]
(June 7, 2004)

28906 Application of LCRA Transmission Services Corporation to Change Rates
[Direct Testimony – Allowable expenses and post test-year adjustments]
(May 11, 2004)

29206 Application of Texas-New Mexico Power Company, First Choice Power, Inc. and Texas Generating Company, LP., To Finalize Stranded Costs Under PURA §39.262
[Direct Testimony – Price re-determination of lignite price]
(April 2, 2004)

28840 Application of AEP Texas Central Company for Authority to Change Rates
[Direct Testimony – Plant in Service]
(February 17, 2004)

28045 Application of Southwestern Electric Power Company for Authority to Reconcile Fuel Costs
[Direct Testimony – Reasonable and Necessary Expenses and Prudent Management]
(November 12, 2003)

27576 Application of Texas-New Mexico Power Company for Reconciliation of Fuel Costs
[Direct Testimony – Price predetermination & alternate fuels]
(July 25, 2003)

26194 Petition of El Paso Electric Company to Reconcile Fuel Costs
[Direct Testimony – Necessary Expenses and Off-System Sales]
(April 24, 2003)

26195 Joint Application of Texas Genco, LP and Centerpoint Energy Houston Electric, LLC to Reconcile Eligible Fuel Revenues and Expenses Pursuant to Subst. R. 25.236
[Direct Testimony – Recovery of Post-Mine Reclamation Cost]
(January 7, 2003)

25778 Emergency Complaint of Henry A. Miller, Et Al. Against American Electric Power Company and Request for an Emergency Cease and Desist Order
[Direct Testimony – Issues related to Ordering Paragraphs in Docket No. 21741]
(August 20, 2002)

24835 Petition of Reliant Energy, Incorporated for Approval of Environmental Cleanup Costs Plan
[Direct Testimony – Technical Issues of Application]
(January 15, 2002)

20314 Application of Hino Electric Power Company for a Certificate of Convenience and Necessity in Cameron, Willacy, and Hidalgo Counties
[Direct Testimony – Technical Issues of Application]
(October 25, 2001)

20125 Application of Beaumont Power & Light Company for a Certificate of Convenience and Necessity in Jefferson County, Texas
[Direct Testimony – Technical Issues of Application]
(October 25, 2001)

19950 Application of Corpus Christi Power & Light Company for a Certificate of Convenience and Necessity in Nueces and San Patricio Counties
[Direct Testimony – Technical Issues of Application]
(October 25, 2001)

23550 Application of Entergy Gulf States, Inc. for the Authority to Reconcile Fuel Costs
[Direct Testimony – Nuclear PBR and Outage]
(July 13, 2001)

23477 Application of West Texas Utilities Company for the Authority to Reconcile Fuel Costs
[Direct Testimony – Fuel Purchases]
(August 20, 2001)

22356 Application of Entergy Gulf States, Inc. for Approval of Unbundled Cost of Service Rate Pursuant to PURA §39.201 and Public utility Commission Substantive Rule §25.344
[Direct Testimony – Environmental Cleanup Cost Recovery]
(January 16, 2001)

22355 Application of Reliant Energy Incorporated for Approval of Unbundled Cost of Service Rate Pursuant to PURA §39.201 and Public Utility Commission Substantive Rule §25.344
[Direct Testimony – Transmission and Distribution Capital Expenditures]
(December 18, 2000)

22350 Application of TXU Electric Company for Approval of unbundled Cost of Service Rate Pursuant to PURA §39.201 and Public Utility Commission Substantive Rule §25.344
[Direct Testimony – Environmental Cleanup Cost Recovery]
(October 13, 2000)

22352 Application of Central Power and Light Company for Approval of Unbundled Cost of Service Rate Pursuant to PURA §39.201 and Public Utility Commission Substantive Rule §25.344
[Direct Testimony - Environmental Cleanup Cost Recovery]
(October 6, 2000)

22344 Generic Issues Associated with Application for Approval of Unbundled Cost of Service Rate Pursuant to PURA §39.210 and Public Utility Commission Substantive Rule §25.344
[Direct Testimony – O&M Escalators] (July 27, 2000)
[Rebuttal Testimony](August 3, 2000)
[Errata for Direct](August 3, 2000)

17525 Application of Southwestern Public Service Company for Certification of Qualifying Facility Purchased Power Contract under Section 2.209 of PURA 95
[Direct Testimony – Fuel Price Risk
(August 19. 1997)

16628 Petition of the Lower Colorado River Authority to Reconcile its Fuel Revenues and Expenses and For Other Relief
[Direct Testimony – Coal, Gas, Oil & Purchased Power Reconciliation]
(May 8, 1997)

15195 Application of Texas Utilities Electric Company for a Reconciliation of Fuel Costs
[Direct Testimony – Mine Productivity
(October 7, 1996)

14965 Application of Central Power and Light Company for Authority to Change Rates and Reconcile Fuel Costs
[Direct Testimony – Fuel PBR in Competitive Issues Phase]
(July 18, 1996)

15102 Application of Gulf States Utilities Company to Reconcile Its Fuel Costs, for Permission to Delay Requesting a Surcharge, or in the Alternative, for a Surcharge to Recover Under-recovered Fuel Expense
[Direct Testimony – Reconciliation of Fossil Fuel]
(July 8, 1996)

14893 Petition of Sam Rayburn G & T Electric Cooperative, Inc. for Authority to Change Rates
[Direct Testimony – Coal Inventory, Non-reconcilable and Eligible Fuel Expense]
(January 18, 1996)

14499 Petition of Southwestern Public Service Company for Findings of Special Circumstances and For Associated Waivers
[Direct Testimony]
(November 21, 1995)

12065 Complaint of Kenneth D. Williams against Houston Lighting & Power Company
[Direct Testimony – Trinity Mine Investment]
(November 29, 1994)

12820 Petition of the General Counsel for and Inquiry into the Reasonableness of the Rates and Services of Central Pore and Light Company
[Direct Testimony – Plant Held for Future Use]
(October 17, 1994)

12855 Application of Southwestern Electric Power Company to Reconcile Fuel Costs and Request for Accounting Order
[Direct Testimony – Coal Issues]
(August 10, 1994)
[Supplemental Testimony]
(August 29, 1994)

11520 Petition of the General Counsel for an Inquiry into the Reasonableness of Rates and Services of Southwestern Public Service Company
[Direct Testimony – Revenue Requirement Phase]
(July 29, 1993)

11735 Application of Texas Utilities Electric Company for Authority to Change Rates
[Direct Testimony – Fuel Phase]
(July 13, 1993)
[Direct Testimony – Revenue Requirement Phase
(July 13, 1993

11292 Application of Entergy Company and Gulf States Utilities Company for Sale, Transfer, or Merger
[Direct Testimony – Fuel Price Forecast
(January 8, 1993)
[Surrebuttal Testimony] (February 12, 1993)

10894 Application of Gulf States Utilities Company to Reconcile Fuel Costs, Establish New Fixed Fuel Factors, and Recover its Under-recovered Fuel Expenses
[Direct Testimony – Fuel Price Forecast, Fuel Reconciliation]
(August 28, 1992)

11011 Petition of Southwestern Public Services Company for a Fuel Reconciliation
[Direct Testimony – Fuel Reconciliation]
(August 4, 1992)

10982 Application of Sam Rayburn G&T Electric Cooperative, Inc. for Authority to Change Rates
[Direct Testimony – Purchase Power, Non-reconcilable Fuel Expenses, Fuel Price Forecast, Fuel Inventory, Fuel Reconciliation]
(June 3, 1992)

10092 Petition of Houston Lighting & Power Company for Reconciliation of Fuel Costs
[Direct Testimony – Fuel Reconciliation]
(March, 1991)
[Supplemental Testimony]
(June21, 1992)

10200 Application of Texas-New Mexico Power Company for Authority to Change Rates, Prudence Phase
[Direct Testimony – Fuel Inventory, Fuel Price Forecast]
Prudence (November 8, 1991)
Revenue Requirement (December 13, 1991)
Fuel (December 13, 1991)

9850 Petition of Houston Lighting & Power Company for Authority to Change Rates

[Direct Testimony – Fuel Inventory, Depreciation, Non-reconcilable Fuel Expenses]
(February 19, 1991)

9300 Application of Texas Utilities Electric Company for Authority to Change Rates
[Direct Testimony – Fuel Reconciliation]
(June, 1990)

9030 Petition of the General Counsel for a Fuel Reconciliation for Southwestern Public Service Company
[Direct Testimony – Fuel Reconciliation]
(May, 1990)

9561 Application of Central Power and Light Company for Authority to Change Rates
[Direct Testimony – Fuel Reconciliation, Fuel Price Forecast, Fuel Inventory]
(August, 1990)

9491 Application of Texas-New Mexico Power Company for Authority to Change Rates
[Direct Testimony – Fuel Price Forecast, Fuel Inventory]
(July, 1990)

9427 Application of Lower Colorado River Authority for Authority to Change Rates
[Direct Testimony – Prudence of Cummins Creek]
(July, 1990)

8900 Petition of the General Counsel for a Fuel Reconciliation for Southwestern Electric Power Company
[Direct Testimony – Coal and Lignite Reconciliation]
(January, 1990)
[Supplemental Testimony]
(January, 1990)

8646 Petition and Statement of Intent of Central Power and Light Company to Change Rates
[Direct Testimony – Fuel Reconciliation, Fuel Management, Coal Inventory, Coal Price Forecast, Non-reconcilable Fuel Expenses, Plant Held for Future Use]
(May – December, 1989)

8595 Application of Sam Rayburn G & T Electric Cooperative, Inc. for Authority to Change Rates
[Direct Testimony – Fuel Reconciliation, Non-reconcilable Fuel Expenses, Fuel Price Forecast]
(April, 1989)

8588 Application of El Paso Electric Company for Reconciliation of Fuel
[Direct Testimony – Fuel Reconciliation] (August, 1989)

8425 Petition of Houston Lighting & Power Company for Authority to Change Rates, Phases I & II
[Direct Testimony – Fuel Reconciliation. Non-reconcilable Fuel Expenses] (March, 1989)

8400 Application of Lower Colorado River Authority to Change Rates [Direct Testimony – Fuel Reconciliation, Non-reconcilable Fuel Expenses, Fuel Price Forecast, Prudence Review] (March, 1989)

