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JOINT APPLICATION OF ELECTRIC TRANSMISSION TEXAS, LLC AND SHARYLAND UTILITIES, L.P. TO AMEND THEIR CERTIFICATES OF CONVENIENCE AND NECESSITY FOR THE NORTH EDINBURG TO LOMA ALTA DOUBLE-CIRCUIT 345-KV TRANSMISSION LINE IN HIDALGO AND CAMERON COUNTIES, TEXAS	§	BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY

OF

TOM SWEATMAN

ON BEHALF OF

THE CITY OF McALLEN

NOVEMBER 8, 2013

1148

DIRECT TESTIMONY OF
TOM SWEATMAN

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DIRECT TESTIMONY OF
TOM SWEATMAN

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, OCCUPATION, AND ADDRESS.

A. My name is Tom Sweatman. I am a consultant on bulk electric power issues. My business address is 30110 Hacienda Lane, Georgetown, Texas 78628.

Q. PLEASE STATE YOUR PROFESSIONAL QUALIFICATIONS.

A. I have attached my resume to my testimony as Attachment A.

Q. ON WHOSE BEHALF ARE YOU PRESENTING TESTIMONY IN THIS PROCEEDING?

A. I am presenting testimony on behalf of the City of McAllen, Texas ("City").

Q. WHAT ARE YOUR QUALIFICATIONS TO PROVIDE TESTIMONY REGARDING THE SELECTION OF A ROUTE ON WHICH TO BUILD THE SUBJECT TRANSMISSION LINE IN THIS PROCEEDING?

A. I have a long career dealing with transmission issues. My first job following my graduation in 1963 was based at the Odessa Transmission Division of Texas Electric Service Company ("TESCO"), which became a part of TXU, which is now Energy Future Holdings. Following field work in transmission and substation construction, maintenance, and system protection, I became one of three inspectors during the construction of a portion of the double circuit 345-kV transmission line which originates in Odessa, Texas and terminates at the Morgan Creek Generation Station in Colorado City.

Following a tour in the U.S. Army, I performed high voltage testing of transmission and generation system components. Following that, I designed protective relay schemes to initiate high voltage circuit breaker operation for system fault protection of transmission lines and other components on the Electric Reliability Council of Texas ("ERCOT") grid.

After a period of designing distribution systems, I spent three years supervising the installation of electrical control systems of the 400 megawatt TESCO Eagle Mount Unit #3 gas-fired steam electric generating unit near Fort Worth, which included inspection of activities tying the generator to the ERCOT transmission grid. I performed similar oversight during construction of the 540 megawatt TESCO Permian Basin Unit #6 gas-fired steam electric generating unit near Monahans, Texas. Finally, I was promoted to Manager of Power Plant Construction.

I left TESCO to become Chief Engineer at the Public Utility Commission of Texas ("PUC" or "Commission"), a position I held for eight years. Among other things, the position required the supervision of engineers who made recommendations for routing new transmission lines in Certificate of Convenience and Necessity ("CCN") cases.

Later I became Executive Director of ERCOT and participated in committee and subcommittee meetings dealing with the planning and operation of the ERCOT system grid. I coordinated the activities of the ERCOT Board and Technical Advisory Committee ("TAC"). I created and supervised an engineering staff to support the TAC and subcommittees. I coordinated the implementation of the ERCOT Independent System Operator ("ISO") and was project manager of the construction of the Austin and Taylor facilities.

During my consulting career I have testified in numerous hearings concerning electric transmission and generation issues. These are listed in my resume.[1]

II. PURPOSE OF TESTIMONY

Q. WHY HAVE YOU BEEN CALLED TO TESTIFY IN THIS CASE, AND WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The City of McAllen has asked me to evaluate the Joint Applicants' offering of the 32 alternative routes and 10 supplemental alternative routes and make a determination of which route comes closest to meeting the Commission's routing criteria. The purpose of my testimony is to make that determination and present a recommendation in that regard.

