Control Number: 38597

Item Number: 2131

Addendum StartPage: 0

SOAH DOCKET NO. 473-11-0072
PUC DOCKET NO. 38597

APPLICATION OF ONCOR ELECTRIC DELIVERY COMPANY LLC TO AMEND A CERTIFICATE OF CONVENIENCE AND NECESSITY FOR THE KRUM WEST TO ANNA 345-KV CREZ TRANSMISSION LINE IN COLLIN, COOKE, DENTON AND GRAYSON COUNTIES	§ § § § § § § § § §	**PUBLIC UTILITY COMMISSION** **OF TEXAS**

DIRECT TESTIMONY

OF

LARRY GURLEY

ON BEHALF OF THE GREENBELT ALLIANCE OF DENTON COUNTY

November 16, 2010

SOAH DOCKET NO. 473-11-0072
PUC DOCKET NO. 38597

DIRECT TESTIMONY OF LARRY GURLEY

TABLE OF CONTENTS

SOAH DOCKET NO. 473-11-0072
PUC DOCKET NO. 38597

DIRECT TESTIMONY OF LARRY GURLEY

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, PRESENT EMPLOYER, AND BUSINESS ADDRESS.

A. My name is Larry Gurley. I am employed by Energy Markets Consulting, Inc. as President and CEO. My address is 7247 Rosenthal Parkway, Lorena, Texas.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL QUALIFICATIONS.

A. I received a Bachelor of Science degree in electrical engineering from the University of Texas at Arlington in 1983. Since then, I have had broad experience in various roles in the power industry, including roles in system operation, regulatory affairs, and wholesale market design as a utility executive. In 17 years at Brazos Electric Cooperative, I had roles in System Operations of progressing responsibilities, and I was Manager, System Operations when I left in 2000. This role included managing the operation of a generation and transmission system that included more than 2,000 circuit miles of transmission line ranging in voltage from 69 kV to 345 kV. At the time, the Brazos system served the loads of member cooperatives totaling almost 2,000 MW. After leaving Brazos, I joined TXU where I was on a team responsible for representing the company in ERCOT wholesale market design. Shortly after joining, I was given responsibility for establishing their Qualified Scheduling Entity (QSE), which is an entity qualified to submit scheduling and ancillary service bids and settle payments with ERCOT. During my time at TXU, and subsequently Luminant, I held various roles in market operations and regulatory affairs. When I left Luminant in December 2008, I was Vice President–Markets and Regulatory. I formed my own consulting company, Energy Markets Consulting, Inc., in January 2009.

Q. ARE YOU A REGISTERED PROFESSIONAL ENGINEER?

A. Yes. I am a registered engineer in the State of Texas.

Q. HAVE YOU EVER SUBMITTED TESTIMONY BEFORE THE COMMISSION?

A. Yes. I testified on behalf of TXU in Docket No. 33416, on behalf of Lewis Linn and Phyllis Cohen in Docket No. 37464, on behalf of Johnny Vinson, et. al, in Docket No. 38324, and on behalf of Weinzierl Ranch in Docket No. 38354.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING?

A. I'm testifying on behalf of the Greenbelt Alliance of Denton County. The Greenbelt Alliance was organized to protect the current scenic natural state of the greenbelt that runs between Ray Roberts Lake and Lewisville Lake in Denton County (the Greenbelt).

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I am addressing Oncor's application for a certificate of convenience and necessity (CCN) for the Krum West to Anna 345-kV CREZ transmission line in Collin, Cooke, Denton, and Grayson Counties. The purpose of my testimony is to present my conclusions and recommendations regarding the proposed routes in this proceeding. I have evaluated Oncor's application, visited the study area, and have developed an expert opinion regarding the optimal route for the proposed Krum West to Anna transmission line. Relying on the facts presented and my expert opinion, I will identify potential design difficulties with the quadruple circuit H-frame structure that Oncor is proposing for link Z8 through the Greenbelt, and I will show why Route 1859 is the best route based on statutory factors, Commission rules and precedent, and the facts in this case.

Q. YOU STATED THAT YOU VISITED THE STUDY AREA. PLEASE EXPLAIN.

A. On October 18, 2010, I traveled to the study area and conducted an investigation of portions of the proposed routes. I conducted a site visit of the existing 138 kV easement across the Greenbelt along Link Z8. I also visited the portions of Link

Z8 that are located in residential areas on either side of the Greenbelt. I traveled along public roads that traverse in close proximity to the preferred route. I visited the proposed location for the new Krum West Switching Station. Additionally, I traveled to the northern part of the study area and observed the potential location of several alternative route links.

II. ROUTE SELECTION CRITERIA

Q. PLEASE DESCRIBE THE CRITERIA THAT MUST BE CONSIDERED UNDER PURA AND COMMISSION RULES IN SELECTING THE ROUTE FOR A PROPOSED TRANSMISSION LINE.

A. Section 37.056(c) of the Public Utility Regulatory Act (PURA) sets forth specific criteria that the Commission must evaluate to select the route for a new transmission line. PURA § 37.056(4) includes the following factors:

(A) community values;

(B) recreational and park areas;

(C) historical and aesthetic values;

(D) environmental integrity; [and]

(E) the probable improvement of service or lowering of cost to consumers in the area if the certificate is granted.

The Commission's Substantive Rule 25.101(b)(3)(B)(i-iv) provides additional criteria that must be considered in selecting a route:

(B) Routing: An application for a new transmission line shall address the criteria in PURA § 37.056(c) and considering those criteria, engineering constraints, and costs, the line shall be routed to the extent reasonable to moderate the impact on the affected community and landowners unless grid reliability and security dictate otherwise. The following factors shall be considered in the selection of the utility's preferred and alternate routes unless a route is agreed to by the utility, the landowners whose property is cross by the proposed line, and owners of land that contains a habitable structure within 300 feet of the centerline of a transmission project of 230 kV of less, or within 500 feet of the centerline of a transmission project greater than 230 kV, and otherwise conforms to the criteria in PURA § 37.056(c);

(i) whether the routes utilize existing compatible rights-of-way, including the use of vacant positions on existing multiple-circuit transmission lines;

(ii) whether the routes parallel existing compatible rights-of-way;

(iii) whether the routes parallel property lines or other natural or cultural features; and

(iv) whether the routes conform with the policy of prudent avoidance.

Q. DID YOU RELY ON THESE CRITERIA IN DRAWING YOUR CONCLUSIONS ABOUT THE OPTIMAL ROUTE FOR THE PROPOSED LINE IN THIS CASE?

A. Yes, I did. In my opinion, these criteria weigh in favor of selecting Route 1859.

III. DESCRIPTION OF THE STUDY AREA

Q. PLEASE DESCRIBE WHAT YOU OBSERVED WHEN YOU VISITED THE STUDY AREA.

A. The southern part of the study areas is a suburban area with fairly dense residential development. The Lake Ray Roberts Greenbelt is located in the southern part of the study area. The Greenbelt is a heavily wooded, undeveloped natural area. The northern part of the study area is more rural and consists mainly of pastureland. There is less residential development in the northern part of the study area.

