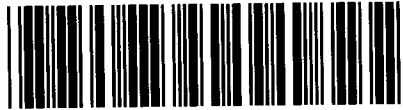


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SOAH DOCKET NO. 473-13-5207
PUC DOCKET NO. 41606

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

**DIRECT ROUTE ADEQUACY TESTIMONY OF JAMES R. DAUPHINAIS ON
BEHALF OF JOINT LANDOWNERS**

JAMES R. DAUPHINAIS, Paramount Citrus II LLC; Paramount Citrus Packing Company LLC; Michael Rhodes; ML Rhodes, Ltd.; Rhodes Enterprises, Inc.; Jimmie and Barbara Steidinger; Anthony E. Gray; G and M Real Estates Co.; Durango Development, Inc.; Richard L. Gillett; Richard Gillett Family Trust; and Jean D. Strait Family LLC (collectively "Rhodes Alliance"); Fortco Properties, Ltd., Rio Fresh, Juan Lino Garza, and Garza Family Living Trust (together, "Joint Landowners"), files this Direct Route Adequacy Testimony, which is attached. Intervenors and James R. Dauphinais stipulate that this Direct Testimony can be treated by all parties as if the answers were filed under oath.

Respectfully submitted,

BRAUN & GRESHAM, PLLC
P.O. Box 1148 (Mailing)
Dripping Springs, Texas 78620
14101 Hwy. 290 W., Suite 1100B (Physical)
Austin, Texas 78737

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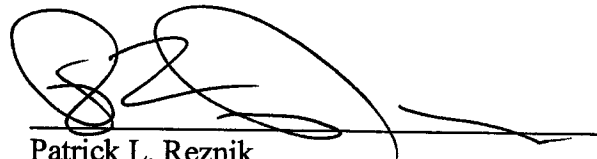
512-894-5426 (telephone)
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By: 
Patrick L. Reznik
State Bar No. 16806780
Cassie Gresham
State Bar No. 24045980

ATTORNEYS FOR THE RHODES ALLIANCE

CERTIFICATE OF SERVICE

I certify that a copy of this document will be served on all parties of record on September 17, 2013, in accordance with Public Utility Commission Procedural Rule 22.74.


Patrick L. Reznik
Cassie Gresham

**SOAH DOCKET NO. 473-13-5207
PUC DOCKET NO. 41606**

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

Direct Route Adequacy Testimony and Exhibits of

James R. Dauphinais

On behalf of

**Rhodes Alliance
Fortco Properties, Ltd.,
Rio Fresh,
Juan Lino Garza, and
Garza Family Living Trust**

September 17, 2013

BAI
BRUBAKER & ASSOCIATES, INC.

SOAH DOCKET NO. 473-13-5207
PUC DOCKET NO. 41606

JOINT APPLICATION OF ELECTRIC	)	
TRANSMISSION TEXAS, LLC AND	)	
SHARYLAND UTILITIES TO AMEND	)	BEFORE THE STATE OFFICE
THEIR CERTIFICATES OF	)	
CONVENIENCE AND NECESSITY FOR	)	OF
THE NORTH EDINBURG TO LOMA	)	
ALTA DOUBLE-CIRCUIT 345-KV	)	
TRANSMISSION LINE IN HIDALGO	)	ADMINISTRATIVE HEARINGS
AND CAMERON COUNTIES, TEXAS	)	
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- JRD-RA-8: Overview Map of Route BAI-4
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- JRD-RA-10: Joint Applicants' Response to Request For Information ("RFI") Rhode-1-16
- JRD-RA-11: Billo Deposition Transcript
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SOAH DOCKET NO. 473-13-5207
PUC DOCKET NO. 41606

JOINT APPLICATION OF ELECTRIC
TRANSMISSION TEXAS, LLC AND
SHARYLAND UTILITIES 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

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) ADMINISTRATIVE HEARINGS
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STATE OF MISSOURI)
COUNTY OF ST. LOUIS) SS