III. APPROACH

Q. HOW HAVE YOU APPROACHED YOUR TASK?

A. I have reviewed the Joint Applicants' application, environmental assessment and testimony regarding proposed routes 1 through 32, as well as the supplemental application, testimony, and description of supplemental routes 1S through 10S. I have in particular examined the environmental data provided by POWER Engineering in Tables 4-1 and 4-1S. My recommendation is based on this examination and a comparison of the data for the alternate routes.

[1] *See* Attachment A.

IV. DISCUSSION OF ALTERNATIVES

Q. PLEASE DISCUSS YOUR EVALUATION OF THE DATA PROVIDED BY THE JOINT APPLICANTS.

A. With 42 suggested alternative routes and 48 environmental data categories, plus the consideration of the cost[2] of each route, there are 2,058 data points to consider. POWER Engineering does not weight the evaluation criteria; thus, there is no mathematical analysis offered to give consideration as to which criteria POWER Engineering considers more important than others. However, some categories, such as total cost of a route, length of a route, number of habitable structures impacted, and so on, will likely be considered more important by the Administrative Law Judge and the Commission than perhaps, for example, the number of cemeteries within 1,000 feet of the Right of Way ("ROW") centerline, or the number of miles within the foreground visual zone of farm-to-market roads. Other environmental engineers do give weight to individual environmental criteria, but this can give rise to criticism that the data is subject to manipulation. Therefore, I have evaluated the data in Table 4-1 and 4-1S using two approaches to give some consideration to the difference in the various categories.

A. All Routes Against All Criteria

Q. HOW DID YOU BEGIN YOUR ANALYSIS?

A. First, I identified which route(s) have the most positive score(s) in each of the 48 environmental criteria (plus cost) used in Joint Applicants' Tables 4-1 and 4-1S, giving one point to each route with the best data point in each criteria. Table TS-1, attached to this testimony as Attachment B, illustrates with highlighting which routes

[2] All cost figures used in my analysis included the Joint Applicants' "Estimated Additional Costs" to upgrade existing substations, etc.

received a point for having the most positive number in each criteria. For example, Routes 1S and 9S each received one point for being the shortest routes at 86.3 miles long each. After evaluating all 42 routes against each other within each of the 48 criteria (plus cost), the alternative routes with the most points using this method are as follows:

18 points	Route 10S
16 Points	Route 2S
14 Points	Route 9S
13 Points	Routes 3S, 5S, 6S
12 points	Routes 1S, 8S
11 Points	Routes 4S, 16, 25, 30, 31, 32
10 Points	Routes 7S, 21, 22
5–9 Points	Remaining routes

Q. WHAT DO YOU GLEAN FROM THIS EXERCISE?

A. The routes with the largest number of higher scores should be considered as candidates for the final selection. Specifically, the top three, which are clear choices, are routes 10S, 2S, and 9S and should be considered. It is significant that all "S" or supplemental routes compared very well, and, in fact, usually better than the initially filed routes 1 through 32.

B. <u>All Routes Against Select Criteria</u>

Q. WHAT ELSE DID YOU CONSIDER?

A. Without weighting the various environmental criteria, judgment is called for. I have listed 13 evaluation criteria (plus cost) which I feel are important routing considerations. I evaluated all 42 routes against each other within each of the 13 criteria (plus cost), which is illustrated in Table TS-2 in Attachment C attached to this testimony. Following is the list of the 13 criteria (plus cost) and the routes which received "first place" scores in each selected criteria (plus cost):

Cost	Route 9S
Length	Routes 1S and 9S
Habitable Structures within 500' of ROW Centerline	Route 32
Newly affected habitable structures with 500' of ROW Centerline	Route 32
Number of habitable structures to be relocated/removed	Routes 13, 15, 22, 24, 31, 5S, 6S
Length of ROW using existing transmission line ROW	Route 7S
Length of ROW parallel to existing transmission ROW	Route 5
Length of ROW parallel to other existing ROW	Route 25
Length of ROW parallel to apparent property lines	Route 16
Number of pipeline crossings	Route 2S
Number of transmission line crossings	Route 2S
Number of US and State highway crossings	Route 6, 31
Length of ROW within foreground visual zone of US/State highways	Route 31
Number of Irrigation, Drainage and Canal crossings	Route 31

Q. HOW DO YOU INTERPRET THESE FINDINGS?

A. The top three routes that stand out are those that received top scores in at least two criteria. Routes 31, 32, 2S and 9S, should thus be considered, along with the routes 10S, 2S, and 9S that excelled in all criteria. Routes 9S and 2S are in both top selections using all criteria and selected criteria; thus, five routes remain: 2S, 9S, 10S, 31, and 32.