Q. ARE THERE ROUTING DIFFERENCES BETWEEN THE NORTHERN AND THE SOUTHERN PARTS OF THE STUDY AREA?

A. Yes. There are multiple combinations of route links in the northern part of the study area. In the southern part of the study area, however, all of the routes use Link Z8, which crosses the property owned by the US Army Corp of Engineers (USACE).

Q. HOW DOES ONCOR ADDRESS THE ROUTING DIFFERENCES?

A. Oncor addresses these differences in several ways. First, because of the dense population in the southern part of the study area, Oncor proposes to use steel

monopoles for the southern routes. Oncor estimates that steel monopoles will cost $1.7 million per mile, which is $400,000 per mile more than steel lattice towers.[1] Further, because Oncor proposes to use its existing easement for portions of Link Z1, and Links Z7, and Z8, Oncor proposes to use a quadruple circuit H-frame structure that will accommodate the existing 138-kV transmission line, the proposed 345-kV double circuit transmission line, and a distribution line underbuild. Additionally, there will be space on the structure for an additional new 138-kV circuit.[2] Oncor estimates the cost of this structure to be $2.5 million per mile.[3] Oncor has stated that it is preferable to use lattice towers for the northern routes because of the lower per-acre costs, the greater availability of less constrained rights-of-way, and the lower cost per mile of construction.[4]

Q. PLEASE DESCRIBE THE PORTION OF LINK Z8 ALONG THE GREENBELT.

A. The Greenbelt is heavily wooded. I personally estimated the trees at the edge of the easement to be approximately 90 feet tall.[5] There is an existing 138-kV transmission line on wooden H-frame poles that crosses the Greenbelt. Based on the observations I made during my site visit, I believe that the entire width of portions the existing 100-foot easement in the Greenbelt may not be fully cleared. Therefore, I think it is likely that additional trees and vegetation will need to be removed if a route using Link Z8 is adopted.

Q. PLEASE DESCRIBE THE PORTIONS OF LINK Z8 OUTSIDE OF THE GREENBELT.

A. Portions of Link Z8 are located just outside the Greenbelt in residential areas. On my site visit, I observed that there are many habitable structures located near the existing easement.

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[1] Oncor Response to Walton RFI 3-2.

[2] Oncor Response to Greenbelt Alliance RFI 3-1.

[3] Oncor Response to Clear Creek Ridge RFI 3-10.

[4] Oncor Response to Walton RFI 3-2.

[5] This estimation was confirmed by Oncor in response to Greenbelt Alliance RFI 2-5.

Q. IS THE PROPOSED QUADRUPLE CIRCUIT STEEL H-FRAME STRUCTURE USED WIDELY IN ONCOR'S SERVICE TERRITORY?

A. No. Oncor indicated that the only location in which it currently has a similar structure is the NW Carrollton to Hackberry transmission line.[6] Oncor stated that because the proposed structure is not an Oncor standard structure, there is no current inventory on hand of quadruple circuit H-frame structures.[7] Oncor also stated that the expected fabrication time for these structures is unknown at this time.[8]

Q. HAVE YOU PERSONALLY VIEWED THE SIMILAR STRUCTURE?

A. Yes, I traveled to the Dallas Fort Worth Metroplex and viewed the similar structure along the NW Carrollton to Hackberry transmission line that is similar to the one that Oncor is proposing. Photos I took of the structure are attached as Exhibit LG-2.

Q. WHAT ARE YOUR OBSERVATIONS REGARDING THIS STRUCTURE AND ITS CURRENT LOCATION?

A. I observed this structure to be quite large, although it is not as tall or as wide as the quadruple circuit steel H-frame structure proposed by Oncor in this proceeding. I also observed that the structure on the NW Carrollton to Hackberry transmission line does not have a distribution underbuild as is proposed for the structure along portions of Link Z1, and Links Z7 and Z8. It also has cross braces between the two poles. In the area in which I observed the structure, it was located in an industrial park-type area, and was not located in a residential area. Additionally, there was little to no vegetation abutting the easement.

Q. HOW DOES THE PROPOSED QUADRUPLE CIRCUIT STEEL H-FRAME COMPARE TO THE EXISTING 138-KV TRANSMISSION LINE ALONG LINKS Z1, Z7 AND Z8?

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[6] Oncor Response to Greenbelt Alliance RFI 2-1.

[7] Oncor Response to Greenbelt Alliance RFI 3-10.

[8] Oncor Response to Greenbelt Alliance RFI 3-11.

A. The proposed structure is significantly taller and wider. The existing 138-kV transmission line is on wooden poles that Oncor stated are between 64 feet, 6 inches and 73 feet, 6 inches tall[9] and 30 feet wide.[10] By contrast, the proposed structure is made of steel, and Oncor's preliminary design estimates indicate that it could be 155 feet tall and 91 feet wide. A schematic that I prepared demonstrating a comparison of the two structures is attached as Exhibit LG-1.

IV. LINK Z8 DESIGN ISSUES

Q. PLEASE DESCRIBE THE DESIGN ISSUE YOU HAVE IDENTIFIED WITH LINK Z8.

A. As I stated previously, Oncor proposes to use a quadruple circuit steel H-frame structure along a portion of Link Z1, and Links Z7 and Z8. I have calculated that the distance from conductor to the tree canopy will be 14 feet, which is less than the distance of 20 feet required by NERC. Thus, I am concerned that in order to meet certain NERC clearance standards, Oncor may have to build the quadruple circuit H-frame taller than currently proposed along the portion of Link Z8 that goes through the Greenbelt on the existing 100-foot easement.[11]

Q. PLEASE EXPLAIN.

A. I would first note that Oncor has stated that until a route is approved, and/or it becomes evident that these specialty structures will be needed, the specific design specifications and detailed structure drawings will not be finalized.[12] Thus, I have made my calculations based on the information Oncor has provided and my personal observations.

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[9] Oncor Supplemental Response to Venable RFI 4-2.

[10] *See* Oncor Response to Venable RFI 4-3

[11] Oncor has stated that it intends to parts of Link Z8 within an existing Oncor 100 foot easement. *See* Direct Testimony of Jill Alvarez at 6.

[12] *See* Oncor Response to Greenbelt Alliance RFI 3-7.

Oncor stated in discovery that the maximum height of the proposed quadruple circuit H-frame structures is expected to range between 140 and 155 feet.[13] Oncor also stated in discovery that the design sag of the 345-kV conductors on the quadruple circuit H-frame will be 19 feet.[14] Using this information, along with the preliminary design specifications of the quadruple circuit H-frame on Figure 1-3 of the Environmental Assessment, I have calculated that the height of the 345-kV conductors above the ground at its lowest point will be 56 feet, 10 inches.

Q. PLEASE EXPLAIN HOW YOU MADE THIS CALCULATION.

A. I made this calculation by taking the 155 foot maximum height of the H-frame structure and subtracting (a) 71 feet for the distance between the top of the structure and the lowest cross arm;[15] (b) 8 feet, 2 inches for the distance between the lower cross arm and the conductor;[16] and (c) 19 feet for design sag.[17] Thus, if the structure is built at this maximum height, the 345-kV conductor would be only 56 feet, 10 inches above the ground at its lowest point. This 56 foot, 10 inch distance is well below the 90 foot height of the tree canopy at the edge of the easement.