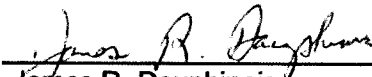
Affidavit of James R. Dauphinais

James R. Dauphinais, being first duly sworn, on his oath states:

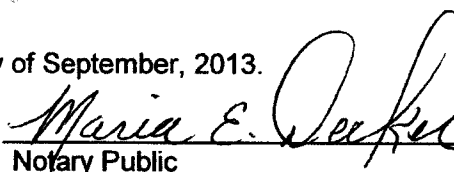
1. My name is James R. Dauphinais. I am a consultant with Brubaker & Associates, Inc., having its principal place of business at 16690 Swingley Ridge Road, Suite 140, Chesterfield, Missouri 63017. We have been retained by Paramount Citrus II LLC; Paramount Citrus Packing Company LLC; Michael Rhodes; ML Rhodes, Ltd.; Rhodes Enterprises, Inc.; Jimmie and Barbara Steidinger; Anthony E. Gray; G and M Real Estates Co.; Durango Development, Inc.; Richard L. Gillett; Richard Gillett Family Trust; and Jean D. Strait Family LLC (collectively "Rhodes Alliance"); Fortco Properties, Ltd., Rio Fresh, Juan Lino Garza, and Garza Family Living Trust (together, with Rhodes Alliance, "Joint Landowners") in this proceeding on their behalf.

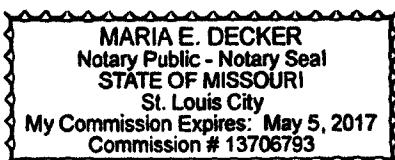
2. Attached hereto and made a part hereof for all purposes is my direct route adequacy testimony and exhibits which were prepared in written form for introduction into evidence in the SOAH Docket No. 473-13-5207 | PUC Docket No. 41606.

3. I hereby swear and affirm that the testimony and exhibits are true and correct and that they show the matters and things that it purports to show.


James R. Dauphinais

Subscribed and sworn to before me this 16th day of September, 2013.


Notary Public



SOAH DOCKET NO. 473-13-5207
PUC DOCKET NO. 41606

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

Direct Route Adequacy Testimony of James R. Dauphinais

1 **I. Introduction**

2 **Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A James R. Dauphinais. My business address is 16690 Swingley Ridge Road,
4 Suite 140, Chesterfield, MO 63017.

5 **Q WHAT IS YOUR OCCUPATION?**

6 A I am a consultant in the field of public utility regulation and a Managing Principal of
7 Brubaker & Associates, Inc., energy, economic and regulatory consultants.

8 **Q PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.**

9 A I have earned a Bachelor of Science in Electrical Engineering from the University of
10 Hartford and have completed a number of graduate level courses in electric power
11 systems through the Engineering Outreach Program of the University of Idaho. In the
12 twelve and one-half years prior to the beginning of my current employment with BAI, I
13 was employed in the Transmission Resource Planning Department of the Northeast

1 Utilities Service Company. While employed in that function, I conducted numerous
2 dynamic, load flow and production cost analyses related to thermal, voltage and
3 stability issues that I studied in support of Northeast Utilities' planning and operation
4 of its electric transmission system. This also included participation in the New
5 England Power Pool Stability Task Force and several technical working groups within
6 the Northeast Power Coordinating Council. It also involved examination of potential
7 solutions to operational and planning problems including, but not limited to,
8 transmission line solutions and the routes that might be utilized by such transmission
9 line solutions. During my subsequent 16 years of employment with BAI, I have been
10 involved with a wide variety of electric utility issues including, but not limited to,
11 avoided cost calculations, certification of public convenience and necessity, fuel
12 adjustment clauses, interruptible rates, market power, market structure, prudence,
13 resource planning, standby rates, transmission rates, transmission losses,
14 transmission planning, and transmission line routing. This has included providing
15 testimony before the Federal Energy Regulatory Commission, the Alberta Utilities
16 Commission and many State Commissions with respect to one or more of these
17 issues. I have also assisted end-use customers with power procurement and
18 assisted a variety of clients in regard to transmission access issues. My background
19 is further detailed in Appendix A to my testimony.