C. Five Surviving Routes Against All Criteria

Q. HOW DID YOU COMPARE THESE FIVE SURVIVING ROUTES?

A. I have prepared Table TS-3, Attachment D to my testimony, which measures the five surviving routes against all 48 criteria (plus cost). Additionally, I have also indicated with a red highlight the "2nd place" points, in addition to "1st place" points highlighted in green. That is, I first compared the five surviving routes against all criteria and identified those routes receiving the best and second-best scores using all 48 criteria (plus cost). When both 1st place and 2nd place scores are added together, the surviving routes rank as follows:

First Place: Routes 2S, 9S, and 10S (tie)
Fourth Place: Route 31
Fifth Place: Route 32

D. Five Surviving Routes Against Select Criteria

Q. DID YOU PERFORM ANY FURTHER ANALYSIS?

A. Yes. I then measured the five surviving routes against the select set of 13 environmental criteria (plus cost) which I believe come closest to meeting the Commission's most commonly used routing considerations. The results are shown in Table TS-4, Attachment E to my testimony. Using this measurement, the surviving routes rank as follows:

First Place: Route 31
Second Place: Route 32
Third Place: Route 2S
Fourth Place: Route 10S
Fifth Place: Routes 9S

Using all 48 categories (plus cost) identifies Routes 2S, 9S, and 10S as the best routes. Using only the select list of 13 criteria (plus cost) identifies Route 31 as the best route.

V. RECOMMENDATION

Q. WHAT IS YOUR RECOMMENDATION?

A. Based on my analysis, I would feel comfortable recommending either Routes 2S, 9S, 10S or Route 31. I do note that Route 31 is the first overall choice of the Power Engineering Project Manager and the second overall choice of the Power Engineering Land Use Specialist.[3] I understand these positions were taken prior to the submission

[3] *See* Table 5-1 Power's Environmental Ranking of the Alternative Routes, Attachment 1 at 183 of 1616.

of alternate routes 1S – 10S, but I also note Route 31 stands up very well against the supplemental routes when using the selected criteria.

Therefore, it is my recommendation that Route 31 be chosen as the route connecting Loma Alta to North Edinburg in this proceeding, although I would alternatively recommend routes 2S, 9S, and 10S as also presenting very good routing options.

Q. WHEN YOU WERE PREPARING YOUR ANALYSIS, DID YOU TAKE INTO ACCOUNT THE LACK OF DESIRABILITY OF USING ANY PARTICULAR LINK?

A. No. I did not take individual links into consideration. I took a holistic approach and only examined routes as a whole. I assumed all routes to be of equal value prior to comparing the routes using my methodology.

Q. HAS IT BEEN BROUGHT TO YOUR ATTENTION THAT THE USE OF ANY PARTICULAR PROPOSED LINK MAY CREATE UNDESIRABLE ISSUES?

A. Yes. Experts for the City of McAllen have indicated the selection of any route using link 118a will likely generate an investigation by the Federal Aviation Administration ("FAA"). The FAA will likely require either a reduction in tower height, line relocation, or some other action. If this happens, it is likely to cause changes in design, added costs and delays in construction and initial operation of this line which has been determined to be critical.

As this link is part of Route 32, this casts doubt on the viability, and use, of Route 32, which utilizes Link 118a.

VI. CONCLUSION

Q. DOES THAT CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

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Education: Texas A&M University
College Station, Texas
B.S. ELECTRICAL ENGINEERING

PROFESSIONAL EXPERIENCE

Electric Power Consultant (2002 – 2013)

February to April 2013: Submitted draft expert testimony for client in Texas PUCT Docket No. 40685: Application of SWEPCO to Amend its CCN for a Proposed 345kV Double-Circuit Transmission Line within Bowie County. Client received favorable action during settlement negotiations.