6692 Application of Texas-New Mexico Power Company for Certification of a Lignite-Fired Generation Station in Robertson County, Texas (Remand) [Direct Testimony – Fuel Price Forecast] (June, 1990)

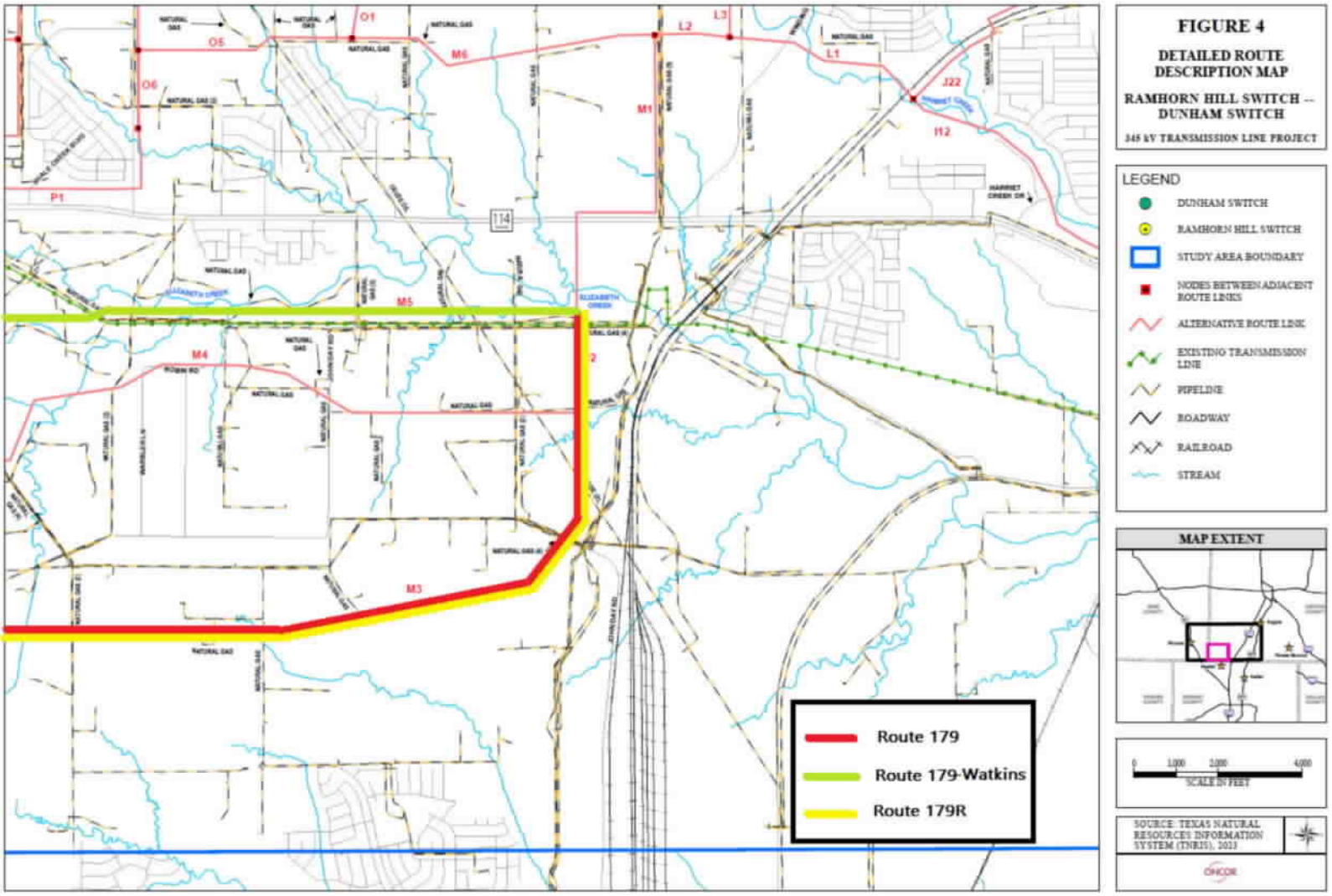
8095 Application of Texas-New Mexico Power Company for Authority to Change Rates [Direct Testimony - Purchased Power Expenses] (July, 1988)

8280 Application of Southwestern Electric Power Company for Authority to Increase Interim Fixed Fuel Factors
[Direct Testimony - Fuel Price Forecast] (November, 1988)

8328 Petition of West Texas Utilities Company for Order to Increase Fixed Fuel Factors
[Direct Testimony - Fuel Price Forecast] (November, 1988)

EXHIBIT BA-3

Map of Route Comparisons



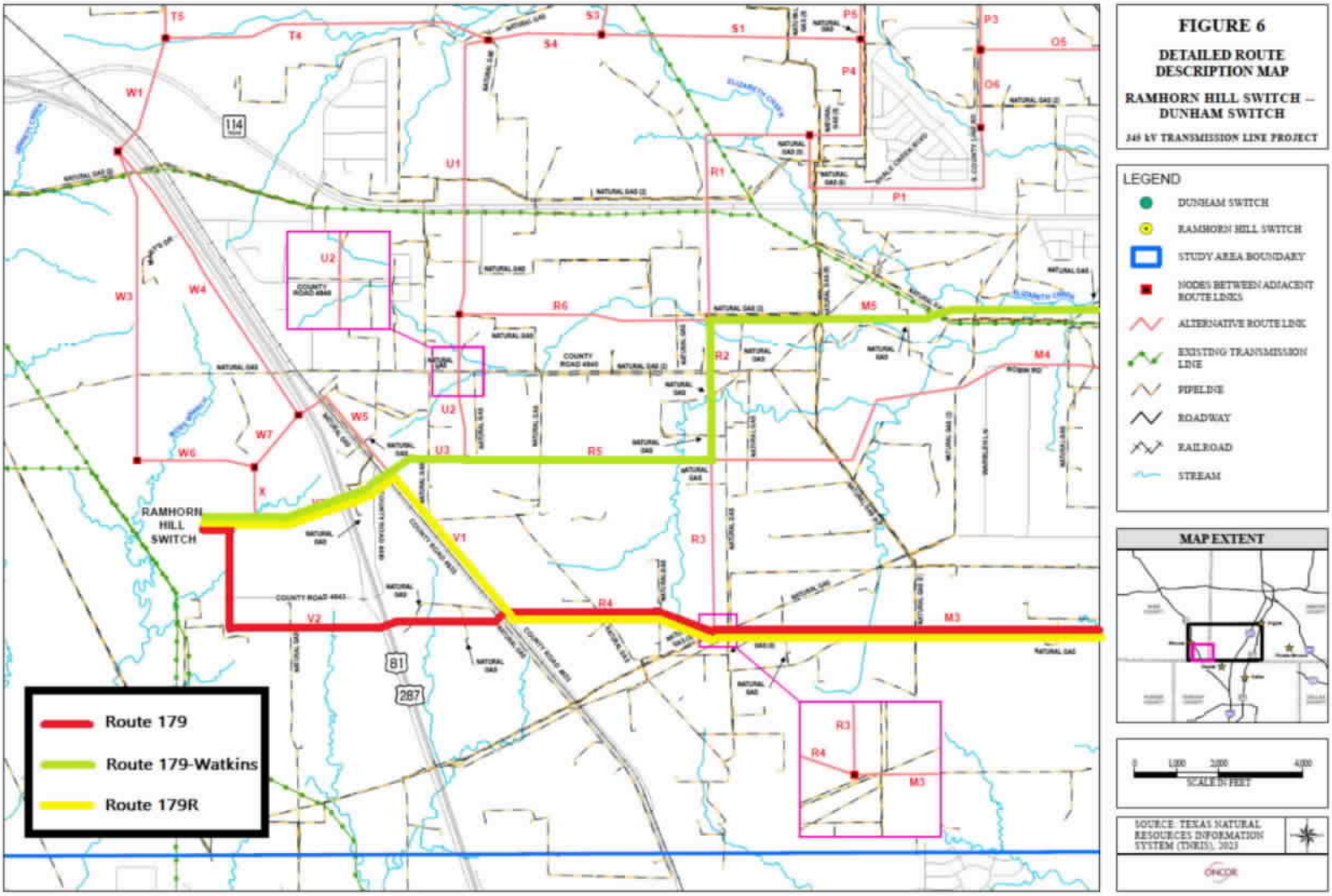


FIGURE 6
DETAILED ROUTE DESCRIPTION MAP
RAMHORN HILL SWITCH – DUNHAM SWITCH
345 kV TRANSMISSION LINE PROJECT
LEGEND
DUNHAM SWITCH
RAMHORN HILL SWITCH
STUDY AREA BOUNDARY
NODES BETWEEN ADJACENT ROUTE LINES
ALTERNATIVE ROUTE LINK
EXISTING TRANSMISSION LINE
PIPELINE
ROADWAY
RAILROAD
STREAM
MAP EXTENT
0 1,000 2,000 4,000
SCALE IN FEET
SOURCE: TEXAS NATURAL RESOURCES INFORMATION SYSTEM (TNRIS), 2023
ONCOR
RAMHORN HILL SWITCH
Route 179
Route 179-Watkins
Route 179R
T5
T4
S3
S4
S1
P5
P3
O5
O6
P4
W1
U1
R1
P1
U2
W3
W4
R6
M5
R2
M4
W5
W7
W6
U3
R5
V1
R3
V2
R4
M3
R3
R4
M3

EXHIBIT BA-4

Comparison of Routes 179, 179-Watkins, and 179R

Alternative Route Number	179	179-Watkins	179R
Length of alternative route	114,898	110,373	114,174
Length of route parallel to existing electric transmission lines	5,227	5,227	5,227
Length of route parallel to railroads	0	0	4,261
Length of route parallel to existing public roads/highways	6,591	6,591	8,040
Length of route parallel to pipelines	7,636	9,440	7,636
Length of route parallel to apparent property boundaries	20,834	20,438	25,094
Total length of route parallel to existing compatible rights-of-way	26,061	25,665	30,322
Number of habitable structures within 500 feet of the route centerline[1]	97	98	100
Number of parks or recreational areas within 1,000 feet of the route centerline[2]	4	4	4
Length of the route across parks/recreational areas	0	0	0
Length of route through commercial/industrial areas	4,607	4,551	4,617
Length of the route across cropland/hay meadow	20,248	22,691	20,248
Length across rangeland pasture	71,051	58,417	69,522