Q HAVE YOU PREVIOUSLY FILED TESTIMONY BEFORE THE PUBLIC UTILITY COMMISSION OF TEXAS ("PUCT" OR "COMMISSION") ON TRANSMISSION-RELATED MATTERS IN GENERAL AND IN CERTIFICATE OF CONVENIENCE AND NECESSITY ("CCN") PROCEEDINGS, IN PARTICULAR?

A Yes. I filed transmission-related testimony in Competitive Renewable Energy Zone ("CREZ") Docket No. 33672 and in Certificate of Convenience and Necessity ("CCN") Docket Nos. 32707, 34440, 37464, 37778, 38140, 38230, 38290, 38324, 38354, 38517, 38597 and 40728. Of these proceedings, I filed and/or presented direct route adequacy testimony in Docket Nos. 38140 and 38597.

Q ON WHOSE BEHALF ARE YOU APPEARING IN THIS PROCEEDING?

A I am testifying on behalf of Paramount Citrus II LLC; Paramount Citrus Packing Company LLC; Michael Rhodes; ML Rhodes, Ltd.; Rhodes Enterprises, Inc.; Jimmie and Barbara Steidinger; Anthony E. Gray; G and M Real Estates Co.; Durango Development, Inc.; Richard L. Gillett; Richard Gillett Family Trust; and Jean D. Strait Family LLC (collectively "Rhodes Alliance"); Fortco Properties, Ltd., Rio Fresh, Juan Lino Garza, and Garza Family Living Trust (together, with Rhodes Alliance, "Joint Landowners").

Q WHAT IS THE SUBJECT MATTER OF YOUR TESTIMONY?

A My testimony addresses the adequacy of the route alternatives offered to the Commission by Electric Transmission Texas, LLC ("ETT") and Sharyland Utilities, L.P. (collectively "Joint Applicants") in their CCN application ("Application") for the proposed North Edinburg to Loma Alta single-circuit, double-circuit capable 345 kV transmission line project ("Proposed Project"). At the request of the counsel for the

1 intervenors I am testifying on behalf of, I evaluated: (i) the 32 proposed routes
2 offered by the Joint Applicants in their Application, (ii) modifications of those filed
3 routes that I assembled from various route links that the Joint Applicants' have
4 noticed in this proceeding, and (iii) two examples of the many possible alternative
5 routes that might have been available to the Commission for consideration but for the
6 ERCOT specification that the route for the proposed transmission line be routed in
7 proximity to South McAllen Substation.

8 I would like to note Mr. Rudolph K. "Rudi" Reinecke of Integrated
9 Environmental Solutions, LLC ("IES") is separately sponsoring direct route adequacy
10 testimony on behalf of Joint Landowners. His testimony supports the preliminary
11 routing factor values for the unnoticed links I incorporated into the two alternative
12 route examples I discuss in my testimony herein.

13 I would like to also note that in performing my review of route adequacy that is
14 detailed in this testimony, I assumed the routing factor data provided by the Joint
15 Applicants is accurate. Mr. Reinecke and I are continuing to examine the Joint
16 Applicants' routing factor data and could potentially disagree with aspects of it later in
17 this proceeding when we file our direct testimony.

18 Finally, my silence in regard to any issue should not be taken as an
19 endorsement of any position taken by the Joint Applicants in their Application or direct
20 testimony in this proceeding.

21 **Q WHAT MATERIALS DID YOU REVIEW PRIOR TO THE PREPARATION OF YOUR**
22 **DIRECT ROUTE ADEQUACY TESTIMONY?**

23 **A** I reviewed the Joint Applicants' Application, direct testimony and responses to
24 requests for information. I also was present by telephone for the deposition of

1 ERCOT Staff member Mr. Jeff Billo. I have attached a copy of the transcript of his
2 deposition, the exhibits for that deposition and Mr. Billo's corrections to the transcript
3 as Exhibit JRD-RA-11 to my direct route adequacy testimony. Finally, I reviewed
4 relevant portions of the North American Electric Reliability Corporation ("NERC")
5 reliability Standard and ERCOT Planning Guide.