November, 2012 to January, 2013: Submitted draft expert testimony for client in Texas PUC Docket 40728 – Application of Electric Transmission Texas to build a 345-kv line in the Rio Grande Valley. Case settled in client's favor.

September to November, 2010: Provided expert testimonly for landowner clients in Texas PUC Docket 38354 – Amend CCN for 345-kv CREZ McCamey D to Kendall to Gillespie Transmission Line. Client received favorable decision by PUC.

July to November, 2010: Provided expert testimony for landowner clients in Texas PUC Docket 38290 – Amend CCN for 345-kv CREZ Hereford to White Deer Transmission Line. Received favorable decision by PUC.

2008-2009: Successfully assisted Stirling Energy Systems to find suitable land for solar project near Marfa, TX.

Oct 2008 – Mar 2009: Provided expert testimony for Occidental Power Marketing, L.P. in Texas SOAH Docket 473-08-3165, PUC Docket 35690, Petition of Big Country Electric Cooperative, Inc. for a Cease and Desist Order.

May 2008: Provided expert testimony for Hempstead County Hunt Club vs SWEPCO concerning status of construction of 600 MW Coal Fired Power Plant.

February 2006: Submitted written expert testimony for Franklin County Power of Illinois vs Sierra Club concerning status of construction of 600 MW Coal Fired Power Plant.

January and April, 2002: Provided expert testimony in Texas PUC Docket No. 24815, Complaint of Fayette Electric Cooperative, Inc. against The City of Schulenburg, Texas concerning service area boundary dispute re PUC Docket 17. Deposition in January, 2002. Live hearing testimony April 16, 2002.

Electric Reliability Council of Texas (1986 – 2002)
Austin, Texas

December, 1986 to January, 1996

EXECUTIVE DIRECTOR: First individual to hold this position. Established a technical staff to support the ERCOT Board of Directors, committees, subcommittees, task forces and working groups. Provided liaison with ERCOT members to deal with competitive pressures in a regulated industry. Coordinated the transition of ERCOT from an all utility organization to one that included cogenerators, independent power producers and power marketers. Performed duties as the ERCOT Regional Manager for the North American Electric Reliability Council (NERC).

January 1996 to July 2000

ADMINISTRATIVE DIRECTOR: Persuaded the Texas PUC to designate ERCOT to establish an Independent System Operator (ISO) for the region. Directed the reorganization of ERCOT to become the nation's first ISO, including assembling the initial 30 member ISO operating staff and leading the diverse selection committee to choose an ISO Director. This required intense coordination of the ERCOT Board, committees and working groups. Provided liaison with the PUC Chairman, Pat Wood, to insure a smooth transition to retail deregulation.

July, 2000 to November 2002

DIRECTOR OF NEW FACILITIES: Represented ERCOT management to insure success in the design and construction of the facilities to house the ERCOT Primary and Backup ISO facilities in Taylor and Austin, Texas. Insured liaison between ERCOT personnel and architect/engineer, contractor and subs. Made design/cost decisions at the level below top management. Advised the project team concerning the electric power industry as necessary.

Utility Consultant *July, 1984 to December, 1986*
Austin, Texas

UTILITY CONSULTANT: Provided managerial, rate and certification assistance to electric I.O.U.'s, municipalities, electric cooperatives, and private water utilities when dealing with regulatory authorities.

Texas Public Utility Commission *December, 1975 to July, 1984*
Austin, Texas

DIRECTOR OF ENGINEERING: First individual to hold this position following the legislation creating a public utility commission for Texas. Established and supervised the Engineering Division of approximately 20 engineers and support staff which provided technical expertise and testimony in rate review, depreciation techniques and licensing of electric, telephone and water utilities. Reported directly to the three commissioners. Along with the commissioners and other directors, created the Substantive Rules governing pricing and service of electric, telephone and private water utilities. Personally testified in certification and rate cases and supervised other engineers in doing the same.