Q. WHAT OTHER CALCULATIONS HAVE YOU MADE?

A. I estimated the total width of the lower crossarm to be 91 feet by adding the combined widths of the three bars making up the lowest crossarm (86 feet)[18] and an estimated width of the poles at the lowest crossarm (5 feet total for two poles). With the structure centered in the easement, this would make the horizontal distance from the end of the crossarm to the canopy 4 feet, 6 inches. I then added to that distance 9 feet, 3 inches, which is my estimate of the horizontal distance between the edge of the bottom crossarm and the outside edge of the bundled

[13] Oncor's Response to Greenbelt Alliance RFI 2-10.

[14] Oncor's Response to Greenbelt Alliance RFI 2-6.

[15] EA at Figure 1-3.

[16] EA at Figure 1-3.

[17] Oncor Response to Greenbelt Alliance RFI 4.1.

[18] EA at Figure 1-3.

conductor on the H-frame structure.[19] Given these estimates, I calculated that the 345-kV conductor would be about 14 feet from the tree canopy at the edge of the easement.

Q. WHAT IS THE IMPLICATION REGARDING THESE CALCULATIONS.

A. Oncor must comply with the NERC Reliability Standard FAC-003-1 for Transmission Vegetation Management, which specifies that Oncor must attain a minimum of 20 feet between a 345-kV transmission line and the vegetation when performing vegetation management.[20] Given the height of the trees at the edge of the easement and the estimated dimensions of the H-frame structure, it appears that at the distance of 14 feet that I calculated, Oncor will not be able to attain the required distance between the conductor and the trees at the edge of the easement if it builds the H-frame structure as proposed as it is below the minimum of 20 feet as required by the NERC Standard.

Q. IS THERE A WAY FOR ONCOR TO ACHIEVE THE NECESSARY CLEARANCE TO THE TREES AT THE EDGE OF THE EASEMENT?

A. It appears that to achieve the necessary clearance, given the width of the easement and the size of the structure, Oncor must increase the height of the structure. Assuming the horizontal distance of 14 feet of the conductor from the trees that I calculated, and the required diagonal distance of 20 feet as required by the NERC standard, the vertical distance of the conductor above the trees would need to be more than 14 feet. Given the tree canopy height of 90 feet, the conductor would have to be a minimum of 104 feet above the ground. Accounting for the 98 foot, 2 inch distance between the top of the quadruple circuit H-frame and the lowest conductor (as calculated above),[21] it is my opinion that the overall structure height

[19] The distance from the edge of the crossarm to the centerline of the bundled is estimated at 10 feet, 6 inches. The bundled conductor is estimated to be 2 feet, 6 inches wide. This makes the estimate of the horizontal distance from the outside edge of the crossarm to the outside edge of the bundled conductor 9 feet, 3 inches.

[20] Oncor Response to Greenbelt Alliance RFI 4-1.

[21] That is, 71 feet for the distance between the top of the structure and the lowest crossarm, plus 8 feet, 2 inches for the distance between the lower crossarm and the conductor, plus 19 feet for design sag.

would need to be more than 202 feet in order to meet NERC Standard FAC-003-1 given the width of the proposed structure within a 100 foot easement.

Q. ARE THERE ANY ISSUES ASSOCIATED WITH BUILDING STRUCTURES THAT ARE OVER 200 FEET TALL?

A. It is doubtful that the structures as proposed by Oncor are designed for such a height. Oncor has not provided any information in this docket indicating that they plan to construct such a structure nor whether it would even be feasible. The only information Oncor has provided relates to quadruple circuit H-frames that are 155 feet tall or less, which, in my opinion, cannot be used through the Greenbelt along the existing 100 foot easement pursuant to the NERC Standard.

Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE DESIGN ISSUES ASSOCIATED WITH LINK Z8?

A. The design issues that I have identified call into question the feasibility of constructing the proposed transmission line along Link Z8 as proposed by Oncor. For these reasons, I recommend utilizing routes that avoid Link Z8.

V. ROUTE ANALYSES

Q. PLEASE DESCRIBE THE PROCESS YOU USED TO EVALUATE THE VARIOUS ROUTES PROPOSED FOR THE KRUM WEST TO ANNA TRANSMISSION LINE.

A. My analysis involved reviewing the criteria relied upon by the Public Utility Commission in making its recent transmission line routing decisions. The raw data I used for this analysis was provided in Table 7-1 of Oncor's Environmental Assessment (EA), along with Attachments 3A and 3B of the Application. Based on Oncor's stated preference for using lattice towers on the northern routes, and the fact that these routes impact significantly fewer habitable structures than the southern routes, I evaluated the northern routes assuming they would be constructed on lattice towers.

Q. PLEASE EXPLAIN HOW YOU PERFORMED YOUR ANALYSIS.

A. In conducting my analysis, I examined data for land use, ecology, aesthetics, and cultural resources for the various routes from Table 7-1 of Oncor's EA. I balanced this data against the relevant criteria in PURA § 37.056 and P.U.C. Substantive Rule 25.101.

Q. WHAT FACTORS PLAYED A KEY ROLE IN YOUR ANALYSIS?

A. As discussed in my testimony, I have concerns about the feasibility of using southern routes due to the design issues associated with the quadruple circuit steel H-frame structure. Thus, I removed all routes that use Link Z8 from my analysis.

Q. WHAT IF THE JUDGES OR THE COMMISSION WERE TO DISAGREE WITH YOUR POSITION REGARDING THE FEASIBILITY OF LINK Z8?

A. Even if it is determined to be feasible to construct the quadruple circuit steel H-frame structures along Link Z8, it is still my opinion that southern routes should not be considered. I have significant concerns about the number of habitable structures on the southern routes. The number of habitable structures within 500 feet of the proposed centerline on the southern routes ranges from 154 to 257. By contrast, on the northern routes, the number of habitable structures within 500 feet of the proposed centerline ranges from 71 to 141. Thus, every southern route has a higher habitable structure count than any of the northern routes. On Oncor's preferred route, there are 215 habitable structures within 500 feet of the proposed centerline. There is no reason to impact this many habitable structures when there are other viable route alternatives available. For these reasons, I focused my analysis on the northern routes.

Q. WHAT IS YOUR RECOMMENDATION REGARDING THE ROUTE THAT SHOULD BE SELECTED IN THIS PROCEEDING?

A. I recommend that route 1859 be selected.

Q. HOW DID YOU DETERMINE THAT ROUTE 1859 WAS THE BEST ROUTE CHOICE AMONG THE NORTHERN ROUTES?

A. Routing analysis requires a balance of the various statutory and rule criteria. As a starting point, I first filtered the northern routes by cost, followed by the number of habitable structures. I then sorted the routes by the percentage of the length of the route parallel to existing compatible rights-of-way. Once I had completed this, I compared the various data for each route and developed my recommendation for a route that is in my opinion the best balance of the various factors.

Q. PLEASE DESCRIBE THE SIGNIFICANT FACTORS THAT LED TO YOUR CONCLUSION.

A. Route 1859 has the following attributes:

- Route 1859 costs an estimated $129,316,000, including substation costs, and using steel lattice towers. Of the northern routes, it is the seventh cheapest route.