6 **Q CAN YOU PLEASE SUMMARIZE YOUR CONCLUSIONS AND**
7 **RECOMMENDATIONS?**

8 **A** I conclude:

- 9 • The Application unreasonably denies the Administrative Law Judge ("ALJ") and
10 the Commission the opportunity to examine route alternatives of potentially
11 significantly lower cost and routing impact than those that can be assembled from
12 the route links that have been noticed in this proceeding; and
- 13 • The underlying cause of this issue was the decision by ERCOT to recommend the
14 proposed 345 kV transmission line be routed in proximity to the existing South
15 McAllen 138 kV Substation without considering:
 - 16 ○ The additional dollar cost and other additional adverse routing
17 impacts that would need to be incurred in order to route the
18 proposed transmission line in proximity to South McAllen 138 kV
19 Substation; and
 - 20 ○ The dollar cost that would need to be later incurred to connect the
21 proposed 345 kV transmission line to South McAllen 138 kV
22 Substation (including the cost for a new 345/138 kV transformer at
23 that substation).

24 My review indicates that ERCOT estimated that routing the proposed
25 transmission line in proximity to South McAllen 138 kV Substation, after later
26 constructing a connection to South McAllen 138 kV Substation (including installing a
27 new 345/138 kV transformer at South McAllen Substation), would potentially avoid
28 \$35.4 million to \$95 million in future (post-2016 and post-2020) 138 kV transmission
29 upgrades, but ERCOT did not factor into its analysis: (i) the additional cost for routing
30 the proposed transmission line in proximity to South McAllen 138 kV Substation,

1 (ii) the additional adverse impact to landowners and the community in the area
2 necessary in order to route the proposed transmission line in proximity to South
3 McAllen 138 kV Substation and (iii) the additional cost that would need to be incurred
4 later to connect the proposed 345 kV transmission line to South McAllen 138 kV
5 Substation (including the cost for a new 345/138 kV transformer at South McAllen
6 Substation).

7 In addition, the Joint Applicants have not proposed to route the proposed
8 345 kV transmission line to South McAllen 138 kV Substation. Instead, they have
9 proposed to route the 345 kV transmission line within a proximity circle that is placed
10 with South McAllen Substation just inside its northern boundary. This would require
11 an entirely new substation and/or new 138 kV or 345 kV transmission lines to connect
12 to either South McAllen 138 kV Substation or existing 138 kV transmission lines in the
13 area. This would add yet additional cost. If a connection is not ultimately made to
14 South McAllen 138 kV Substation, it would also require additional study by ERCOT to
15 determine whether such an alternative provided the same relief as that ERCOT
16 identified for a South McAllen 138 kV Substation connection.

17 Working with Mr. Reinecke, I have been able to identify that, if ERCOT's
18 South McAllen proximity routing specification is eliminated, additional alternative
19 routes could be noticed that have significantly better performance with regard to
20 estimated cost, habitable structures, paralleling linear features (i.e., existing
21 transmission lines, other existing right-of-way and apparent property boundaries), and
22 length than any of the alternative route possibilities that can be assembled from the
23 route links noticed by the Joint Applicants in the proceeding. Specifically, Mr.
24 Reinecke and I have identified one example of such an additional alternative route –

Route BAI-5. As compared to the Joint Applicants' recommended route (Route 32),
Route BAI-5:

- Has an estimated cost that is approximately \$100 million (29%) lower;
- Has approximately 210 (39%) fewer habitable structures within 500 feet of its centerline;
- Has approximately 29 (31%) fewer miles of length not parallel to existing transmission lines;
- Has approximately 23 (48%) fewer miles of length not parallel to either existing transmission lines or other existing right-of-way;
- Has approximately 17 (56%) fewer miles of length not parallel to either existing transmission lines, other existing right-of-way or apparent property boundaries; and
- Has approximately 40 (34%) fewer miles of total length.

