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SOAH DOCKET NO. 473-18-5064
PUC DOCKET NO. 48358

APPLICATION OF LCRA	§	BEFORE THE STATE OFFICE
TRANSMISSION SERVICES	§	
CORPORATION TO AMEND ITS	§	
CERTIFICATE OF CONVENIENCE	§	OF
AND NECESSITY FOR THE	§	
PROPOSED COOKS POINT 138-KV	§	
TRANSMISSION LINE PROJECT IN	§	
BURLESON COUNTY, TEXAS	§	ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY AND EXHIBIT

OF

JESSICA R. MELENDEZ, P.E. #104702

ON BEHALF OF

APPLICANT
LCRA TRANSMISSION SERVICES CORPORATION

September 10, 2018

SOAH DOCKET NO. 473-18-5064
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DIRECT TESTIMONY AND EXHIBIT OF JESSICA R. MELENDEZ, P.E.

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EXHIBIT

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Jessica R. Melendez, P.E. My business address is: Lower Colorado River Authority (LCRA), 3505 Montopolis Drive, Bldg. D, Austin, Texas 78744.

Q. WHAT IS YOUR CURRENT OCCUPATION?

A. I am a Senior Engineer employed by the LCRA in the Line and Structural Engineering Department.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I earned a Bachelor of Science Degree in Architectural Engineering from the University of Texas at Austin in 2003 and a Master of Science Degree in Engineering Management from the University of Texas at Austin in 2008. I am a licensed professional engineer in the State of Texas (License No. 104702) and have worked for professional engineers or as a professional engineer since 2003. I have worked in the Line and Structural Engineering Department at LCRA since May 2005.

Q. PLEASE STATE YOUR CURRENT JOB RESPONSIBILITIES.

A. I provide professional services related to the engineering design of electric transmission lines. I am responsible for organizing, executing, and managing various types of transmission line projects and ensuring that the designs address the provisions and requirements of applicable engineering regulations, guidelines, and standards. I prepare cost estimates, perform engineering calculations, procure consulting services, structures, and other materials, prepare construction documents (drawings, specifications, and cost estimates), provide construction support and oversight, and provide engineering support to LCRA Transmission Services Corporation's (LCRA TSC's) transmission maintenance and operations functions. I perform engineering analyses, prepare cost estimates, and provide

engineering expert witness testimony for CCN projects. I also train and mentor new engineers in the Line and Structural Engineering Department.

Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THE PUBLIC UTILITY COMMISSION OF TEXAS (PUC OR COMMISSION)?

A. Yes, I testified in Docket Nos. 39479, 43599, and 45866.

II. SCOPE AND PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to describe the engineering, design, and cost aspects of the proposed Cooks Point 138-kilovolt (kV) Transmission Line Project (Project), including:

(1) the design of the proposed facilities;

(2) the proposed transmission line structure structures and right-of-way (ROW) widths;

(3) the proposed substation acreages;

(4) engineering considerations and permits for the proposed facilities; and

(5) estimated costs for the proposed facilities.

Q. WHAT PORTIONS OF LCRA TSC'S APPLICATION TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY (CCN) FOR THE PROJECT (APPLICATION) DO YOU SPONSOR?

A. I sponsor the responses to Questions 5 and 13 in the Application. I also co-sponsor the response to Question 4 with Mr. Kristian Koellner and Mr. Justin Stryker, the responses to Questions 6, 20, and 23 with Ms. Melinda Jensen, the responses to Questions 7 and 8 with Mr. Koellner, and the response to Question 17 with Ms. Jensen and Mr. Stryker. I co-sponsor with Mr. Koellner and Mr. Stryker Section 1 of the *Environmental Assessment and Alternative Route Analysis for LCRA TSC's Proposed Cooks Point 138-kV Transmission Line Project in Burleson County, Texas* (EA) prepared by URS that is included as Attachment 1 to the Application. I also sponsor Attachment 4 to the Application. Please refer to Exhibit JAS-4 in Mr. Stryker's direct testimony for an overview of sponsorship of the Application in this case.

Q. WERE YOUR TESTIMONY AND THE PORTIONS OF THE APPLICATION YOU SPONSOR PREPARED BY YOU OR BY KNOWLEDGEABLE PERSONS UPON WHOSE EXPERTISE, JUDGMENT, AND OPINIONS YOU RELY IN PERFORMING YOUR DUTIES?

A. Yes, they were.

Q. IS THE INFORMATION CONTAINED IN YOUR TESTIMONY AND THE PORTIONS OF THE APPLICATION YOU SPONSOR TRUE AND CORRECT TO THE BEST OF YOUR KNOWLEDGE AND BELIEF?