- Route 1859 has only 85 habitable structures within 500 feet of the proposed centerline. Route 1859 ranks twelfth as to this criteria and impacts only 14 more than the minimum.

- The percentage of Route 1859 that parallels existing compatible rights-of-way is 59%. This is over half of the route and the 5th highest percentage of the northern routes under this criteria.

- Route 1859 compares reasonably well in terms of ecological impact with only 18% of its length crossing upland woodlands, riparian woodlands, or potential wetlands. Route 1859 crosses no known habitat of endangered or threatened species or will have no known rare/unique plant locations within the right-of-way.

- Route 1859 compares reasonably well to other northern routes for impact to cultural resources.

Q. ARE THERE OTHER NORTHERN ROUTES THAT ARE ACCEPTABLE?

A. Yes. As I stated, selecting a route requires the balancing of the various factors. Different experts as well as the judges and the Commissioners may balance the factors differently. There are several northern routes that I evaluated that are comparable to Route 1859, and those would be acceptable routes. However, as I balanced the factors, my expert opinion is that Route 1859 is the best choice.

VI. CONCLUSION

Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE PROPOSED TRANSMISSION LINE?

A. For the reasons discussed, routes using Link Z8 should not be considered due to concerns about the feasibility of constructing the quadruple circuit steel monopoles. Nor should the southern routes be considered due to the high number of habitable structures within 500 feet of the centerline. My recommendation is that route 1859 be selected for this project because it is the best balance of the factors outlined under PURA § 37.056 as well as P.U.C. Substantive Rule 25.101.

AFFIDAVIT OF LARRY GURLEY

State of Texas)
)
County of McLennan)

Before me, the undersigned authority, on this day personally appeared the person known by me to be Larry Gurley, who, after being sworn by me, stated as follows:

1. My name is Larry Gurley. I am over eighteen years of age, am of sound mind and competent to make this Affidavit. I have personal knowledge of every statement contained in this Affidavit, and every statement contained herein is true and correct and based on my own personal knowledge.

2. I make this Affidavit in support of my testimony on behalf of the Greenbelt Alliance of Denton County, in the above-captioned proceeding. Attached hereto and made a part hereof for all purposes is my Direct Testimony and Exhibits, which have been prepared in written form for introduction into evidence in SOAH Docket No. 473-11-0072 and Public Utility Commission of Texas Docket No. 38597.

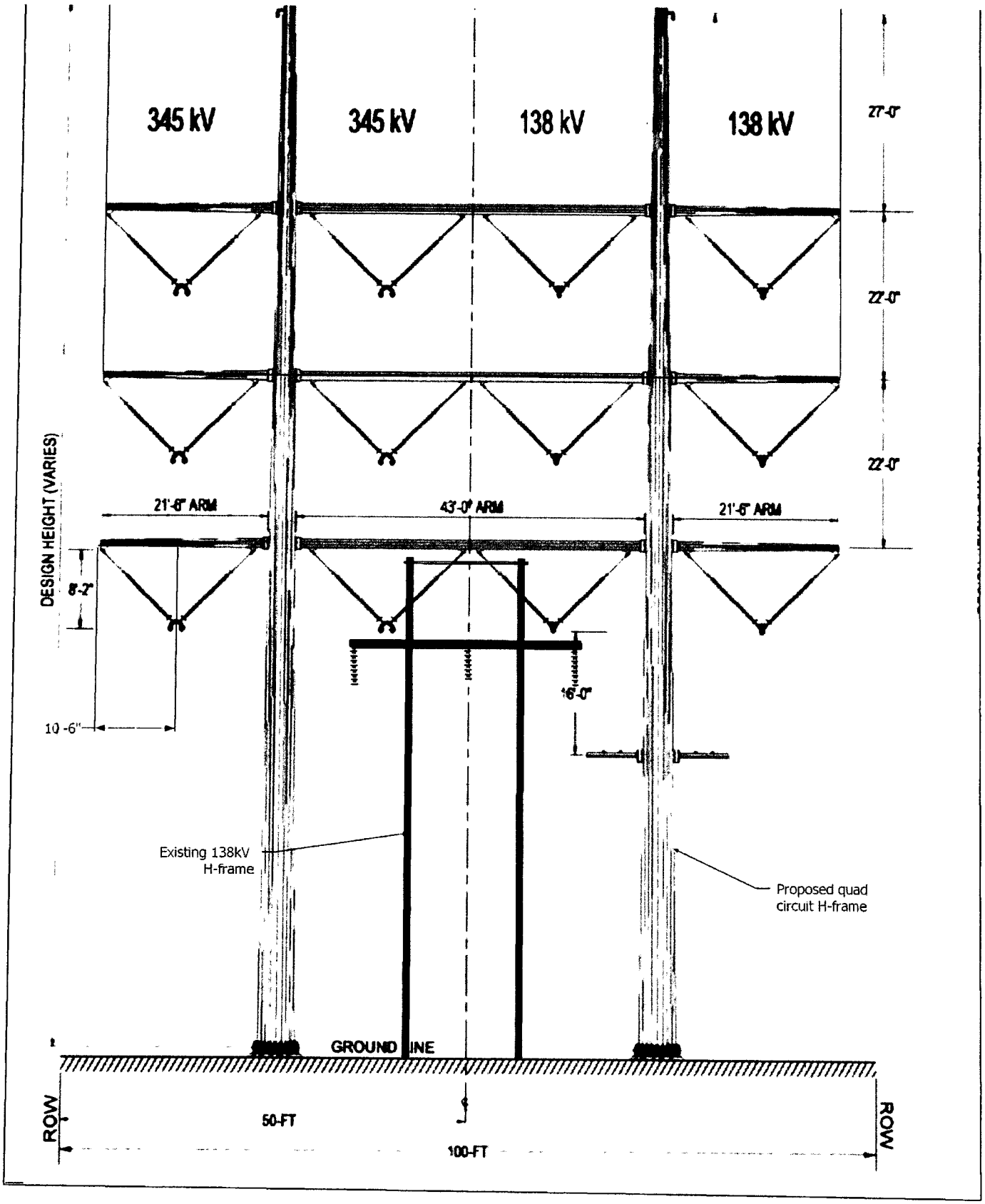
3. I hereby swear and affirm that my answers contained in the testimony are true and correct.