Texas Electric Service Co. (now TXU Energy) *May, 1963 to December 1975*
Fort Worth and West Texas

EXECUTIVE LEVEL SPECIAL PROJECTS TEAM: Followed legislation and provided presentations to mid and upper management.

MANAGER OF POWER PLANT CONSTRUCTION: Completed the successful construction of the Permian Basin Unit #6 540 megawatt gas-fired base load generating unit and the Handley Units #4 and #5 400 megawatt peaking units.

PLANT ELECTRIC MAINTENANCE ENGINEER: Inspected and approved all electrical work done by contractor in the construction of Eagle Mountain Unit #3 400 megawatt gas-fired peaking unit and Permian Basin Unit #6.

ELECTRIC DISTRIBUTION DESIGN ENGINEER: Designed relay systems commensurate with distribution system additions.

PROTECTIVE RELAY ENGINEER: Designed protective relay systems for the Odessa Transmission Division.

FACILITIES TESTING ENGINEER: Supervised and conducted oil, DC, ohm resistance and gas testing of high voltage transformers and circuit breakers.

(From May 1964 to May 1966, served as a Second and First Lieutenant in the U.S. Army Air Defense School at Fort Bliss, Texas as a Branch Chief basic electricity instructor.)

FIELD INSPECTION ENGINEER: Provided field inspection of construction of the 90-mile Odessa-Big Spring 345kv transmission line.

Publications

"Progressive Test Program Pays Off", Transmission & Distribution magazine, December, 1968

"Automatic Carrier Testers Increase Transmission Line Reliability", Transmission & Distribution magazine, May, 1972

REFERENCES

Milton B. Lee, CEO (retired) Community Public Servie Electric and Gas Company of San Antonio (512) 773-7377

Kent Saathoff, Vice President – Operations, Electric Reliability Council of Texas (ERCOT), (512) 921-0701

Mike Greene, Vice Chairman (retired), Energy Future Holdings (214) 535-8551

Sam Hadaway, Principal, FINANCO, Inc. (Financial Analysis Consultants) (512) 431-3734

Sam Jones, CEO (retired), ERCOT (512) 791-8676

Larry Grimm, Consultant, Navigant, former director of Texas Reliability Entity, (512) 565-0773

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Table 4-1S ENVIRONMENTAL DATA FOR ROUTE EVALUATION