A. Yes, it is.

III. DESCRIPTION OF THE PROJECT

Q. PLEASE DESCRIBE THE PROJECT.

A. LCRA TSC proposes to construct, own, and operate a new 138-kV electric transmission line and load-serving substation in Burleson County. The Project will connect from either the existing Bluebonnet Electric Cooperative (BBEC) Lyle Wolz Substation or the existing BBEC Lyons Substation to a new substation in the vicinity of the Cooks Point community. The entire project will be approximately 17 to 23 miles in length, depending on the route approved by the Commission.

IV. STRUCTURE TYPE, ROW WIDTH, AND SUBSTATION ACREAGE

Q. WHAT TYPICAL STRUCTURE TYPE DOES LCRA TSC PROPOSE TO USE FOR THIS PROJECT?

A. LCRA TSC proposes to construct the Project with 138-kV single-circuit steel and/or concrete poles, typically 75 to 110 feet above ground. If ordered otherwise by the PUC, or in constrained areas such as, but not limited to, transmission line crossings and in proximity to airports or heliports, LCRA TSC could use shorter than typical, taller than typical, or alternative structure types including H-frames.

Q. WHAT TYPICAL NEW ROW WIDTH DOES LCRA TSC USE FOR NEW 138-KV TRANSMISSION LINE PROJECTS?

A. LCRA TSC's typical minimum ROW width for a new 138-kV transmission line is 80 feet. LCRA TSC uses this ROW for safe access to the transmission line structures and to provide the necessary clearances between the conductor and structures and vegetation outside of the controlled ROW.

Q. WHAT ROW WIDTH DOES LCRA TSC PROPOSE TO USE FOR THIS PROJECT?

A. The new 138-kV transmission facilities will typically be constructed in new ROW within 80-foot easements and using spans that range from approximately 600 to 1,000 feet. However, LCRA TSC evaluated some areas where segments could be located using a narrower than typical ROW width. Specifically, all or some portions of Segments A4, N, U3, and Z1 are estimated using a 60-foot ROW. This narrower ROW width results in shorter spans (approximately 500 to 600 feet), which will require the use of more poles.

In other areas where 60 feet of private ROW space was not available but adjacent road ROW could be used, LCRA TSC proposes to utilize the road ROW for some portion of the necessary clearances. For example, 40 feet of ROW on private property plus 20 feet of clearance in the road ROW equals 60 feet of total clearance for the transmission line. Specifically, all or some portions of Segments A4 are estimated to utilize a portion of road ROW for clearance purposes.

Thus, because 80 foot ROW was not available throughout the study area, LCRA TSC's use of narrower than typical ROW allowed it to identify a robust set of geographically diverse route alternatives.

Actual easement widths will be determined during the detailed design phase of the Project. Access easements and/or temporary construction easements may be needed in some areas as well.

Q. DOES LCRA TSC PLAN TO UTILIZE ANY OTHER EXISTING ROW OR EASEMENTS FOR THE PROPOSED TRANSMISSION LINE?

A. No. Where proposed segments parallel an existing transmission line, LCRA TSC plans to acquire an independent easement directly adjacent to the existing transmission line easement.

With the exception of proposed Segment A4 described above, where proposed segments parallel existing road ROW, railroad ROW, pipeline ROW or easements, and/or electric distribution line ROW or easements, LCRA TSC plans to acquire an independent easement adjacent to the other existing infrastructure ROW or easement.

Q. WHAT ARE THE ESTIMATED ACREAGES OF THE PROPOSED COOKS POINT SUBSTATION SITES?

A. Alternative substation sites 1, 2, and 4 are estimated to be approximately 8 acres. Alternative substation site 3 is estimated to be approximately 9 acres. The estimated substation acreages account for the area required for the electrical components of the substation as well as the area required for substation access, grading, and construction.

Q. WHY IS PROPOSED SUBSTATION SITE 3 ESTIMATED TO BE APPROXIMATELY ONE ACRE LARGER THAN THE OTHER ALTERNATIVE SUBSTATION SITES?

A. Substation site 3 is estimated to be one acre larger than the other alternative substation sites because the terrain at that location requires additional grading.