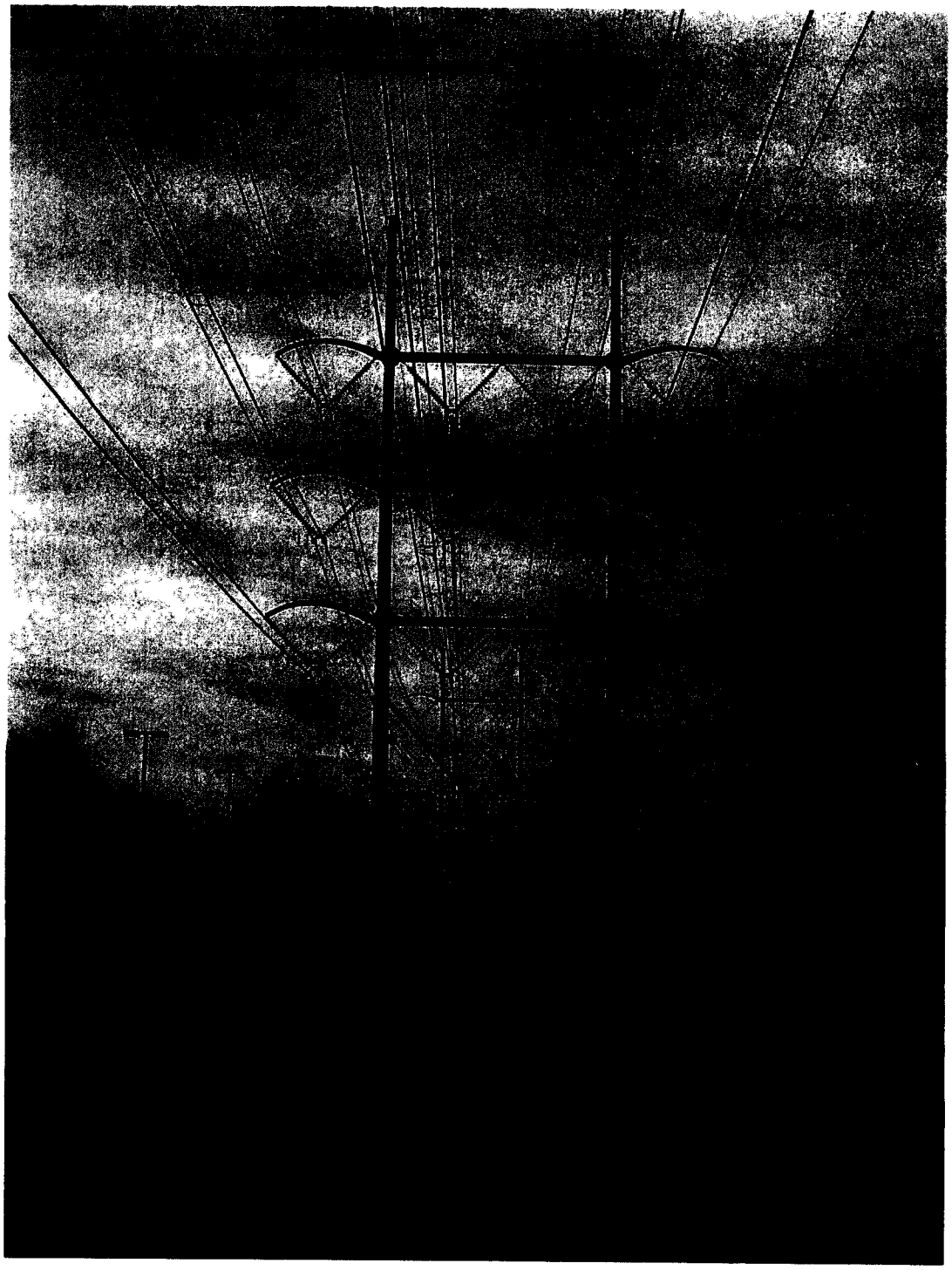
Larry Gurley
LARRY GURLEY

SUBSCRIBED AND SWORN to before me on this the 15th of November, 2010, to certify which witness my hand and seal of office.

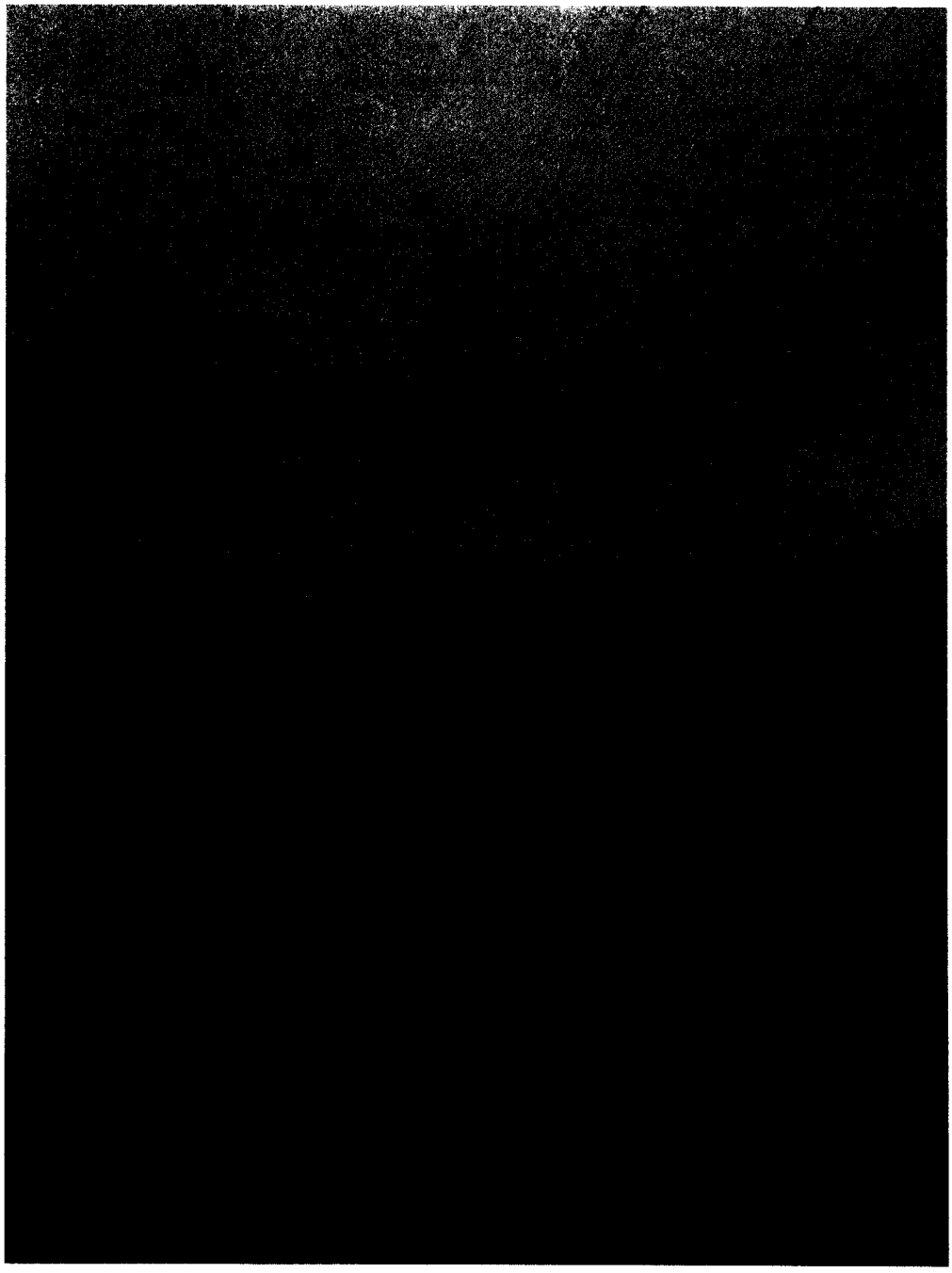
NOTARY PUBLIC STATE OF TEXAS
LISA A. CZAJKOWSKI
Notary Public
STATE OF TEXAS
My Commission
Expires 07/19/2011

Lisa A. Czajkowski
Notary Public


345 kV
345 kV
138 kV
138 kV
27'-0"
22'-0"
22'-0"
DESIGN HEIGHT (VARIES)
21'-6" ARM
43'-0" ARM
21'-6" ARM
8'-2"
10'-6"
16'-0"
Existing 138kV
H-frame
Proposed quad
circuit H-frame
GROUND LINE
ROW
50-FT
100-FT
ROW



View of a similar, quadruple circuit steel H-frame structure along the NW Carrollton to Hackberry transmission line.