I also estimate an additional cost savings of at least \$10 million from Route BAI-5 by avoiding the need to eventually purchase and install a 345/138 kV transformer at South McAllen 138 kV Substation.¹ This transformer would be necessary to connect the proposed 345 kV transmission line to the existing 138 kV substation. Thus, while not routing the proposed 345 kV transmission line in proximity of South McAllen 138 kV Substation might potentially require \$35.4 million to \$95 million in additional post-2016 and post-2020 138 kV transmission upgrades, it can avoid at least \$110 million in additional cost necessary to route the proposed 345 kV transmission line in proximity of South McAllen Substation and eventually provide a connection to that substation.² Therefore, especially when taken in conjunction with the other avoided additional adverse impacts of routing the proposed

¹This does not include the additional cost for a new substation or interconnecting 345 kV or 138 kV transmission lines (some or all of which would be needed under the Joint Applicants' actual proposal in this proceeding since the Joint Applicants are not routing the proposed 345 kV transmission line to South McAllen Substation).

²Again, this does not include the additional avoided cost of a new substation or additional 345 kV or 138 kV transmission lines (some or all of which will be needed under the Joint Applicants' actual proposal in this proceeding since the Joint Applicants are not routing the proposed transmission line to South McAllen 138 kV Substation).

transmission line in proximity to South McAllen Substation that I have noted above, routing the proposed transmission line in the vicinity of South McAllen does not appear to be either necessary or reasonable.

Based on these conclusions, I recommend the Commission:

- Find the Joint Applicants have not filed an adequate number of routes for consideration by the Commission.
- Advise the Joint Applicants that:
 - There may routes the Commission could potentially select for the proposed transmission line if the Joint Applicants were to relax their South McAllen Constraint or present alternatives that do not route the proposed transmission line in the proximity of South McAllen Substation; and
 - They should not constrain themselves to only alternatives that route the proposed transmission line in the proximity of South McAllen Substation.

These recommendations will allow the Commission to weigh the advantages of avoiding potential long-term 138 kV upgrades in the greater McAllen area against the advantages of avoiding the additional adverse impacts (including the additional cost) of routing the proposed transmission line in the proximity of South McAllen Substation. This is a weighing of factors that the Commission should be making. Such a weighing of factors should not be delegated to ERCOT.

II. Route Adequacy Requirements

Q WHAT IS THE PURPOSE OF EXAMINING ROUTE ADEQUACY?

A The purpose is to examine whether an adequate number of reasonably differentiated routes have been proposed by the applicant(s) to allow a reasoned choice of a route by the Commission considering all the facts and circumstances presented. When properly carried out, the examination of route adequacy early in a proceeding will avoid questions in the hearing on merits or after the issuance of a Proposal for

1 Decision with respect to why other routes were not considered. As the Commission
2 has noted in the past (e.g., *Application of Wood County Electric Cooperative, Inc. for*
3 *a Certificate of Convenience and Necessity for Proposed Transmission Line in Wood*
4 *County, Texas*, PUCT Docket No. 32070 (Order on Appeal of Order No. 8 at p. 5)),
5 the lack of resolution of such questions prior to the hearing on merits and the
6 issuance of a Proposal for Decision is problematic in the certification process due to
7 landowner notice requirements, the significant expenditure of resources up to that
8 point, and the significant delays in needed transmission that could result if the
9 certification process has to be restarted. Early identification of inadequate
10 applications is important so that the applicant(s) can withdraw and improve that
11 application before large amounts of time and money are wasted.