Table TS-3 (from tables 4-1 and 4-1S) Surviving Routes, All Criteria

Evaluation Criteria	Route 2S	Route 9S	Route 10S	Route 31	Route32
Land Use					
Total Cost of Alternative Route	297.0	277.3	280.3	335.4	352.3
Length of alternative route	92.6	86.3	86.5	108.2	117.5
Number of habitable structures* within 500 feet of ROW centerline	939	1072	867	674	465
Number of newly affected habitable structures within 500 feet of ROW centerline	770	943	791	476	335
Number of habitable structures* potentially to be relocated/removed*	6	5	5	0	2
Length of ROW using existing transmission line ROW	0	0	0	0	0
Length of ROW parallel to existing transmission line ROW	25.1	17.9	18.2	28.4	24.8
Length of ROW parallel to other existing ROW (highways, pipelines, railways, canals, etc.)	33.6	37.6	37.8	37.9	44.0
Length of ROW parallel to apparent property lines*	15.2	9.7	13.4	14.5	18.3
Length of ROW through parks/recreational areas*	0	0	0	0.3	0
Number of parks/recreational areas* crossed by ROW centerline	0	0	0	1	0
Number of additional parks/recreational areas* within 1,000 feet of ROW centerline	2	2	0	5	5
Length of ROW through USFWS National Wildlife Refuges	0	0	0	0.8	0
Length of ROW through IBWC managed ROW	2.3	1.0	1.0	4.3	5.8
Length of ROW through cropland*	56.4	51.5	53.1	60.5	70.8
Length of ROW through orchards	4.2	3.0	4.3	5.5	4.1
Length of ROW through pasture/rangeland	20.6	21.4	20.5	26.8	26.4
Length of ROW through land irrigated by traveling systems (rolling or pivot type)	0	0	0	0	0
Number of pipeline crossings	29	45	30	94	91
Number of transmission line crossings	16	26	24	25	29
Number of US and State highway crossings	15	13	17	6	9
Number of farm-to-market road crossings	12	15	11	25	18
Number of cemeteries within 1,000 feet of the ROW centerline	3	2	5	3	6
Number of FAA registered airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline	2	2	2	4	4
Number of FAA registered airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline	2	0	0	1	2
Number of private airstrips within 10,000 feet of the ROW centerline	1	1	1	1	1
Number of heliports within 5,000 feet of the ROW centerline	0	0	0	0	0
Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline	9	14	9	0	0
Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	11	10	13	12	12
Aesthetics					
Estimated length of ROW within foreground visual zone* of US and State highways	14.5	18.7	21.8	5.7	18.7
Estimated length of ROW within foreground visual zone* of farm-to-market roads	28.6	31.2	25.4	39.3	32.3
Estimated length of ROW within foreground visual zone* of parks/recreational areas*	7.5	7.1	5.9	17.6	12.3
Ecology					
Length of ROW through upland woodlands	0.5	1.8	1.4	5.2	5.0
Length of ROW through bottomland/riparian woodlands	1.5	0.8	0.8	1.8	1.8
Length of ROW across mapped NWI wetlands	2.3	0.2	2.7	1.0	2.5
Length of ROW across known habitat of federally listed endangered or threatened species	10.2	10.2	11.4	5.9	14.8
Length of ROW across open water (lakes, ponds)	0.7	0.6	0.6	1.0	0.9
Number of stream crossings	3	4	3	9	4
Number of river crossings	0	0	0	0	0
Number of irrigation/drainage canal crossings	141	121	126	90	132
Length of ROW parallel (within 100 feet) to streams or rivers	0	0	0	0	0
Length of ROW across 100-year floodplains	18.5	12.8	17.0	27.7	26.8
Length of ROW within Coastal Management Program boundary	15.9	7.0	8.9	7.1	8.9
Length of ROW seaward of the Coastal Facilities Designation Line	15.9	7.0	8.9	7.1	8.9
Cultural Resources					
Number of recorded cultural resource sites crossed by ROW	2	2	1	5	5
Number of additional recorded cultural resource sites within 1,000 feet of ROW centerline	2	3	3	10	11
Number of National Register listed sites crossed by ROW centerline	0	1	0	2	1
Number of additional National Register listed sites within 1,000 feet of ROW centerline	0	1	1	0	1
Length of ROW across areas of high archeological site potential	38.8	40.4	38.1	82.1	77.7
Top Criteria Points					
2nd Place Criteria Points					
Total of 1st and 2nd place Criteria Points	33	33	33	26	21

Table 4-1S ENVIRONMENTAL DATA FOR ROUTE EVALUATION

Table TS-4 (from tables 4-1 and 4-1S) Surviving Routes - Select Criteria

Evaluation Criteria	Route 2S	Route 9S	Route 10S	Route 31	Route32
Land Use					
Total Cost of Alternative Route	297.0	277.3	280.3	335.4	352.3
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Number of newly affected habitable structures within 500 feet of ROW centerline	770	943	791	476	325
Number of habitable structures[a] potentially to be relocated/removed[b]	6	5	5	0	2
Length of ROW using existing transmission line ROW	0	0	0	0	0
Length of ROW parallel to existing transmission line ROW	25.1	17.9	18.2	28.4	24.8
Length of ROW parallel to other existing ROW (highways, pipelines, railways, canals, etc.)	33.6	37.6	37.8	37.9	44.0
Length of ROW parallel to apparent property lines[c]	15.2	9.7	13.4	14.5	18.3
Number of pipeline crossings	29	45	30	94	91
Number of transmission line crossings	16	26	24	25	29
Number of US and State highway crossings	15	13	17	6	9
Aesthetics					
Estimated length of ROW within foreground visual zone[e] of US and State highways	14.5	18.7	21.8	5.7	18.7
Ecology					
Number of irrigation/drainage canal crossings	141	121	126	90	132
Cultural Resources					
Top Criteria Points					
2nd Place Criteria Points					
Total of 1st and 2nd place Criteria Points	6	4	5	9	7