Another view of a similar, quadruple circuit steel H-frame structure along the NW Carrollton to Hackberry transmission line.

Oncor - Docket No. 38597
Walton RFI Set No. 3
Question No. 3-2
Page 1 of 2

REQUEST:

Page 5 of the Oncor CCN application notes that "the weighing of factors favors the use of monopoles" for the Preferred Route. In Oncor's view, does a similar weighing of factors favor the use of monopoles on all or part of any other of the 96 proposed alternate routes that pass south of Lake Ray Roberts? If so, please identify those routes, and state whether monopoles would be recommended for all of such route or only part of such route. If monopoles would only be recommended for only part of such route, please state where on such route the monopoles would be recommended, and for other parts of such route where monopoles would not be recommended, please state the structure type that would be recommended. For those routes where monopoles would be recommended for only part of the route, please provide a cost estimate for each such route consistent with the estimates provided in Attachments Nos. 3A and 3B of the Application to the extent the cost estimate is different than the monopole cost estimate provided for the route in Oncor's Application.

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

One factor that favors the use of monopoles along the majority of the Preferred Route is the constraints present throughout the area along the southern routes where right-of-way is limited in availability and constrained by existing homes and businesses in close proximity to corridors that were paralleled or utilized. Another factor which weighs in favor of monopole construction for the majority of the Preferred Route is the high comparable per acre cost for many of the links that make up the southern routes. In comparison, the per acre cost for routes that go north of Ray Roberts Lake is less, even substantially less for some areas, due to the more rural nature of the land crossed, and the greater availability of less constrained right-of-way.

In general, those routes that traverse south of Ray Roberts Lake are shorter but the cost of right-of-way acquisition is greater than acquisition of right-of-way for routes that are longer and go north of Ray Roberts Lake. As a result, Oncor believes that it is preferable to construct the route primarily with monopoles along the southern routes and utilize tower construction primarily for those routes that go north.

The delta between construction cost for monopoles versus towers is around $0.4M greater per mile for this proposed project. This difference can increase substantially if there are frequent changes between construction types along a particular route. As a result, Oncor recommends that one type of structure be utilized for the majority of the approved route.

Oncor wanted to ensure that the PUC is adequately equipped with the cost information for both towers and monopoles so that the Commission can make an informed decision

regarding the type of construction to approve. Oncor will build whatever route the PUC approves, and will utilize whatever construction type the PUC orders.

No other cost estimates, other than Attachment Nos. 3A and 3B have been developed.

Oncor - Docket No. 38597
Greenbelt Alliance RFI Set No. 3
Question No. 3-01
Page 1 of 1

REQUEST:

Referring to the Direct Testimony of Jill Alvarez at page 10, provide the estimated date that Oncor plans to add the additional 138 kV circuit.

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

Oncor's future plan for transmission system improvements includes a project to rebuild the Arco to Krugerville 138 kV line segment on double circuit structures with an upgraded conductor and is scheduled for completion in May 2012.

Oncor - Docket No. 38597
Clear Creek Ridge RFI Set No. 3
Question No. 3-10
Page 1 of 1

REQUEST:

Please state the cost per mile of co-locating the proposed 345 kV line with an existing 138 kV line. Please explain how much of the total cost of co-locating 345 and 138 kV lines would be incremental over the average cost per mile of constructing a 345 kV line on separate poles using entirely new ROW.

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

Oncor does not have the costs for co-locating any given 138 kV transmission line with the proposed 345 kV transmission line other than the co-location cost of the existing 138 kV transmission line on links Z7 and Z8 and portion of with Z1 and Z9 with the proposed 345 kV transmission line.

The approximate per mile construction cost of co-locating the proposed 345 kV transmission line with the existing 138 kV transmission line on the quadruple circuit steel H-frame on tangent structures on links Z7, Z8 and portion of Z1 and Z9 is approximately $2.5M per mile.

For the proposed project, the approximate construction cost averages around $1.7M per mile for steel monopoles and around $1.3M per mile for lattice steel towers. The additional per mile cost to build on the quadruple circuit steel H-frames and co-locate the proposed 345 kV line with the existing 138 kV line on links Z7, Z8 and portion of Z1 and Z9 is around $1.2M if the rest of the project is built on lattice steel towers and around $0.8M if the rest of the project is built on steel monopoles.

Oncor - Docket No. 38597
Greenbelt Alliance RFI Set No. 2
Question No. 2-05
Page 1 of 1

REQUEST:

What is the maximum height of the trees adjacent to the ROW for segment Z8 where it crosses the United States Army Corp of Engineers (USACE) greenbelt?

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

Oncor has no specific information on the maximum height of trees adjacent to the existing 138 kV transmission line. Based on visual review of the transmission line structures and the adjacent Greenbelt area, the estimated canopy height is approximately 70 to 90 feet tall.

Oncor - Docket No. 38597
Greenbelt Alliance RFI Set No. 2
Question No. 2-01
Page 1 of 1

REQUEST:

Identify all line segments in the Oncor transmission system where four circuits at 138 kV or greater share the same structure. For each segment listed, please state the width of the right of way (ROW).

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

Oncor has one transmission line segment which has quadruple circuit structures such that a double circuit 345 kV line and a double circuit 138 kV line share the same structure. The line segment is the NW Carrollton to Hackberry transmission line and the typical right-of-way width where the quad circuit structures are located is 100 feet.

Oncor - Docket No. 38597
Greenbelt Alliance RFI Set No. 3
Question No. 3-10
Page 1 of 1

REQUEST:

Provide Oncor's current inventory on hand of the Quadruple Circuit H-Frame structures.

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

Since this is not an Oncor standard structure, there is no current inventory on hand of quadruple circuit H-frame structures.

Oncor - Docket No. 38597
Greenbelt Alliance RFI Set No. 3
Question No. 3-11
Page 1 of 1

REQUEST:

What is the expected fabrication time of the Quadruple Circuit H-Frame structures?

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

Expected fabrication time is unknown at this time. Fabrication time for similar type structures has varied between 12 and16 weeks.

Oncor - Docket No. 38597
Venable RFI Set No. 4
Question No. 4-02 Supplement (10-27-10)
Page 1 of 1

REQUEST:

Please state the total height above ground of each existing H-frame tower used for the existing Oncor 138 kV transmission line as it crosses the Greenbelt in the easement that will be used for Link Z-8.