Length of route across agricultural cropland with mobile irrigation systems	0	0	0
Length of route across upland woodlands	10,126	11,311	10,731
Length of route across riparian areas	7,162	11,536	6,913
Length of route across potential wetlands	0	0	0
Number of stream crossings by the route	27	28	25
Length of route parallel to streams (within 100 feet)	1,351	695	695
Length across lakes or ponds (open waters)	1,704	1,867	2,143
Number of known rare/unique plant locations within the right-of-way	1	1	1
Length of route through known habitat of endangered or threatened species	0	0	0
Number of recorded cultural resource sites crossed by the route	1	1	1
Number of recorded cultural resources within 1,000 feet of the route centerline	3	3	3
Length of route across areas of high archaeological/historical site potential	37,905	56,753	36,864
Number of private airstrips within 10,000 feet of the route centerline	0	0	0
Number of FAA-registered airports with at least one runway more than 3,200 feet in length within 20,000 feet of route centerline	3	3	3
Number of FAA-registered airports with no runway greater than 3,200 feet in length within 10,000 feet of the route centerline	4	4	4

Number of heliports located within 5,000 feet of the route centerline	2	2	2
Number of commercial AM radio transmitters located within 10,000 feet of the route centerline	0	0	0
Number of FM, microwave and other electronic installations within 2,000 feet of the route centerline	2	2	1
Number of U.S. or State Highway crossings by the route	19	19	19
Number of Farm to Market (F.M.), county roads, or other street crossings by the route	11	10	10
Estimated length of right-of-way within foreground visual zone of U.S. and State Highways	47,388	63,395	49,335
Estimated length of right-of-way within foreground visual zone of park/recreational areas	45,369	41,157	41,157

COST	~~$175,208,000~~ $178,749,000	~~$172,744,000~~ $176,285,000	~~$175,411,000~~ $178,952,000

EXHIBIT BA-5

Comparison of Links V1, V3, and V4 with V2

Links	V2	V1,V3,V4	V1	V3	V4
Length of alternative route	9114	8391	4261	3545	585
Length of route parallel to existing electric transmission lines	0	0	0	0	0
Length of route parallel to railroads	0	4261	4261	0	0
Length of route parallel to existing public roads/highways	0	1449	1449	0	0
Length of route parallel to pipelines	0	0	0	0	0
Length of route parallel to apparent property boundaries	0	4261	4261	0	0
Total length of route parallel to existing compatible rights-of-way	0	0	4261	0	0
Number of habitable structures within 500 feet of the route centerline[1]	2	5	5	2	0
Number of parks or recreational areas within 1,000 feet of the route centerline[2]	0	0	0	0	0
Length of the route across parks/recreational areas	0	0	0	0	0
Length of route through commercial/industrial areas	750	759	123	636	0
Length of the route across cropland/hay meadow	0	0	0	0	0
Length across rangeland pasture	7470	5940	2889	2698	353
Length of route across agricultural cropland with mobile irrigation systems	0	0	0	0	0
Length of route across upland woodlands	632	1237	795	210	232
Length of route across riparian areas	249	0	0	0	0
Length of route across potential wetlands	0	0	0	0	0

Number of stream crossings by the route	3	1	0	0	1
Length of route parallel to streams (within 100 feet)	656	0	0	0	0
Length across lakes or ponds (open waters)	14	453	453	0	0
Number of known rare/unique plant locations within the right-of-way	0	0	0	0	0
Length of route through known habitat of endangered or threatened species	0	0	0	0	0
Number of recorded cultural resource sites crossed by the route	0	0	0	0	0
Number of recorded cultural resources within 1,000 feet of the route centerline	0	0	0	0	0
Length of route across areas of high archaeological/historical site potential	1626	585	0	0	585
Number of private airstrips within 10,000 feet of the route centerline	0	0	0	0	0
Number of FAA-registered airports with at least one runway more than 3,200 feet in length within 20,000 feet of route centerline	1	2	0	1	1
Number of FAA-registered airports with no runway greater than 3,200 feet in length within 10,000 feet of the route centerline	0	0	0	0	0
Number of heliports located within 5,000 feet of the route centerline	1	2	0	1	1
Number of commercial AM radio transmitters located within 10,000 feet of the route centerline	0	0	0	0	0
Number of FM, microwave and other electronic installations within 2,000 feet of the route centerline	1	0	0	0	0
Number of U.S. or State Highway crossings by the route	4	4	0	4	0

Number of Farm to Market (F.M.), county roads, or other street crossings by the route	3	2	0	2	0
Estimated length of right-of-way within foreground visual zone of U.S. and State Highways	6042	7990	3860	3545	585
Estimated length of right-of-way within foreground visual zone of park/recreational areas	~~9114~~212	~~83910~~	~~42610~~	~~35450~~	~~5850~~

EXHIBIT B

SOAH DOCKET NO. 473-23-21216
PUC DOCKET NO. 55067

APPLICATION OF ONCOR ELECTRIC DELIVERY LLC TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY FOR THE RAMHORN HILL-DUNHAM 345 KV TRANSMISSION LINE IN DENTON AND WISE COUNTIES	§	BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY

OF

T. BRIAN ALMON

ON BEHALF OF

EDGAR BRENT WATKINS AND MARY ANN LIVENGOOD,
CO-TRUSTEES OF THE WATKINS FAMILY TRUST

JULY 31, 2023

DIRECT TESTIMONY OF T. BRIAN ALMON

TABLE OF CONTENTS

EXHIBITS

I. STATEMENT OF QUALIFICATIONS

Q. Please state your name, occupation and business address.

A. My name is T. Brian Almon. I am a consultant testifying on behalf of Watkins Family Trust in this case. My business address is 343 Bonnabel Blvd., Metairie, Louisiana, 70005.

Q. Please briefly outline your educational and professional background.

A. I have a Bachelor of Science degree in Mining Engineering and a Master of Business Administration degree. My forty-four years of professional experience include mine operating, mine planning, coal marketing to the electric utility industry, and regulating electric utilities. I retired from the Public Utility Commission of Texas (Commission) in December 2011 as the Director of Electric Transmission Analysis after 23 years of employment. During sixteen years of my employment with the Commission, I supervised a staff whose primary duty was to review and file recommendations on applications for amendments to certificate of convenience and necessity for transmission lines. A more detailed resume is provided in Exhibit BA-1. Each year I personally reviewed from eight to fifteen Certificate of Convenience and Necessity (CCN) applications as they were filed with the Commission. I also personally filed testimony on sixteen transmission line cases.

Q. Have you previously testified as an expert before the Commission?

A. Yes. A list of the dockets in which I have testified is provided in Exhibit BA-2.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony in this proceeding?

A. My testimony evaluates the application of Oncor Electric Delivery LLC (Oncor) for the proposed transmission line project described as the Ramhorn Hill-Dunham 345 kV transmission line.

Q. What law, regulations and Commission orders have you used in making your evaluation and arriving at your conclusions and recommendations?

A. For my evaluation, I have referred to PURA § 37.056, P.U.C. SUBST. R. 25.101(b)(3) and the Order of Referral and Preliminary Order in this proceeding. My testimony is also based on my knowledge of commission precedent regarding transmission line CCNs.

Q. How is your testimony organized?

A. My testimony begins in Section I with a statement of my qualifications. In Section II, I discuss the purpose of my testimony. Section III presents a summary of my conclusions and recommendations for this proceeding. In Section IV, I describe the transmission project submitted by Oncor. In Section V, I discuss my evaluation of the 74 alternative routes submitted by Oncor for the Ramhorn Hill-Dunham 345 kV transmission line. In Section VI, I conclude my testimony with a presentation of alternative routes with a comparison to Route 179. This section includes additional information concerning my conclusion and recommendation for the administrative law judges (Judges) and the Commission.

Q. Have you prepared any exhibits related to your testimony?

A. Yes. They are attached to my testimony.

Q. Were these exhibits prepared by you or under your supervision?

A. Yes.

Q. What did you rely upon to reach your conclusions?

A. I have relied upon the Application, Testimony and Responses to Request for Information (RFI) filed by Oncor. Included in the Application is Attachment No. 1 - Environmental Assessment and Alternative Route Analysis (EA) prepared by Halff Associates, Inc. (Halff).

III. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Q. Please summarize the conclusions that you have reached as a result of your analysis.

A. I conclude the following:

1. Oncor presented an adequate number of geographically diverse alternative routes in their application for the proposed Ramhorn Hill-Dunham 345 kV transmission line.
2. Oncor considered the routing criteria as defined by PURA and the PUCT Substantive Rules in its route assessment for the Ramhorn Hill-Dunham 345 kV transmission line.
3. Alternative Route 179-Watkins best addresses the requirements of PURA and the PUCT Substantive Rules when compared to Oncor's "best-meets" Route 179.
4. Alternative Route 179R provides a route that is shorter and has a higher percentage of the length following existing compatible rights-of way than Route 179.

5. The combination of links V1, V3, and V4 should be used in place of link V2 in any route selected by the Judges and Commission.

Q. What is your recommendation?

A. I recommend that the Judges and the Commission approve Alternative Route 179-Watkins as the route that best addresses the requirements of PURA and the PUCT Substantive Rules. As an alternative, in lieu of Route 179, the Judges and the Commission should select Alternative Route 179R which is shorter than Route 179 by 724 feet and has 3% more of its route following existing compatible right-of-way compared to Route 179. Finally, if the Judges and the Commission want to consider *any* alternative route that includes Link V2, I recommend the substitution of links V1, V3, and V4 in place of link V2 in any route that would otherwise use link V2.

IV. PROJECT DESCRIPTION

Q. What is your understanding of the project in the Oncor application?

A. Oncor proposes to plan and construct a new double-circuit 345 kV transmission line to be built on triple-circuit capable monopole structures between the proposed Ramhorn Hill Switch and the proposed Dunham Switch in Denton and Wise Counties. The structures of the proposed transmission line will have two 345 kV circuits with a vacant third circuit position for a future 138 kV circuit. The proposed project will also include the new Ramhorn Hill Switch and the new Dunham Switch. Depending on the route approved by the Commission, the length of the proposed transmission project is

approximately 20 to 23 miles. Typical structure heights will range from 120 to 175 feet.[1]

Q. What is the estimated cost of the proposed transmission project?

A. The estimated cost of the transmission Project is between $168,332,000 and $238,602,000 depending on the route selected by the Commission.[2] Additional costs associated with the proposed Project include the two new switches (Ramhorn Hill and Dunham) with estimated cost of $33,510,000 and $41,348,000 respectively.[3] The cost of the new switches is the same for all of the proposed alternative routes.