V. ENGINEERING CONSIDERATIONS

Q. WHAT ENGINEERING CONSIDERATIONS WILL BE USED IN THE DESIGN OF THE PROJECT?

A. LCRA TSC will design the Project to meet or exceed industry-accepted standards and specifications for operating the transmission facilities in a safe and reliable manner, including the National Electrical Safety Code (NESC). The Project will be constructed in a manner that complies with all state and federal statutes and regulations applicable to transmission line construction and operation, as well as LCRA TSC's Transmission Line

Engineering Standards, LCRA TSC's 138-kV substation engineering standards, and the Rural Utilities Service (RUS) "Design Manual for High Voltage Transmission Lines."

Q. HOW WILL LCRA TSC DETERMINE THE FINAL ALIGNMENT OF THE ROUTE APPROVED BY THE COMMISSION?

A. Upon Commission approval, engineers for LCRA TSC will begin detailed design of the Project and develop an alignment based on the approved route. This will involve gathering detailed survey information, including locations of above-ground, at-grade, and sub-surface constraints and precise property boundary and easement locations, as well as any locations of environmental and cultural resources.

Q. WILL LCRA TSC WORK WITH LANDOWNERS TO MAKE MINOR ROUTE ADJUSTMENTS FOLLOWING THE COMMISSION'S APPROVAL OF A ROUTE?

A. Yes. In accordance with direction set forth in the Commission's order, LCRA TSC will work with landowners on minor routing modifications during the design phase of the Project.

Q. IS IT TYPICAL FOR LCRA TSC TO MAKE OTHER MINOR ROUTE ADJUSTMENTS FOLLOWING THE COMMISSION'S APPROVAL OF A ROUTE FOR ENGINEERING REASONS?

A. Yes. During the CCN phase of the Project, LCRA TSC develops primary segments based on aerial imagery, georectified LiDAR (terrain) data, appraisal district parcel boundaries, and other publicly available utility data. As described above, during the detailed design phase, LCRA TSC will gather detailed survey information, including locations of above-ground, at-grade, and sub-surface constraints, precise property boundary locations, a list and location of all easements located on each property, and precise locations of any environmental and cultural resources. The results of the detailed surveying information, including any new constraints constructed during or after the CCN phase, will determine the final alignment of the transmission line and have the potential to result in minor route adjustments between the CCN phase and the construction phase of the Project.

The ability to make minor route adjustments for engineering reasons is particularly important in study areas that are urban and in study areas such as this one that are congested with existing and developing above-ground and underground infrastructure like oil and gas wells and associated pipelines.

Given the preliminary nature of the data available during the CCN phase of the Project and the pace of oil and gas development in this study area, LCRA TSC requests that the Commission adopt ordering language giving LCRA TSC flexibility to modify the approved route to the minimum extent necessary to avoid engineering constraints encountered following Commission approval, consistent with good utility practice.

Q. PLEASE DESCRIBE THE TYPICAL CONSTRUCTION, OPERATION, AND MAINTENANCE PROCESS FOR A TRANSMISSION LINE AND SUBSTATION OF THE TYPE PROPOSED FOR THE PROJECT.

A. During construction, transmission line projects of this type require surveying, ROW clearing, foundation installation, structure assembly and erection, conductor and shield wire installation, and cleanup. Following construction, LCRA TSC will perform periodic inspection of the ROW, structures, wires, and major substation equipment.

The substation will require a graded site pad and an access road with construction consisting of vegetation removal, cut and fill of existing soils, and the addition of select fill and compacted crushed limestone. Following site preparation, a perimeter fence, foundations, ground grid, electrical equipment, support structures, and a control building will be installed. After all facilities are installed, a final surface layer of gravel will be added, and cleanup will occur when construction is complete. These activities are described further in Sections 1.5 and 1.6 of the EA.

Q. DOES LCRA TSC MITIGATE THE POTENTIAL IMPACTS OF THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF TRANSMISSION LINES ON THE PUBLIC?

A. Yes. LCRA TSC utilizes a number of practices to mitigate the impacts of vegetation removal, construction, and maintenance. These practices are discussed in detail in Sections 1.3, 1.5, and 1.6 of the EA.

Q. WILL ANY ADDITIONAL PERMITS OR APPROVALS BE REQUIRED FOR THE PROJECT AND, IF SO, WHEN WILL THEY BE OBTAINED?

A. Yes. Following Commission approval of the Project, permits or other agency actions will be required and will be obtained prior to construction during the design phase of the Project. Permits or regulatory approval may be required from the following entities:

- Texas Department of Transportation (TxDOT)
- Texas Commission on Environmental Quality (TCEQ)
- United States Army Corps of Engineers
- United States Fish & Wildlife Service (USFWS)
- Texas Historical Commission (THC)
- Railroad Owners

The potential permits or regulatory approvals are described in more detail in Section 1.3 of the EA.