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

For the routing of link Z8 which coincides with the 138 kV transmission line across the Greenbelt, the h-frame structures range in height between 75-ft to 85-ft. Because a portion of those poles are directly embedded in the ground, the total "above ground" height ranges between 64 ft – 6 inches and 73 ft – 6 inches (refer to structure drawing TD-53396, provided in Oncor's response to Venable RFI Set No. 2, Question No. 2-4).

Oncor - Docket No. 38597
Venable RFI Set No. 4
Question No. 4-03
Page 1 of 1

REQUEST:

Please reference Oncor's confidential responses to Venable RFI 2-4. Please state the width of the top crossbars (the crossbars supporting the V-braces as shown on the drawing provided in response to Venable RFI 2-4) for each of the existing H-frame towers used for the existing Oncor 138 kV transmission line as it crosses the Greenbelt in the easement that will be used for Link Z-8.

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

According to the structure drawing provided in response to Venable RFI 2-4 and based on the installed conductor type of 795 MCM ACSR, the crossarms (item #22) are 3-3/4 inches deep x 9-1/2 inches wide x 30-ft in length.

Oncor - Docket No. 38597
Greenbelt Alliance RFI Set No. 3
Question No. 3-07
Page 1 of 1

REQUEST:

What is the weight of the Quadruple Circuit H-Frame structures? If there is a range, please provide the range.

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

The only conceptual document currently available of the quadruple circuit H-frame structure is shown in Figure 1-3 of the Environmental Assessment, included as Attachment 1 to the application. Until a route is approved, and/or it becomes evident that these specialty structures will be needed, the specific design specifications and detailed structure drawings will not be finalized.

Oncor - Docket No. 38597
Greenbelt Alliance RFI Set No. 2
Question No. 2-10
Page 1 of 1

REQUEST:

What is the expected maximum structure height for the quadruple circuit H-frame structure for segment Z8 where it crosses the USACE greenbelt?

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

The expected structure height for the quadruple circuit h-frame proposed to be used along Link Z8 ranges between 140 and 155-ft.

Oncor - Docket No. 38597
Greenbelt Alliance RFI Set No. 2
Question No. 2-06
Page 1 of 1

REQUEST:

What is the design sag and design temperature rise of the 345 kV conductors on the quadruple circuit H-frame structure proposed for segment Z8 where it crosses the USACE greenbelt?

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

The conductor proposed for this 345 kV transmission line project is twin-bundled 1926.9 ACSS/TW. The ruling, or average, span length along Link Z8 is 600-ft. Based on these two factors, the design sag for the 345 kV circuits would be approximately 19-ft and the maximum design temperature would be approximately 356°F.

Oncor - Docket No. 38597
Greenbelt Alliance RFI Set No. 4
Question No. 4-01
Page 1 of 1

REQUEST:

Please refer to Oncor's response to GA 2-3. Does Oncor have a standard or guideline for minimum distance between a 345kV conductor to the closest trees at the edge of cleared right-of-ways in wooded areas? If so, please state the standard or guideline and provide any supportive documents. If not, please explain why there is no such standard or guideline. This question assumes that the shortest distance between the conductor and the trees may be diagonal.

RESPONSE:

The following response was prepared by or under the direct supervision of Jill L. Alvarez, P.E., the sponsoring witness for this response.

Oncor is responsible for complying with the requirements of NERC Reliability Standard for Transmission Vegetation Management (see Attachment 1). Those requirements specify that, for Oncor's 345 kV transmission lines, (1) Oncor must attain a minimum of 20-ft from transmission line conductors when performing vegetation management on the transmission line including vegetation clearing, side trimming and danger tree removal, and (2) Oncor must maintain the vegetation within and along the right-of-way such that at no time will any tree limb or any other vegetation be closer to the transmission line conductors than 10-ft.

ATTACHMENTS

ATTACHMENT 1: FAC-003-1 NERC Reliability Standard Trans Vegetation Management Program, 5 pages.

A. Introduction

1. **Title:** **Transmission Vegetation Management Program**

2. **Number:** FAC-003-1

3. **Purpose:** To improve the reliability of the electric transmission systems by preventing outages from vegetation located on transmission rights-of-way (ROW) and minimizing outages from vegetation located adjacent to ROW, maintaining clearances between transmission lines and vegetation on and along transmission ROW, and reporting vegetation-related outages of the transmission systems to the respective Regional Reliability Organizations (RRO) and the North American Electric Reliability Council (NERC).

4. **Applicability:**

   4.1. Transmission Owner.

   4.2. Regional Reliability Organization.

   4.3. This standard shall apply to all transmission lines operated at 200 kV and above and to any lower voltage lines designated by the RRO as critical to the reliability of the electric system in the region.

5. **Effective Dates:**

   5.1. One calendar year from the date of adoption by the NERC Board of Trustees for Requirements 1 and 2.

   5.2. Sixty calendar days from the date of adoption by the NERC Board of Trustees for Requirements 3 and 4.

B. Requirements

R1. The Transmission Owner shall prepare, and keep current, a formal transmission vegetation management program (TVMP). The TVMP shall include the Transmission Owner's objectives, practices, approved procedures, and work specifications[1].

R1.1. The TVMP shall define a schedule for and the type (aerial, ground) of ROW vegetation inspections. This schedule should be flexible enough to adjust for changing conditions. The inspection schedule shall be based on the anticipated growth of vegetation and any other environmental or operational factors that could impact the relationship of vegetation to the Transmission Owner's transmission lines.

R1.2. The Transmission Owner, in the TVMP, shall identify and document clearances between vegetation and any overhead, ungrounded supply conductors, taking into consideration transmission line voltage, the effects of ambient temperature on conductor sag under maximum design loading, and the effects of wind velocities on conductor sway. Specifically, the Transmission Owner shall establish clearances to be achieved at the time of vegetation management work identified herein as Clearance 1, and shall also establish and maintain a set of clearances identified herein as Clearance 2 to prevent flashover between vegetation and overhead ungrounded supply conductors.

R1.2.1. Clearance 1 — The Transmission Owner shall determine and document appropriate clearance distances to be achieved at the time of transmission vegetation management work based upon local conditions and the expected time frame in which the Transmission Owner plans to return for future

[1] ANSI A300, Tree Care Operations – Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices, while not a requirement of this standard, is considered to be an industry best practice.

vegetation management work. Local conditions may include, but are not limited to: operating voltage, appropriate vegetation management techniques, fire risk, reasonably anticipated tree and conductor movement, species types and growth rates, species failure characteristics, local climate and rainfall patterns, line terrain and elevation, location of the vegetation within the span, and worker approach distance requirements. Clearance 1 distances shall be greater than those defined by Clearance 2 below.

R1.2.2. Clearance 2 — The Transmission Owner shall determine and document specific radial clearances to be maintained between vegetation and conductors under all rated electrical operating conditions. These minimum clearance distances are necessary to prevent flashover between vegetation and conductors and will vary due to such factors as altitude and operating voltage. These Transmission Owner-specific minimum clearance distances shall be no less than those set forth in the Institute of Electrical and Electronics Engineers (IEEE) Standard 516-2003 (*Guide for Maintenance Methods on Energized Power Lines*) and as specified in its Section 4.2.2.3, Minimum Air Insulation Distances without Tools in the Air Gap.