Q. How did Halff support the Oncor application?

A. Oncor retained Halff to perform and prepare an Environmental Assessment for the Proposed Transmission Line Project (EA) for the proposed Project.[4] Halff responsibility for the Project included managing all elements of the preparation of the EA including data acquisition through analysis of the alternative routes.[5] Halff initially identified 221 preliminary alternative routes for evaluation. Seventy-four (74) primary alternative routes that represent an adequate number of reasonable and geographically differentiated primary alternative routes were selected by Oncor for further evaluation.[6]

Q. Do you conclude that Oncor's procedures and evaluations provided a suitable number of alternative routes for the consideration of the Commission?

[1] Application, page 4.

[2] Perkins testimony, page 9 (after errata).

[3] Zapletal testimony, pages 9-10.

[4] Marusak testimony, page 3.

[5] Marusak testimony, page 4.

[6] Perkins testimony, page 9.

A. Yes. I conclude that Oncor with input from Halff performed a reasonable and comprehensive evaluation that addressed all the requirements of PURA and the PUCT Substantive Rules and provided a suitable number of alternative routes.

V. ROUTE SELECTION BY ONCOR

Q. How did Halff evaluate the preliminary alternative routes?

A. Halff used 35 objective criteria that encompass applicable portions of the statute and the rules to evaluate the 221 alternative routes.[7]

Q. Are the criteria used by Halff ranked by importance?

A. No. Each CCN application has unique features that are evaluated generally using criteria that are normally presented in a CCN filing.

Q. Did Halff recommend an alternative route to Oncor?

A. No. Based primarily on an evaluation of the 35 objective criteria, Hallf identified 221 preliminary alternative routes. The evaluation of the 221 preliminary alternative routes was provided to Oncor in the Environmental Assessment and Alternative Route Analysis (EA).

Q. Does Oncor agree with Halff's selection of 221 preliminary alternative routes?

A. Yes. Oncor uses the data for the 221 preliminary alternative routes and the cost estimates for each route to select the 74 primary alternative routes for further evaluation.[8]

Q. What is the result of Oncor's evaluation of the 74 primary alternative routes?

[7] Appendix E. Table 7-2.

[8] Perkins testimony, page 8-9.

A. After reviewing the results of Halff's evaluation for the 74 primary alternative routes in addition to considering estimated costs and other factors including engineering and construction constraints, as well as agency and landowner concerns, Oncor selected Route 179 as the route that best meets the requirements of Texas Utilities Code 37.056(c)(4((A)-(D) and 16 TAC 25.101.[9]

Q. Why does Oncor consider Route 179 the route that best addresses the requirements of PURA and the Commission Substantive Rules?

A. Oncor lists 20 criteria to demonstrate why Route 179 was selected as the route that best addresses the requirements of PURA and the Commission Substantive Rules.[10]

1. Length of alternate route
2. Cost
3. Number of habitable structures
4. Paralleling existing compatible rights-of-way
5. Length of route through commercial/industrial areas
6. Length of route crossing cropland/hay meadow and rangeland pasture
7. Length of route crossing upland woodlands and riparian areas
8. Length of route crossing potential wetlands
9. Number of stream crossings
10. Length of route parallel to streams
11. Length of route across lakes or ponds
12. Number of known rare/unique plant locations within route ROW
13. Number of recorded cultural resource sites crossed

[9] Perkins testimony, page 9.

[10] Exhibit BJP-5

14. Number of recorded cultural resource sites within 1,000 feet of centerline
15. Number of FAA-registered airports with a runway greater than 3,200 feet within 20,000 feet of the centerline along its entire length
16. Number of FAA-registered airports with no runway greater than 3,200 feet within 10,000 feet of the centerline along its entire length
17. Number of heliports located within 5,000 feet of its centerline
18. Number of FM and other electronic installations within 2,000 feet of its centerline
19. Number of crosses over U.S. and State Highways
20. Number of crosses over FM county roads or other streets

Q. Are some of the original criteria not used by Oncor because the values are zero and therefore do not offer anything to the evaluation?

A. Yes. The following criteria have a zero value for all the 74 primary routes and therefore are not used in the final evaluation by Oncor.[11]

1. Length of route across agricultural cropland with mobile irrigation systems
2. Length of route through known habitat of endangered or threatened species
3. Number of private airstrips within 10,000 feet of the route centerline
4. Number of commercial AM radio transmitters located within 10,000 feet of the route centerline

Q. From your evaluation, which route do you conclude best addresses the requirements of PURA and the Commission Substantive Rules?

A. I conclude that Alternative Route 179-Watkins best addresses the requirements of PURA and the Commission Substantive Rules when considering the 74 primary alternative routes and possible modifications.

[11] Appendix E – Table 7-2 of EA.

Q. Did you use the same routing criteria and other factors to perform your evaluation of the 74 primary alternative routes and the development of your recommended route?

A. Yes.

Q. Why do you conclude that an alternative route to the 74 routes presented by Oncor be considered by the Judge and the Commission?

A. I conclude that Alternative Route 179-Watkins has very similar criteria values as Route 179 and should be considered by the Commission.

The significant advantages of Alternative Route 179-Watkins are:

- 0.86 mile shorter than Route 179
- less expensive by $2,464,000 than Route 179
- parallels existing compatible rights-of-way (23%) the same as Route 179
- has only one more habitable structure than Route 179

VI. EVALUATION OF ALTERNATIVE ROUTES

Q. Can a party to this proceeding suggest an alternative route that has not been proposed by Oncor?

A. Yes. Additional routes utilizing the route links presented by Oncor in its filing can be used to create a new alternative route or routes.

Q. Have you developed another alternative route using the same route links initially developed by Halff?

A. Yes. Alternative Route 179-Watkins utilizes the following links developed by Halff and used by Oncor: A0-A4-B1-B61-B62-C1-C21-C23-C7-E2-E1-E6-G1-G3-H41-H42-H8-I8-J3-K1-L5-L4-L3-L2-M1-M5-R2-R5-U3-V3-V4-Z.

Q. What links of Alternative Route 179-Watkins are different from Route 179?

A. Alternative Route 179-Watkins uses Links M5, R2, R5, U3, V3 and V4 in place of links M2, M3, R4 and V2 (see Exhibit BA-3).

Q. Why do you conclude that Alternative Route 179-Watkins better meets the requirements of PURA and the Commission Substantive Rules?

A. When considering the 20 criteria used by Oncor in its evaluation, and giving slightly greater weight to criteria such as length, cost, habitable structures and total paralleling, Alternative Route 179-Watkins compares more favorably than Route 179 as provided in the following discussion using the significant factors used by Oncor witness Perkins.[12]

- The length of Alternative Route 179-Watkins is approximately 20.9 miles and approximately 0.9 miles shorter than Route 179 at approximately 21.8 miles.
- The estimated cost of Alternative Route 179-Watkins is $176,285,000 which is $2,464,000 less than the estimated cost of $178,749,000 for Route 179.[13]
- There are 98 habitable structures within 500 feet of the centerline of Alternative Route 179-Watkins which is only one more than the 97 habitable structures for Route 179.
- Alternative Route 179-Watkins parallels existing compatible corridors for 23% of its length compared to the same percentage (23) for Route 179.
- Alternative Route 179-Watkins has 4,551 feet of its route through commercial/industrial areas compared to 4,607 feet for Route 179.

[12] Exhibit BA-4.

[13] Response to Watkins RFI Set No. 1, Question No. 1-10b (after Oncor errata, *see* Oncor Ex. 24).

- Alternative Route 179-Watkins crosses 22,691 feet of cropland/hay meadow and crosses 58,417 feet of rangeland pasture compared to 20,248 feet and 22,691 feet respectively for Route 179.
- Alternative Route 179-Watkins crosses 11,311 feet of upland woodlands and crosses 11,536 feet of riparian areas compared to 10,126 feet and 7,162 feet respectively for Route 179.
- Neither Alternative Route 179-Watkins or Route 179 cross potential wetlands.
- Alternative Route 179-Watkins crosses 28 streams compared to 27 streams for Route 179.
- The length of Alternative Route 179-Watkins that is parallel to streams (within 100 feet) is 695 feet compared to 1,351 feet for Route 179.
- The length of Alternative Route 179-Watkins across lakes or ponds (open waters) is 1,867 compared to 1,704 feet for Route 179.
- Both Alternative Route 179-Watkins and Route 179 have the same value for the following criteria:
    - Number of known rare/unique plant locations within the route right-of-way
    - Number of recorded cultural resource sites crossed by its centerline
    - Number of recorded cultural resources sites within 1,000 feet of centerline
    - Number of FAA-registered airports with at least one runway more than 3,200 feet in length within 20,000 feet of route

- Number of FAA-registered airports with no runway greater than 3,200 feet in length within 10,000 feet of the route centerline
- Number of heliports located within 5,000 feet of the route centerline
- Number of FM, microwave and other electronic installations within 2,000 feet of the route centerline
- Number of U.S. or State Highway crossings by the route

- Alternative Route 179-Watkins crosses ten FM, county roads or other streets whereas Route 179 crosses eleven roads and streets.[14]
- Both Alternative Routes 179-Watkins and 179 have been judged by Oncor to be feasible from an engineering perspective based on currently known conditions.[15]

Although not included in Oncor's 20 criteria, but still important is the fact that Alternative Route 179-Watkins has an estimated length of right-of-way within the foreground visual zone of park/recreational areas of 41,157 feet compared to 45,369 feet for Route 179.

Q. If the Commission is interested in comparing Oncor's "best meets" Route 179 with a route that is shorter and with a higher percentage of the length following existing compatible rights-of-way what do you recommend?

A. I recommend that the Commission consider Alternative Route 179R.

[14] Response to Watkins RFI Set No. 1, Question No. 1-10a.