Q. WHAT COORDINATION ACTIVITIES WILL LCRA TSC PERFORM TO ADDRESS THE EXISTENCE OF STEEL PIPELINES CARRYING HYDROCARBONS IN THE STUDY AREA?

A. After all other alignments, structure locations, and structure heights are adjusted and set, LCRA TSC will coordinate with these pipeline owners and operators in the vicinity of the route regarding the pipeline owner's or operator's assessment of the need to install measures to mitigate the effects of alternating-current (AC) interference on these pipelines.

Q. HAVE YOU PERFORMED ANY CALCULATIONS RELATED TO THE ELECTRIC AND MAGNETIC FIELDS (EMF) THAT MAY BE EMITTED FROM THE TRANSMISSION LINE?

A. Yes. I calculated EMF for the typical line configuration based on expected Electric Reliability Council of Texas transmission line load flows. I calculated magnetic fields in milliGauss (mG) and electric fields in kV per meter (kV/m). The results, at various distances from the centerline, are presented in Exhibit JRM-1 to my testimony.

Q. WHAT ARE THE UNDERLYING ASSUMPTIONS FOR THESE EMF CALCULATIONS?

A. The EMF calculations presented in Exhibit JRM-1 assume peak loading. The calculation results are taken at a mid-span cross-section where the conductors are at their maximum sag, which results in calculating the highest potential EMF for the span. At most times and in most places, the EMF levels will be less than those presented in the exhibit.

Q. WHAT CONCLUSIONS DID YOU REACH BASED ON THE EMF CALCULATIONS YOU PERFORMED?

A. The calculated EMF levels are comparable to other transmission lines of this type.

Q. PLEASE DESCRIBE THE PRIMARY EQUIPMENT TO BE INSTALLED AT THE NEW COOKS POINT SUBSTATION.

A. The new proposed Cooks Point Substation will include the following installations:

- Two 138-kV A-frame bays;
- Three 138-kV circuit breakers;
- Eight 138-kV disconnect switches;
- One 30 MVA transformer;
- One 138-kV circuit switcher;
- Six low voltage (distribution) bays at 24.9-kV; and
- Substation control houses equipped with associated telecommunications, relay, metering, and control panels.

Q. PLEASE DESCRIBE THE SCOPE OF WORK TO BE PERFORMED AT THE EXISTING SUBSTATIONS IF THE ROUTE SELECTED BY THE PUC CONNECTS AT THE LYLE WOLZ SUBSTATION.

A. If the Project connects at Lyle Wolz Substation, the following will be installed at Lyle Wolz:

- One 138-kV circuit breaker;
- Three 138-kV disconnect switches; and
- Associated protective relaying and control equipment (inside an existing control house).

Q. PLEASE DESCRIBE THE SCOPE OF WORK TO BE PERFORMED AT THE EXISTING SUBSTATIONS IF THE ROUTE SELECTED BY THE PUC CONNECTS AT THE LYONS SUBSTATION.

A. If the Project connects at Lyons Substation, the following will be installed at Lyons:

- Three 138-kV A-frame bays;
- Four 138-kV circuit breakers;
- Ten 138-kV disconnect switches; and
- Substation control house equipped with associated telecommunications, relay, metering, and control panels.

To accommodate the above installations, the Lyons Substation will be expanded by two acres (on land currently owned by BBEC).

Additional relay and control work within the existing control houses at the Lyle Wolz and Gay Hill Substations will also be performed if the Project connects at Lyons Substation.

VI. COST ESTIMATES

Q. WHAT ARE THE ESTIMATED COSTS FOR THE PROJECT?

A. The total estimated costs for the Project range from approximately $35 million to $44 million, with route lengths ranging from approximately 17 to 23 miles. The estimated costs are presented in Attachment 4 to the Application.

Q. WHAT INFORMATION DID YOU USE AS A BASIS FOR GENERATING THE COST ESTIMATES?

A. I used information from a variety of sources, including segment data from the EA and geographic information system (GIS) analysis, preliminary designs and costs from LCRA TSC vendors and contractors based on long-term contract pricing models, and construction cost estimates based on a review of the Project area. Estimates are based on current pricing.

Q. WHAT METHOD DID YOU USE FOR GENERATING THE REAL ESTATE COST ESTIMATES FOR THE TRANSMISSION LINE PORTION OF THE PROJECT?