12 **Q CAN YOU OFFER A RELATIVELY RECENT EXAMPLE WHERE THE**
13 **COMMISSION HAS BEEN PUT INTO A POSITION LATE IN A PROCEEDING**
14 **WHERE AN ADEQUATE NUMBER OF REASONABLY DIFFERENTIATED**
15 **ROUTES HAVE NOT BEEN PROPOSED BY AN APPLICANT TO ALLOW A**
16 **REASONED CHOICE OF A ROUTE BY THE COMMISSION?**

17 **A** Yes. In LCRA Transmission Services Corporation's application for a CCN for the
18 then proposed Gillespie to Newton 345 kV CREZ Transmission Line in Docket
19 No. 37448, the Commission determined, after a Proposal for Decision had already
20 been issued in favor of a particular proposed route, that no proposed route in the
21 LCRA application met the requisite statutory and regulatory requirements
22 (Commission April 26, 2010 Order in Docket No. 37448). As a result, the
23 Commission denied LCRA's application. Furthermore, after additional analysis by
24 ERCOT that was requested by the Commission, the Commission ultimately approved

1 an unopposed stipulation in Docket No. 38577 that replaced the proposed Gillespie to
2 Newton 345 kV transmission line project with the reconductoring or reconstruction of
3 138 kV transmission lines already owned by LCRA and Oncor (Commission
4 December 1, 2010 Order in Docket No. 38577 at p. 1). This is also an example of a
5 situation where the Commission was not provided sufficient information with regard to
6 the other alternatives available to it. Specifically, that there were 138 kV transmission
7 upgrades available that would remove the need to route a new 345 kV transmission
8 line between Gillespie and Newton.

9 There is an important parallel between the CCN application currently before
10 the Commission in this proceeding and the application before the Commission in
11 Docket No. 38577. Specifically, as I will discuss later in my testimony herein, the
12 route alternatives that have been proposed by the Joint Applicants in this proceeding
13 present a problem to the Commission with regard to selecting a route for the
14 proposed transmission line that meets the requisite statutory and regulatory
15 requirements in light of the additional route alternatives that would be available to the
16 Commission but for the Joint Applicants restricting themselves to routes and route
17 links that attempt to meet ERCOT's specification to route the proposed transmission
18 line in proximity to South McAllen 138 kV Substation. In addition, the analysis
19 performed by ERCOT for the proposed transmission line (Attachment 6 of Application
20 at Report pages 20, 21 and 25) shows there is an alternative available involving
21 138 kV transmission line upgrades that would eliminate the need to route the
22 proposed transmission line in proximity to South McAllen 138 kV Substation. As I will
23 discuss later, ERCOT did not weigh the additional costs and additional adverse
24 routing impacts associated with its proposal to eventually connect the proposed
25 transmission line to South McAllen Substation against the cost of the 138 kV

transmission upgrades alternative. Furthermore, ERCOT's need for either alternative is clouded because the need pertains to less certain (post-2016) long-term needs and is based on the speculative addition of 250 MW of additional load above forecasted load in the Brownsville area. This all makes ERCOT's South McAllen proximity specification for the proposed transmission line highly questionable.

III. Route Selection Factors

Q WHAT FACTORS ARE CONSIDERED IN THE SELECTION OF A TRANSMISSION LINE ROUTE BY THE COMMISSION?

A All of the factors outlined in Section 37.056(c)(4)(A-D) of the Texas Utilities Code, Commission Substantive Rule 25.101 and the Commission's policy of prudent avoidance related to electric and magnetic fields are considered. In addition, other guidance comes from past decisions by the Commission. The circumstances involved in individual transmission line cases vary so the applicability of such precedent depends on the similarity of prior cases to the issues at hand and whether there is any new or different information related to the issues that was not available to the Commission at the time the precedent was established. Finally, there are additional factors that are considered as part of the overall environmental assessment typically included with each application.

Q SHOULD GREATER WEIGHT BE PLACED ON CERTAIN FACTORS VERSUS OTHERS?