[15] Exhibit BJP-5, page 4 and response to Question No 1-10c of Watkins RFI No. 1

Q. What are the apparent differences between Route 179 and Alternative Route 179R that would make Alternative Route 179R a better selection for meeting the requirements of PURA and the Commission Substantive Rules?

A. The apparent differences between Routes 179 and 179R are:

- Alternative Route 179R is shorter than Route 179 by 724 feet.
- Alternative Route 179R parallels railroads for 4,261 feet of its length compared to 0 feet for Route 179.
- Alternative Route 179R parallels existing public roads/highways for 8,040 feet of its length compared to 6,591 feet for Route 179.
- Alternative Route 179R parallels apparent property boundaries for 25,094 feet of its length compared to 20,834 feet for Route 179.
- Alternative Route 179R has 27% of its route following existing compatible right-of-way compared to 23% for Route 179. This difference equates to Alternative Route 179R following existing compatible right-of-way for 0.79 miles more than Route 179 while also being 0.14 miles shorter than Route 179.
- Alternative Route 179R has only three more habitable structures than Route 179.
- Alternative Route 179R costs only $203,000 or 0.08% more than Route 179. Eight one-hundredths of one percent is a *de minimis* amount and well within any margin of error and/or contingency amount in the cost estimates provided by Oncor.
- Alternative Route 179R parallels streams for 695 feet of its length compared to 1,351 feet for Route 179.

- Alternative Route 179R has an estimated length of right-of-way within the foreground visual zone of park/recreational areas for 41,157 feet compared to 45,369 feet for Route 179.

All other criteria have similar individual values for the two routes (Routes 179 and 179R).

Q. What are the links that are used in Alternative Route 179R?

A. Alternative Route 179R utilizes the following links developed by Halff and used by Oncor: A0-A4-B1-B61-B62-C1-C21-C23-C7-E2-E1-E6-G1-G3-H41-H42-H8-I8-J3-K1-L5-L4-L3-L2-M1-M2-M3-R4-V1-V3-V4-Z.

Q. In summary what are the differences in links for Route 179, Alternative Route 179-Watkins, and Alternative Route 179R?

A. The differences in links for the three routes are:

- Route 179 uses links M2, M3, R4 and V2.
- Alternative Route 179-Watkins uses links M5, R2, R5, U3, V3 and V4.
- Alternative Route 179R uses links M2, M3, R4, V1, V3, and V4.

All three routes originate at the terminus of link M1 and terminate at link Z.

The comparison of the criteria for Route 179, Alternative Route 179-Watkins and Alternative Route 179R is presented in Exhibit BA-4.

Q. Do you have a recommendation if the Commission wants to consider an alternative route that includes link V2.

A. Yes. If the Commission considers a route using link V2, I recommend that the Commission compare the advantages of using the combination of links V1, V3, and V4 instead of link V2.

The use of the combination of links V1, V3, and V4 compare more favorably than the use of link V2 in any proposed route and will better address the requirements of PURA and the PUCT Substantive Rules.

Q. How does the combination of links V1, V3, and V4 compare to link V2?

A. When considering the significant criteria of length, number of habitable structures, compatible right-of-way, and cost, the combination of links V1, V3, and V4 compare very favorably to link V2. The combination of links V1, V3, and V4:

- ✓ is shorter by 724 feet than link V2
- ✓ has 51% of its length along compatible ROW compared to 0% for link V2
- ✓ has only three more habitable structures than V2
- ✓ is only 0.08% more expensive than V2 ($203,000)[16]

In addition, the combination of links V1, V3, and V4, while being 724 feet shorter than V2, also has 212 feet less of its length within the foreground visual zone of park/recreational areas as well as having 656 less feet parallel to streams (51% less feet parallel to streams compared to V2).

Q. Does this conclude your testimony?

A. Yes.

[16] Exhibit BA-5

EXHIBIT BA-1

Qualifications of T. Brian Almon

EXHIBIT BA-1

QUALIFICATIONS

OF

T. BRIAN ALMON

I received a Bachelor of Science in Mining Engineering from the University of Arizona in 1967 and a Master of Business Administration degree from the same university in 1973. I also attended Virginia Polytechnic Institute and State University for postgraduate studies in mining engineering during 1968 and 1969. I have attended seminars on coal supply agreements, economic evaluation of mining projects, and regulation of electric utilities.

After receiving my BS degree, I was employed with New Jersey Zinc Company as a Mine Engineer (Austinville, Virginia). In 1970, I joined the Anaconda Company as an Assistant Shift Foreman at the Twin Buttes copper mine (Sahuarita, Arizona). After completion of my MBA degree, I was employed by El Paso Coal Company (El Paso, Texas), a subsidiary of El Paso Natural Gas Company, in several positions: Development Engineer, Senior Development Engineer, Administrator of Technical Staff, Administrator of Technical Staff & Coal Marketing, and Manager of Coal Marketing and Technical Services.

As an engineer, my responsibilities included planning and cost estimating for surface coal mines. As administrator and manager, I was responsible for economic evaluation of coal projects, coal analyses, computer program development, forecasting the fuel needs of electric utilities, and marketing El Paso Coal Company's coal properties located in four western states.

In 1980 I joined Tenneco Coal Company (Houston, Texas) as Manager of Coal Marketing with responsibility for marketing Texas and Mississippi lignite to electric utilities. My duties included the determination of future fuel needs for the electric utilities in Texas. I followed very closely the activities of utilities and competing coal companies. I also tracked prices of competing fuels and coal transportation.

In May 1988, I began my employment with the Commission as a Fuel Engineer. My duties included evaluating utility fuel procurement management practices, forecasting short and long-term fuel prices, recommending depreciation rates and fuel inventory levels, and supporting Commission projects in the fuel area. In December 1993, I became Manager of Engineering with responsibility over fuel, power plant engineering, and transmission line siting. On October 1, 1995, as part of an agency-wide reorganization, I assumed the responsibility for fuel as Assistant Director of Fuel Analysis. On January 9, 1998, I assumed the responsibility for fuel and engineering as an Assistant Director in the Electric Industry Analysis Division. When I retired from the PUCT in December, 2011, my title was Director of the Electric Transmission Analysis Section in the Infrastructure and Reliability Division with essentially the same duties.

EXHIBIT BA-2

List of Dockets Containing Testimony of T. Brian Almon

EXHIBIT BA-2
LIST OF DOCKETS CONTAINING TESTIMONY OF
T. BRIAN ALMON

PUC DOCKET NUMBER	DESCRIPTION
49603	Application of Upshur Rural Electric Cooperative Corporation to Amend Its Certificate of Convenience and Necessity for a 138-kv Transmission Line in Harrison County (Hallsville-Gum Springs) [Direct Testimony – Route Selection] (January 27, 2020) [Rebuttal Testimony – Route Selection] (February 19, 2020)
48909	Joint Application of Oncor Electric Delivery Company LLC and the City of Lubbock, Acting by and through Lubbock Power & Light for a Certificate of Convenience and Necessity for the Proposed Wadsworth to New Oliver to Farmland 345-Kv Transmission Line in Lubbock and Lynn Counties and the Proposed Southeast to New Oliver to Oliver 115-Kv Transmission Line in Lubbock County [Direct Testimony – Route Selection] (May 7, 2019) [Rebuttal Testimony – Route Selection] (June 21, 2019)
48668	Joint Application of Sharyland Utilities, L.P. and City of Lubbock Acting by and through Lubbock Power & Light for a Certificate of Convenience and Necessity for the Proposed Abernathy to Wadsworth 345 kV Transmission Line in Hale and Lubbock Counties, Texas [Direct Testimony – Route Selection] (March 13, 2019)
48625	Joint Application of Sharyland Utilities, L.P. and City of Lubbock Acting by and through Lubbock Power & Light for a Certificate of Convenience and Necessity for the Proposed Ogallala to Abernathy 345 KV Transmission Line in Castro, Hale, and Swisher Counties, Texas [Direct Testimony – Route Selection] (February 15, 2019) [Rebuttal Testimony – Route Selection] (March 22, 2019)
46429	Application of Brazos Electric Power Cooperative, Inc. for Amendment to its Certificate of Convenience and Necessity for a 138-kv Transmission Line in Collin County [Direct Testimony - Route Adequacy] (March 3, 2017) [Direct Testimony – Route Selection] (April 28, 2017) [Rebuttal Testimony – Route Selection] (June 13, 2017)
46042	Application of Southwestern Public Service Company to Amend its Certificate of Convenience and Necessity for a Proposed 345-KV Transmission Line within Hale, Hockley, Lubbock, Terry, and Yoakum Counties (TUCO to Yoakum) [Direct Testimony – Route Selection] (December 5, 2016) [Rebuttal Testimony – Route Selection] (December 16, 2016)
45170	Application of Brazos Electric Power Cooperative, Inc. to Amend a Certificate of Convenience and Necessity for a 138-kV Double Circuit Transmission Line in Collin and Denton Counties [Direct Testimony – Route Selection] (February 22, 2016)
44837	Application of AEP Texas Central to Amend a Certificate of Convenience and Necessity for a Proposed 138-kV Transmission Line in Bee County and Goliad County, Texas [Direct Testimony – Route Selection] (December 7, 2015)

[Rebuttal Testimony – Route Selection] (February 2, 2016)

44547 Application of Centerpoint Energy Houston Electric, LLC to Amend a Certificate of Convenience and Necessity for a Proposed 345-kV Transmission Line Within Grimes, Harris, and Waller Counties
[Direct Testimony – Route Adequacy] (June 15, 2015)
[Direct Testimony – Route selection] (July 13, 2015)
[Rebuttal Testimony – Route selection] (July 31, 2015)

43878 Application of Brazos Electric Power Cooperative, Inc. To Amend a Certificate of Convenience and Necessity for a 138-kV Double Circuit Transmission Line in Collin and Denton Counties
[Direct Testimony – Route selection] (July 26, 2015

43599 Application of LCRA Transmission Services Corporation to Amend its Certificate of Convenience and Necessity for the Proposed Blumenthal Substation and 138-KV Transmission Line Project in Blanco, Gillespie, and Kendall Counties, Texas
[Direct Testimony – Route selection]
(April 6, 2015)

41606 Joint Application of Electric Transmission Texas, LLC and Sharyland Utilities to Amend its Certificate of Convenience and Necessity for the North Edinburg to Loma Alta Double-Circuit 345-KV Transmission Line in Hidalgo and Cameron Counties, Texas
[Direct Testimony – Route adequacy]
(September 17, 2013)