A. The real estate cost estimates for the Project were developed using the following steps:

- Identify the parcels crossed by the estimated transmission line easement for each segment, and determine the estimated easement acreage on each parcel.
- Obtain the county tax appraisal market value for each parcel. Use the tax appraisal data to determine the cost per acre for each parcel.
- Calculate the estimated easement cost on each parcel by multiplying the estimated easement acreage on the parcel by the tax appraisal market value per acre.
- For each segment, sum the estimated easement cost per parcel to obtain the total estimated easement cost for the segment.
- Multiply the estimated easement cost by a factor of 2.25. The multiplier factor accounts for additional costs associated with items not specifically included in the estimated cost of the easement on a per parcel basis. These items may include, but are not limited to, temporary construction easements, damages to the remainder, construction damages, temporary or permanent off ROW access easements, changes in land use and/or land value during the period of time between the preparation of the estimate and acquisition, and additional compensation required as an outcome of litigation.

Q. DOES THE TRANSMISSION LINE REAL ESTATE ESTIMATED COST PER ACRE DETERMINE THE ROW AND LAND ACQUISITION COST FOR A PARCEL THAT LCRA TSC WILL ACTUALLY PAY A LANDOWNER?

A. No. Upon selection of a final route by the Commission, LCRA TSC will determine the precise placement of the alignment on each parcel and use property values based on an independent appraisal to develop actual easement acquisition costs for each parcel. The ROW costs presented in the Application that are used for Project cost estimating purposes should not be viewed or considered as appraised, calculated costs to obtain individual easements across individual parcels. The data I used to estimate ROW costs for the Project were based on publicly available, reproducible, and verifiable information. Basing the estimates on publicly available data ensured that LCRA TSC applied a consistent method for the purpose of comparing relative overall cost estimates among all the proposed alternative routes.

Q. DO THE TRANSMISSION LINE COST ESTIMATES INCLUDE COSTS ASSOCIATED WITH POTENTIAL ENDANGERED SPECIES MITIGATION?

A. Yes. The cost estimates included in the Application include mitigation costs associated with the federally listed endangered Houston Toad, where applicable.

Q. PLEASE DESCRIBE IN DETAIL HOW THE ENVIRONMENTAL COST ESTIMATES WERE PREPARED.

A. To estimate mitigation costs for impacts to the federally listed endangered Houston Toad, LCRA TSC quantified the amount (in acres) of optimal habitat identified in the Habitat Suitability Analysis (described in Chapter 2 of the EA) that occurs within the proposed ROW. Mitigation was estimated as a 1:1 ratio (acre for acre) at $7,500 per acre.

Q. DO YOU FIND THE COST ESTIMATES TO BE REASONABLE?

A. Yes, I do. The estimates were prepared using input from LCRA TSC staff with expertise in different disciplines, including real estate, environmental, and construction. I reviewed the components of the cost estimates and found the cost estimates for the various routes to be reasonable and consistent with engineering practices and market conditions in effect on the filing date.

Q. ARE THERE FACTORS THAT COULD AFFECT THE ESTIMATED COSTS PRESENTED IN THE APPLICATION?

A. Yes. Changes in market conditions, including construction labor and/or the cost of metals or other natural resources, as well as changes in land use, could increase or decrease costs above or below the estimates contained in the Application. Over time, these and other factors could change, resulting in increased or decreased actual costs compared to the estimated costs.

VII. SUMMARY AND CONCLUSION

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. LCRA TSC proposes to construct, own, and operate a new 138-kV electric transmission line and load-serving substation in Burleson County. The Project will connect from either the existing BBEC Lyle Wolz Substation or the existing BBEC Lyons Substation to a new

substation in the vicinity of the Cooks Point community. The entire project will be approximately 17 to 23 miles in length, depending on the route approved by the Commission.

LCRA TSC proposes to construct the Project with 138-kV single-circuit steel and/or concrete poles on typical 80-foot wide easements.

The Project cost estimates are reasonable and consistent with engineering practices and market conditions in effect on the filing date.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

Exhibit JRM-1: Electric and Magnetic Fields Summary

Table JRM-1a: Electric Fields Summary			
Transmission Line Configuration	Maximum	30 ft from CL	40 ft from CL
	(kV/m)	(kV/m)	(kV/m)
Single Circuit Single Pole Configuration	1.76	0.87	0.59

Table JRM-1b: Magnetic Fields Summary			
Transmission Line Configuration	Maximum	30 ft from CL	40 ft from CL
	(mG)	(mG)	(mG)
Single Circuit Single Pole Configuration	3.91	2.19	1.58

Notes:
Electric fields calculated in kV per meter (kV/m).
Magnetic fields calculated in milliGauss (mG).