A Yes. For example, the Commission itself in its Final Order in Docket No. 30168, *Application of TXU Delivery Company to Amend a Certificate of Convenience and Necessity (CCN) for a proposed transmission line within Jack, Wise and Benton*

1 *Counties, Texas*, noted that it has previously emphasized two factors in deciding the
2 routing of transmission lines: the cost of the line and its impact on habitable
3 structures (Final Order at 2). The Commission also found in Docket No. 30168 that
4 the Administrative Law Judges placed too much emphasis on recreational and park
5 areas, historical values, and environmental issues (*Id.*). This said, in more recent
6 transmission line routing proceedings (e.g., Docket Nos. 37464, 38230 and 38354),
7 the Commission has not necessarily selected the route that has the least number of
8 habitable structures impacted when another route had significantly better
9 performance in regard to paralleling existing compatible Right-of-Way (including
10 apparent property boundaries).

11 Another point of emphasis is seen in Section (b)(3)(B) of Commission
12 Substantive Rule 25.101. This section of the rule emphasizes the paralleling of
13 compatible Right-of-Way (including apparent property boundaries) in addition to
14 conforming to the Commission's policy of prudent avoidance of electric and magnetic
15 fields. It is also important to recognize that, all else being equal, the paralleling of
16 existing transmission lines, particularly of existing lines of equal or greater size and
17 visibility, by its very nature has less impact on the community and landowners than
18 the paralleling of other compatible rights-of-way since those other rights-of-way do
19 not involve existing infrastructure that includes tall structures with three conductors
20 strung between them just a few feet below the top of those structures. Such
21 paralleling of transmission lines also offers the possibility of collocation of a proposed
22 transmission line with the existing transmission lines being paralleled when it is
23 reasonably justified and does not create a reliability issue. Such collocation can be
24 used to help to further mitigate a new transmission line's impact on the community
25 and landowners.

1 Finally, although some categories of data tabulated in the environmental
2 assessment can be considered as routing factors, they deserve less weighting than
3 those factors provided by statute and rule. For example, being in the "foreground
4 visual zone" of state and U.S. highways is not necessarily a significant detriment
5 unless the affected state and U.S. highways are widely recognized as scenic routes,
6 highways or byways. Indeed, a high number in the category of foreground visual
7 zone of highways can often be a good factor, as it indicates that a route may be more
8 compliant with the routing criteria by following highways, which are generally
9 considered to be compatible corridors.

10 **Q WHEN WEIGHING THE FACTORS TO BE CONSIDERED, IS IT POSSIBLE THAT**
11 **SUBSTANTIALLY BETTER PERFORMANCE WITH RESPECT TO ONE FACTOR**
12 **CAN ULTIMATELY OUTWEIGH INFERIOR PERFORMANCE WITH RESPECT TO**
13 **ANOTHER FACTOR?**

14 **A**Yes. A hypothetical example of this would be when one route impacts a relatively
15 small number of habitable structures, but parallels a very small amount of the
16 available existing compatible right-of-way. In such a circumstance, it may be
17 appropriate to select a route that impacts more habitable structures if that route also
18 significantly outperforms the other route in terms of its paralleling of existing
19 compatible right-of-way.

20 **Q CAN UNIQUE CIRCUMSTANCES NOT READILY CAPTURED IN ROUTING**
21 **FACTORS MODIFY THE SELECTION OF A TRANSMISSION LINE ROUTE?**

22 **A**Yes. There are three recent examples of such unique circumstances. First, in
23 Docket No. 38290, the iconic beauty and engineering challenges of Palo Duro

1 Canyon, in conjunction with significantly higher habitable structure counts on another
2 route that avoided Palo Duro Canyon, led to the selection by the Commission of a
3 significantly more expensive route for the transmission line proposed in that
4 proceeding.

5 In Docket No. 38354, the well developed Interstate 10 corridor was found to
6 be a more compatible right-of-way for paralleling purposes than the alternative
7 paralleling opportunities that were available. This led to the selection by the
8 Commission of a route that had significantly higher habitable structure counts than
9 other routes that were available for the transmission line proposed in that proceeding.

10 Lastly, in Docket No. 38597, the adverse impact on community values of
11 crossing the Greenbelt multi-use trail system, along with both the routing factor
12 performance and the large size of the structures associated with the only crossing of
13 the Greenbelt that would be allowed by the U.S. Army Corps of Engineers, led to the
14 Commission's selection of a route significantly longer in both total length and length
15 not paralleling existing compatible right-of-way (including apparent property
16 boundaries).