38743 Application of Electric Transmission Texas, LLC to Amend its Certificate of Convenience and necessity for the Tesla to Edith Clarke to Clear Crossing to West Shackelford 345-kV CREZ Transmission Line in Childress, Cottle, Hardeman, Foard, Knox, Hasdell, Jones, and Shackelford Counties
[Direct Testimony – Route selection]
(January 7, 2011)

38480 Application of Texas-New Mexico Power Company for Authority to Change Rates
[Direct Testimony – Self-insurance & storm hardening]
(November 15, 2010)

38354 Application of LCRA Transmission Services Corporation to Amend its Certificate of Convenience and Necessity for the McCamey D to Kendall to Gillespie 345-kV CREZ Transmission Line in Schleicher, Mason, Gillespie, Kerr and Kendall Counties
[Direct Testimony – Route Selection
(October 11, 2010)

38339 Application of CenterPoint Energy Houston, LLC for Authority to Change Rates
[Direct Testimony – Self-insurance]
(September 17, 2010)

38230 Application of Lone Star Transmission, LLC for a Certificate of Convenience and Necessity for the Central A to Central C to Sam Smith/Navarro Proposed CREZ Transmission Line
[Direct Testimony – Route Selection]
(August 26, 2010)

38361 Application of El Paso Electric Company to Reconcile Fuel Costs (Severed from PUC Docket 37690)
[Direct Testimony – Recovery of Mine Closing Costs]
(July 16, 2010)

37744 Application of Entergy Texas, Inc. For Authority to Change Rates and Reconcile Fuel Costs
[Direct Testimony – Coal supply for Nelson 6 power plant and third-party power contract]
(June 16, 2010)

37162 Application of Southwestern Electric Power Company for Authority to Reconcile Fuel Costs
[Direct Testimony – Performance of Pirkey and Dolet Hills power plants]
(May 13, 2010)

37448 Application of LCRA Transmission Services Corporation to Amend its Certificate of Convenience and Necessity for the Gillespie to Newton 345-kV CRES Transmission Line in Gillespie, Llano, San Saba, Burnet, and Lampasas Counties, Texas
[Direct Testimony – Route Selection]
(January 20, 2010)

36025 Application of Texas-New Mexico Power Company for Authority to Change Rates
[Direct Testimony – Self-insurance]
(June 3, 2009)

35665 Commission Staff's Petition for Selection of Entities Responsible for Transmission Improvements Necessary to Deliver Renewable Energy from Competitive Renewable Energy Zones
[Direct Testimony – Assignment of TSP for CREZ Projects]
(October 28, 2008)
[Rebuttal Testimony – Priority & default projects and proposed joint venture]
(November 14, 2008)

35763 Application of Southwestern Public Service Company for Authority to Change Rates, to Reconcile Fuel and Purchased Power Costs for 2006 and 2007, and to Provide a Credit for Fuel Cost Savings
[Direct Testimony – Storm restoration and reserve amount]
(October 21, 2008)

34800 Application of Entergy Gulf States, Inc. for Authority to Change Rates and to Reconcile Fuel Costs
[Direct Testimony – Revenue Requirement and Fuel Phases]
(April 18, 2008)

34077 Joint Report and Application of Oncor Electric Delivery Company and Texas Energy Future Holdings Limited Partnership Pursuant to PURA §14.101
[Direct Testimony – Reliability Standard]
(September 21, 2007)
[Direct Testimony – Support of Stipulation]
(October 24, 2007)

33672 Commission Staff's Petition for Designation of Competitive Renewable Energy Zones
[Direct Testimony – Designation of CREZ in Texas]
(April 24, 2007)
[Rebuttal Testimony – Designation of CREZ in Texas]
(May 21, 2007)
[Corrected Direct and Rebuttal Testimony]
(June 4, 2007)

33309 Application of AEP Texas Central Company for Authority to Change Rates
[Direct Testimony – Self Insurance Plan and Catastrophe Reserve]
(March 23, 2007)

32766 Application of Southwestern Public Service Company for: (1) Authority to Change Rates; (2) Reconciliation of its Fuel Costs for 2004 and 2005; (3) Authority to Revise the Semi-Annual Formulae Originally Approved in Docket No. 27751 Used to Adjust its Fuel Factors; and (4) Related Relief [Direct Testimony – Coal Issues]
(January 12, 2007)

32018 Notice of Violation by TXU Electric Delivery of PURA §38.005, Relating to Electric Service Reliability Measures and P.U.C. Subst. R. 25.52, Relating to Reliability and Continuity of Service
[Direct Testimony – Appropriate Penalty] (July 13, 2006)

31824 Application of the Electric Reliability Council of Texas for Approval of the ERCOT System Administrative Fee
[Direct Testimony – Review of Technical Expenditures]
(January 23, 2006)

31064 Application of AEP Texas North Company and Taylor Electric Cooperative, Inc. for Clarification of Service Area Boundary in Taylor County
[Direct Testimony – Boundary Determination]
(November 8, 2005)

30143 Petition of El Paso Electric Company to Reconcile Fuel Costs
[Direct Testimony – Purchased Power and Off-system Sales]
(March 2, 2005)

29801 Application of Southwestern Public Service Company for Reconciliation of its Fuel Costs for 2002 and 2003, A Finding of Special Circumstances and Related Relief
[Direct Testimony – Coal Inventory and Wheeling Expenses]
(November 2, 2004)

28813 Petition to Inquire into the Reasonableness of the Rates and Services of Cap Rock Energy Corporation
[Direct Testimony – Funding Catastrophe Reserve]
(September 13, 2004)

29526 Application of Centerpoint Energy Houston Electric LLC, Reliant Energy Retail Services, LLC and Texas Genco LP to Determine Stranded Costs and Other True-Up Balances Pursuant to PURA §39.262
[Direct Testimony – Environmental Cleanup Costs]
(June 7, 2004)

28906 Application of LCRA Transmission Services Corporation to Change Rates
[Direct Testimony – Allowable expenses and post test-year adjustments]
(May 11, 2004)

29206 Application of Texas-New Mexico Power Company, First Choice Power, Inc. and Texas Generating Company, LP., To Finalize Stranded Costs Under PURA §39.262
[Direct Testimony – Price re-determination of lignite price]
(April 2, 2004)

28840 Application of AEP Texas Central Company for Authority to Change Rates
[Direct Testimony – Plant in Service]
(February 17, 2004)

28045 Application of Southwestern Electric Power Company for Authority to Reconcile Fuel Costs
[Direct Testimony – Reasonable and Necessary Expenses and Prudent Management]
(November 12, 2003)

27576 Application of Texas-New Mexico Power Company for Reconciliation of Fuel Costs
[Direct Testimony – Price predetermination & alternate fuels]
(July 25, 2003)

26194 Petition of El Paso Electric Company to Reconcile Fuel Costs
[Direct Testimony – Necessary Expenses and Off-System Sales]
(April 24, 2003)

26195 Joint Application of Texas Genco, LP and Centerpoint Energy Houston Electric, LLC to Reconcile Eligible Fuel Revenues and Expenses Pursuant to Subst. R. 25.236
[Direct Testimony – Recovery of Post-Mine Reclamation Cost]
(January 7, 2003)

25778 Emergency Complaint of Henry A. Miller, Et Al. Against American Electric Power Company and Request for an Emergency Cease and Desist Order
[Direct Testimony – Issues related to Ordering Paragraphs in Docket No. 21741]
(August 20, 2002)

24835 Petition of Reliant Energy, Incorporated for Approval of Environmental Cleanup Costs Plan
[Direct Testimony – Technical Issues of Application]
(January 15, 2002)

20314 Application of Hino Electric Power Company for a Certificate of Convenience and Necessity in Cameron, Willacy, and Hidalgo Counties
[Direct Testimony – Technical Issues of Application]
(October 25, 2001)

20125 Application of Beaumont Power & Light Company for a Certificate of Convenience and Necessity in Jefferson County, Texas
[Direct Testimony – Technical Issues of Application]
(October 25, 2001)

19950 Application of Corpus Christi Power & Light Company for a Certificate of Convenience and Necessity in Nueces and San Patricio Counties
[Direct Testimony – Technical Issues of Application]
(October 25, 2001)

23550 Application of Entergy Gulf States, Inc. for the Authority to Reconcile Fuel Costs
[Direct Testimony – Nuclear PBR and Outage]
(July 13, 2001)

23477 Application of West Texas Utilities Company for the Authority to Reconcile Fuel Costs
[Direct Testimony – Fuel Purchases]
(August 20, 2001)

22356 Application of Entergy Gulf States, Inc. for Approval of Unbundled Cost of Service Rate Pursuant to PURA §39.201 and Public utility Commission Substantive Rule §25.344
[Direct Testimony – Environmental Cleanup Cost Recovery]
(January 16, 2001)

22355 Application of Reliant Energy Incorporated for Approval of Unbundled Cost of Service Rate Pursuant to PURA §39.201 and Public Utility Commission Substantive Rule §25.344
[Direct Testimony – Transmission and Distribution Capital Expenditures]
(December 18, 2000)

22350 Application of TXU Electric Company for Approval of unbundled Cost of Service Rate Pursuant to PURA §39.201 and Public Utility Commission Substantive Rule §25.344
[Direct Testimony – Environmental Cleanup Cost Recovery]
(October 13, 2000)

22352 Application of Central Power and Light Company for Approval of Unbundled Cost of Service Rate Pursuant to PURA §39.201 and Public Utility Commission Substantive Rule §25.344
[Direct Testimony - Environmental Cleanup Cost Recovery]
(October 6, 2000)

22344 Generic Issues Associated with Application for Approval of Unbundled Cost of Service Rate Pursuant to PURA §39.210 and Public Utility Commission Substantive Rule §25.344
[Direct Testimony – O&M Escalators] (July 27, 2000)
[Rebuttal Testimony](August 3, 2000)
[Errata for Direct](August 3, 2000)

17525 Application of Southwestern Public Service Company for Certification of Qualifying Facility Purchased Power Contract under Section 2.209 of PURA 95
[Direct Testimony – Fuel Price Risk
(August 19. 1997)