R1.2.2.1 Where transmission system transient overvoltage factors are not known, clearances shall be derived from Table 5, IEEE 516-2003, phase-to-ground distances, with appropriate altitude correction factors applied.

R1.2.2.2 Where transmission system transient overvoltage factors are known, clearances shall be derived from Table 7, IEEE 516-2003, phase-to-phase voltages, with appropriate altitude correction factors applied.

R1.3. All personnel directly involved in the design and implementation of the TVMP shall hold appropriate qualifications and training, as defined by the Transmission Owner, to perform their duties.

R1.4. Each Transmission Owner shall develop mitigation measures to achieve sufficient clearances for the protection of the transmission facilities when it identifies locations on the ROW where the Transmission Owner is restricted from attaining the clearances specified in Requirement 1.2.1.

R1.5. Each Transmission Owner shall establish and document a process for the immediate communication of vegetation conditions that present an imminent threat of a transmission line outage. This is so that action (temporary reduction in line rating, switching line out of service, etc.) may be taken until the threat is relieved.

R2. The Transmission Owner shall create and implement an annual plan for vegetation management work to ensure the reliability of the system. The plan shall describe the methods used, such as manual clearing, mechanical clearing, herbicide treatment, or other actions. The plan should be flexible enough to adjust to changing conditions, taking into consideration anticipated growth of vegetation and all other environmental factors that may have an impact on the reliability of the transmission systems. Adjustments to the plan shall be documented as they occur. The plan should take into consideration the time required to obtain permissions or permits from landowners or regulatory authorities. Each Transmission Owner shall have systems and procedures for documenting and tracking the planned vegetation management work and ensuring that the vegetation management work was completed according to work specifications.

R3. The Transmission Owner shall report quarterly to its RRO, or the RRO's designee, sustained transmission line outages determined by the Transmission Owner to have been caused by vegetation.

R3.1. Multiple sustained outages on an individual line, if caused by the same vegetation, shall be reported as one outage regardless of the actual number of outages within a 24-hour period.

R3.2. The Transmission Owner is not required to report to the RRO, or the RRO's designee, certain sustained transmission line outages caused by vegetation: (1) Vegetation-related outages that result from vegetation falling into lines from outside the ROW that result from natural disasters shall not be considered reportable (examples of disasters that could create non-reportable outages include, but are not limited to, earthquakes, fires, tornados, hurricanes, landslides, wind shear, major storms as defined either by the Transmission Owner or an applicable regulatory body, ice storms, and floods), and (2) Vegetation-related outages due to human or animal activity shall not be considered reportable (examples of human or animal activity that could cause a non-reportable outage include, but are not limited to, logging, animal severing tree, vehicle contact with tree, arboricultural activities or horticultural or agricultural activities, or removal or digging of vegetation).

R3.3. The outage information provided by the Transmission Owner to the RRO, or the RRO's designee, shall include at a minimum: the name of the circuit(s) outaged, the date, time and duration of the outage; a description of the cause of the outage; other pertinent comments; and any countermeasures taken by the Transmission Owner.

R3.4. An outage shall be categorized as one of the following:

R3.4.1. Category 1 — Grow-ins: Outages caused by vegetation growing into lines from vegetation inside and/or outside of the ROW;

R3.4.2. Category 2 — Fall-ins: Outages caused by vegetation falling into lines from inside the ROW;

R3.4.3. Category 3 — Fall-ins: Outages caused by vegetation falling into lines from outside the ROW.

R4. The RRO shall report the outage information provided to it by Transmission Owner's, as required by Requirement 3, quarterly to NERC, as well as any actions taken by the RRO as a result of any of the reported outages.

C. Measures

M1. The Transmission Owner has a documented TVMP, as identified in Requirement 1.

M1.1. The Transmission Owner has documentation that the Transmission Owner performed the vegetation inspections as identified in Requirement 1.1.

M1.2. The Transmission Owner has documentation that describes the clearances identified in Requirement 1.2.

M1.3. The Transmission Owner has documentation that the personnel directly involved in the design and implementation of the Transmission Owner's TVMP hold the qualifications identified by the Transmission Owner as required in Requirement 1.3.

M1.4. The Transmission Owner has documentation that it has identified any areas not meeting the Transmission Owner's standard for vegetation management and any mitigating measures the Transmission Owner has taken to address these deficiencies as identified in Requirement 1.4.

M1.5. The Transmission Owner has a documented process for the immediate communication of imminent threats by vegetation as identified in Requirement 1.5.

M2. The Transmission Owner has documentation that the Transmission Owner implemented the work plan identified in Requirement 2.

M3. The Transmission Owner has documentation that it has supplied quarterly outage reports to the RRO, or the RRO's designee, as identified in Requirement 3.

M4. The RRO has documentation that it provided quarterly outage reports to NERC as identified in Requirement 4.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

RRO

NERC

1.2. Compliance Monitoring Period and Reset

One calendar Year

1.3. Data Retention

Five Years

1.4. Additional Compliance Information

The Transmission Owner shall demonstrate compliance through self-certification submitted to the compliance monitor (RRO) annually that it meets the requirements of NERC Reliability Standard FAC-003-1. The compliance monitor shall conduct an on-site audit every five years or more frequently as deemed appropriate by the compliance monitor to review documentation related to Reliability Standard FAC-003-1. Field audits of ROW vegetation conditions may be conducted if determined to be necessary by the compliance monitor.

2. Levels of Non-Compliance

2.1. Level 1:

2.1.1. The TVMP was incomplete in one of the requirements specified in any subpart of Requirement 1, or;

2.1.2. Documentation of the annual work plan, as specified in Requirement 2, was incomplete when presented to the Compliance Monitor during an on-site audit, or;

2.1.3. The RRO provided an outage report to NERC that was incomplete and did not contain the information required in Requirement 4.

2.2. Level 2:

2.2.1. The TVMP was incomplete in two of the requirements specified in any subpart of Requirement 1, or;

2.2.2. The Transmission Owner was unable to certify during its annual self-certification that it fully implemented its annual work plan, or documented deviations from, as specified in Requirement 2.

2.2.3. The Transmission Owner reported one Category 2 transmission vegetation-related outage in a calendar year.

2.3. **Level 3:**

2.3.1. The Transmission Owner reported one Category 1 or multiple Category 2 transmission vegetation-related outages in a calendar year, or;

2.3.2. The Transmission Owner did not maintain a set of clearances (Clearance 2), as defined in Requirement 1.2.2, to prevent flashover between vegetation and overhead ungrounded supply conductors, or;

2.3.3. The TVMP was incomplete in three of the requirements specified in any subpart of Requirement 1.

2.4. **Level 4:**

2.4.1. The Transmission Owner reported more than one Category 1 transmission vegetation-related outage in a calendar year, or;

2.4.2. The TVMP was incomplete in four or more of the requirements specified in any subpart of Requirement 1.

E. Regional Differences

None Identified.

Version History

Version	Date	Action	Change Tracking
Version 1	TBA	1. Added "Standard Development Roadmap." 2. Changed "60" to "Sixty" in section A, 5.2. 3. Added "Proposed Effective Date: April 7, 2006" to footer. 4. Added "Draft 3: November 17, 2005" to footer.	01/20/06