16628 Petition of the Lower Colorado River Authority to Reconcile its Fuel Revenues and Expenses and For Other Relief
[Direct Testimony – Coal, Gas, Oil & Purchased Power Reconciliation]
(May 8, 1997)

15195 Application of Texas Utilities Electric Company for a Reconciliation of Fuel Costs
[Direct Testimony – Mine Productivity
(October 7, 1996)

14965 Application of Central Power and Light Company for Authority to Change Rates and Reconcile Fuel Costs
[Direct Testimony – Fuel PBR in Competitive Issues Phase]
(July 18, 1996)

15102 Application of Gulf States Utilities Company to Reconcile Its Fuel Costs, for Permission to Delay Requesting a Surcharge, or in the Alternative, for a Surcharge to Recover Under-recovered Fuel Expense
[Direct Testimony – Reconciliation of Fossil Fuel]
(July 8, 1996)

14893 Petition of Sam Rayburn G & T Electric Cooperative, Inc. for Authority to Change Rates
[Direct Testimony – Coal Inventory, Non-reconcilable and Eligible Fuel Expense]
(January 18, 1996)

14499 Petition of Southwestern Public Service Company for Findings of Special Circumstances and For Associated Waivers
[Direct Testimony]
(November 21, 1995)

12065 Complaint of Kenneth D. Williams against Houston Lighting & Power Company
[Direct Testimony – Trinity Mine Investment]
(November 29, 1994)

12820 Petition of the General Counsel for and Inquiry into the Reasonableness of the Rates and Services of Central Pore and Light Company
[Direct Testimony – Plant Held for Future Use]
(October 17, 1994)

12855 Application of Southwestern Electric Power Company to Reconcile Fuel Costs and Request for Accounting Order
[Direct Testimony – Coal Issues]
(August 10, 1994)
[Supplemental Testimony]
(August 29, 1994)

11520 Petition of the General Counsel for an Inquiry into the Reasonableness of Rates and Services of Southwestern Public Service Company
[Direct Testimony – Revenue Requirement Phase]
(July 29, 1993)

11735 Application of Texas Utilities Electric Company for Authority to Change Rates
[Direct Testimony – Fuel Phase]
(July 13, 1993)
[Direct Testimony – Revenue Requirement Phase
(July 13, 1993

11292 Application of Entergy Company and Gulf States Utilities Company for Sale, Transfer, or Merger
[Direct Testimony – Fuel Price Forecast
(January 8, 1993)
[Surrebuttal Testimony] (February 12, 1993)

10894 Application of Gulf States Utilities Company to Reconcile Fuel Costs, Establish New Fixed Fuel Factors, and Recover its Under-recovered Fuel Expenses
[Direct Testimony – Fuel Price Forecast, Fuel Reconciliation]
(August 28, 1992)

11011 Petition of Southwestern Public Services Company for a Fuel Reconciliation
[Direct Testimony – Fuel Reconciliation]
(August 4, 1992)

10982 Application of Sam Rayburn G&T Electric Cooperative, Inc. for Authority to Change Rates
[Direct Testimony – Purchase Power, Non-reconcilable Fuel Expenses, Fuel Price Forecast, Fuel Inventory, Fuel Reconciliation]
(June 3, 1992)

10092 Petition of Houston Lighting & Power Company for Reconciliation of Fuel Costs
[Direct Testimony – Fuel Reconciliation]
(March, 1991)
[Supplemental Testimony]
(June21, 1992)

10200 Application of Texas-New Mexico Power Company for Authority to Change Rates, Prudence Phase
[Direct Testimony – Fuel Inventory, Fuel Price Forecast]
Prudence (November 8, 1991)
Revenue Requirement (December 13, 1991)
Fuel (December 13, 1991)

9850 Petition of Houston Lighting & Power Company for Authority to Change Rates

[Direct Testimony – Fuel Inventory, Depreciation, Non-reconcilable Fuel Expenses]
(February 19, 1991)

9300 Application of Texas Utilities Electric Company for Authority to Change Rates
[Direct Testimony – Fuel Reconciliation]
(June, 1990)

9030 Petition of the General Counsel for a Fuel Reconciliation for Southwestern Public Service Company
[Direct Testimony – Fuel Reconciliation]
(May, 1990)

9561 Application of Central Power and Light Company for Authority to Change Rates
[Direct Testimony – Fuel Reconciliation, Fuel Price Forecast, Fuel Inventory]
(August, 1990)

9491 Application of Texas-New Mexico Power Company for Authority to Change Rates
[Direct Testimony – Fuel Price Forecast, Fuel Inventory]
(July, 1990)

9427 Application of Lower Colorado River Authority for Authority to Change Rates
[Direct Testimony – Prudence of Cummins Creek]
(July, 1990)

8900 Petition of the General Counsel for a Fuel Reconciliation for Southwestern Electric Power Company
[Direct Testimony – Coal and Lignite Reconciliation]
(January, 1990)
[Supplemental Testimony]
(January, 1990)

8646 Petition and Statement of Intent of Central Power and Light Company to Change Rates
[Direct Testimony – Fuel Reconciliation, Fuel Management, Coal Inventory, Coal Price Forecast, Non-reconcilable Fuel Expenses, Plant Held for Future Use]
(May – December, 1989)

8595 Application of Sam Rayburn G & T Electric Cooperative, Inc. for Authority to Change Rates
[Direct Testimony – Fuel Reconciliation, Non-reconcilable Fuel Expenses, Fuel Price Forecast]
(April, 1989)

8588 Application of El Paso Electric Company for Reconciliation of Fuel
[Direct Testimony – Fuel Reconciliation] (August, 1989)

8425 Petition of Houston Lighting & Power Company for Authority to Change Rates, Phases I & II
[Direct Testimony – Fuel Reconciliation. Non-reconcilable Fuel Expenses] (March, 1989)

8400 Application of Lower Colorado River Authority to Change Rates [Direct Testimony – Fuel Reconciliation, Non-reconcilable Fuel Expenses, Fuel Price Forecast, Prudence Review] (March, 1989)

6692 Application of Texas-New Mexico Power Company for Certification of a Lignite-Fired Generation Station in Robertson County, Texas (Remand) [Direct Testimony – Fuel Price Forecast] (June, 1990)

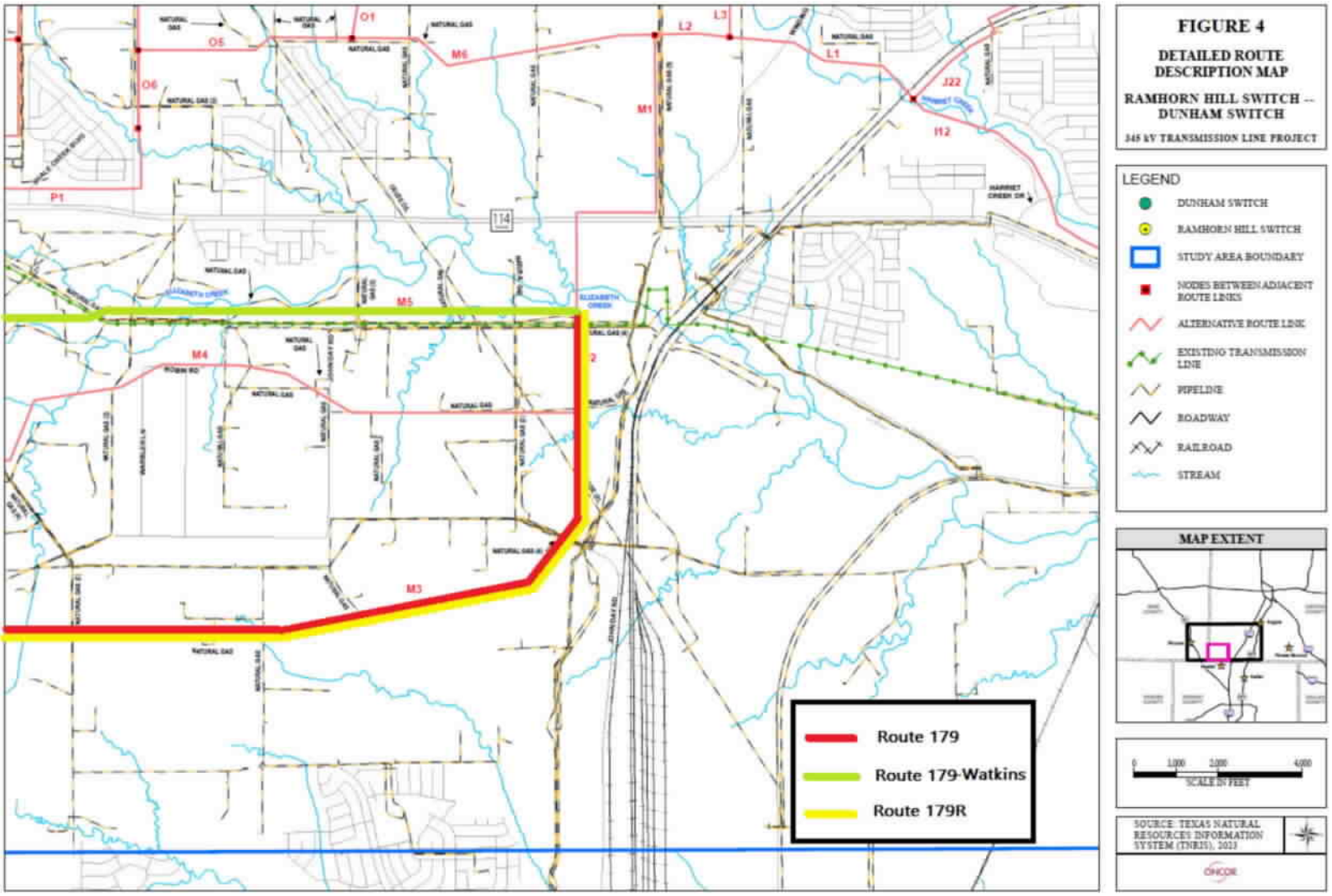
8095 Application of Texas-New Mexico Power Company for Authority to Change Rates [Direct Testimony - Purchased Power Expenses] (July, 1988)

8280 Application of Southwestern Electric Power Company for Authority to Increase Interim Fixed Fuel Factors
[Direct Testimony - Fuel Price Forecast] (November, 1988)

8328 Petition of West Texas Utilities Company for Order to Increase Fixed Fuel Factors
[Direct Testimony - Fuel Price Forecast] (November, 1988)

EXHIBIT BA-3

Map of Route Comparisons



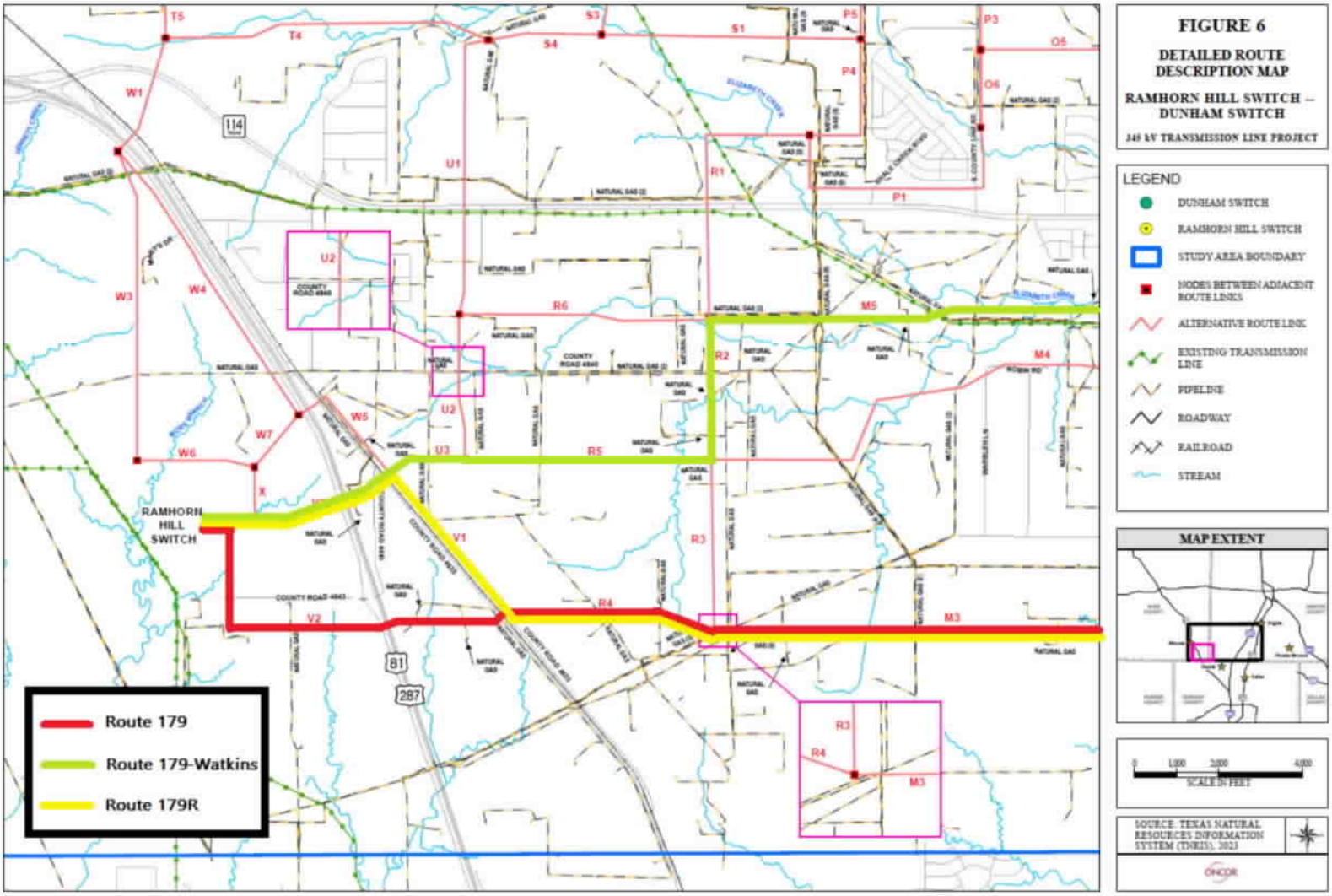


FIGURE 6

DETAILED ROUTE DESCRIPTION MAP

RAMHORN HILL SWITCH – DUNHAM SWITCH

345 kV TRANSMISSION LINE PROJECT

LEGEND

- DUNHAM SWITCH
- RAMHORN HILL SWITCH
- STUDY AREA BOUNDARY
- NODES BETWEEN ADJACENT ROUTE LINES
- ALTERNATIVE ROUTE LINK
- EXISTING TRANSMISSION LINE
- PIPELINE
- ROADWAY
- RAILROAD
- STREAM

MAP EXTENT

0 1,000 2,000 4,000

SCALE IN FEET

SOURCE: TEXAS NATURAL RESOURCES INFORMATION SYSTEM (TNRIS), 2023

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EXHIBIT BA-4

Comparison of Routes 179, 179-Watkins, and 179R

Alternative Route Number	179	179-Watkins	179R
Length of alternative route	114,898	110,373	114,174
Length of route parallel to existing electric transmission lines	5,227	5,227	5,227
Length of route parallel to railroads	0	0	4,261
Length of route parallel to existing public roads/highways	6,591	6,591	8,040
Length of route parallel to pipelines	7,636	9,440	7,636
Length of route parallel to apparent property boundaries	20,834	20,438	25,094
Total length of route parallel to existing compatible rights-of-way	26,061	25,665	30,322
Number of habitable structures within 500 feet of the route centerline[1]	97	98	100
Number of parks or recreational areas within 1,000 feet of the route centerline[2]	4	4	4
Length of the route across parks/recreational areas	0	0	0
Length of route through commercial/industrial areas	4,607	4,551	4,617
Length of the route across cropland/hay meadow	20,248	22,691	20,248
Length across rangeland pasture	71,051	58,417	69,522

Length of route across agricultural cropland with mobile irrigation systems	0	0	0
Length of route across upland woodlands	10,126	11,311	10,731
Length of route across riparian areas	7,162	11,536	6,913
Length of route across potential wetlands	0	0	0
Number of stream crossings by the route	27	28	25
Length of route parallel to streams (within 100 feet)	1,351	695	695
Length across lakes or ponds (open waters)	1,704	1,867	2,143
Number of known rare/unique plant locations within the right-of-way	1	1	1
Length of route through known habitat of endangered or threatened species	0	0	0
Number of recorded cultural resource sites crossed by the route	1	1	1
Number of recorded cultural resources within 1,000 feet of the route centerline	3	3	3
Length of route across areas of high archaeological/historical site potential	37,905	56,753	36,864
Number of private airstrips within 10,000 feet of the route centerline	0	0	0
Number of FAA-registered airports with at least one runway more than 3,200 feet in length within 20,000 feet of route centerline	3	3	3
Number of FAA-registered airports with no runway greater than 3,200 feet in length within 10,000 feet of the route centerline	4	4	4

Number of heliports located within 5,000 feet of the route centerline	2	2	2
Number of commercial AM radio transmitters located within 10,000 feet of the route centerline	0	0	0
Number of FM, microwave and other electronic installations within 2,000 feet of the route centerline	2	2	1
Number of U.S. or State Highway crossings by the route	19	19	19
Number of Farm to Market (F.M.), county roads, or other street crossings by the route	11	10	10
Estimated length of right-of-way within foreground visual zone of U.S. and State Highways	47,388	63,395	49,335
Estimated length of right-of-way within foreground visual zone of park/recreational areas	45,369	41,157	41,157

COST	$178,749,000	$176,285,000	$178,952,000

EXHIBIT BA-5

Comparison of Links V1, V3, and V4 with V2

Links	V2	V1,V3,V4	V1	V3	V4
Length of alternative route	9114	8391	4261	3545	585
Length of route parallel to existing electric transmission lines	0	0	0	0	0
Length of route parallel to railroads	0	4261	4261	0	0
Length of route parallel to existing public roads/highways	0	1449	1449	0	0
Length of route parallel to pipelines	0	0	0	0	0
Length of route parallel to apparent property boundaries	0	4261	4261	0	0
Total length of route parallel to existing compatible rights-of-way	0	0	4261	0	0
Number of habitable structures within 500 feet of the route centerline[1]	2	5	5	2	0
Number of parks or recreational areas within 1,000 feet of the route centerline[2]	0	0	0	0	0
Length of the route across parks/recreational areas	0	0	0	0	0
Length of route through commercial/industrial areas	750	759	123	636	0
Length of the route across cropland/hay meadow	0	0	0	0	0
Length across rangeland pasture	7470	5940	2889	2698	353
Length of route across agricultural cropland with mobile irrigation systems	0	0	0	0	0
Length of route across upland woodlands	632	1237	795	210	232
Length of route across riparian areas	249	0	0	0	0
Length of route across potential wetlands	0	0	0	0	0

Number of stream crossings by the route	3	1	0	0	1
Length of route parallel to streams (within 100 feet)	656	0	0	0	0
Length across lakes or ponds (open waters)	14	453	453	0	0
Number of known rare/unique plant locations within the right-of-way	0	0	0	0	0
Length of route through known habitat of endangered or threatened species	0	0	0	0	0
Number of recorded cultural resource sites crossed by the route	0	0	0	0	0
Number of recorded cultural resources within 1,000 feet of the route centerline	0	0	0	0	0
Length of route across areas of high archaeological/historical site potential	1626	585	0	0	585
Number of private airstrips within 10,000 feet of the route centerline	0	0	0	0	0
Number of FAA-registered airports with at least one runway more than 3,200 feet in length within 20,000 feet of route centerline	1	2	0	1	1
Number of FAA-registered airports with no runway greater than 3,200 feet in length within 10,000 feet of the route centerline	0	0	0	0	0
Number of heliports located within 5,000 feet of the route centerline	1	2	0	1	1
Number of commercial AM radio transmitters located within 10,000 feet of the route centerline	0	0	0	0	0
Number of FM, microwave and other electronic installations within 2,000 feet of the route centerline	1	0	0	0	0
Number of U.S. or State Highway crossings by the route	4	4	0	4	0

Number of Farm to Market (F.M.), county roads, or other street crossings by the route	3	2	0	2	0
Estimated length of right-of-way within foreground visual zone of U.S. and State Highways	6042	7990	3860	3545	585
Estimated length of right-of-way within foreground visual zone of park/recreational areas	212	0	0	0	0