17 The relevance of these three examples is that they show it is important to
18 consider not just routing factors, but also any significant unique circumstances that
19 may not be captured within those routing factors.

IV. Adequacy of Joint Applicants Filed Routes

Q PLEASE DESCRIBE THE PROPOSED ROUTES THE JOINT APPLICANTS HAVE OFFERED FOR CONSIDERATION BY THE COMMISSION IN THIS PROCEEDING.

A The Joint Applicants have offered 32 different proposed routes to the Commission. All 32 of the proposed routes take one or the other of only two general paths. They all originate in North Edinburg Substation and either:

- Run west, south and then east, around the periphery of the greater McAllen area, to pass through the South McAllen Constraint and then onto Loma Alta Substation (“Western Proposed Routes”); or
- Run east, south, back west and then back east, around the periphery of the greater McAllen area, to pass through the South McAllen Constraint and then onto Loma Alta Substation (“Eastern Proposed Routes”).

The Joint Applicants’ routing factor data (other than for estimated cost) for the 32 proposed routes is presented in Table 4-1 of Attachment 1 of the Joint Applicants’ Application. Attachment 5 of the Joint Applicants’ Application presents the Joint Applicants’ cost estimates for each of the 32 proposed routes offered by the Joint Applicants. All 32 routes run through a proximity circle presented in the Joint Applicants’ Exhibit MEC-2 (“South McAllen Proximity Circle” or “South McAllen Constraint”) that the Joint Applicants propose to use to determine whether a proposed route meets an ERCOT specification that the proposed transmission line be “...routed in proximity to the existing South McAllen Substation” (Joint Applicant witness Caskey Direct at page 24 and Attachment 6 of the Joint Applicants’ Application at page 1). Exhibit JRD-RA-1 combines the information from the Joint Applicants’ Table 4-1 and Attachment 5 together along with information on the number of total interventions on the noticed route links that make up each route. The intervention numbers were compiled by reviewing each intervention that has been

1 filed in this proceeding to date and the noticed route links associated with each of
2 those interventions.

3 **Q IS THE JOINT APPLICANTS' SOUTH MCALLEN PROXIMITY CIRCLE CENTERED**
4 **ON SOUTH MCALLEN SUBSTATION?**

5 A No. As shown in the Joint Applicants' Exhibit MEC-2, South McAllen is located just
6 inside the northern boundary of the South McAllen Proximity Circle.

7 **Q HAVE THE JOINT APPLICANTS VERIFIED WITH ERCOT THAT THEIR**
8 **PROPOSED SOUTH MCALLEN PROXIMITY CIRCLE IS A REASONABLE TEST**
9 **FOR COMPLYING WITH ERCOT'S SPECIFICATION THAT THE PROPOSED**
10 **TRANSMISSION LINE IS "ROUTED IN PROXIMITY TO THE EXISTING SOUTH**
11 **MCALLEN SUBSTATION?"**

12 A No. In response to Request For Information ("RFI") Rhode-1-16 (Exhibit JRD-RA-10),
13 the Joint Applicants indicated that they have not done so. Furthermore, during the
14 Deposition of ERCOT Staff member Jeff Billo, Mr. Billo confirmed that the Joint
15 Applicants did not consult with ERCOT with regard to their South McAllen Proximity
16 Circle (Billo Deposition Transcript (Exhibit JRD-RA-11) at pages 68, 69 and 71).

17 **Q HAS ERCOT DEFINED WHAT IT MEANT BY "...ROUTED IN PROXIMITY TO THE**
18 **EXISTING SOUTH MCALLEN SUBSTATION?"**

19 A No (Exhibit JRD-RA-11 at page 67). As I will detail later in my testimony, ERCOT's
20 analysis that led to this routing specification (Attachment 6 of the Application at
21 Report pages 19, 20 and 25) only identified certain post-2016 and post-2020 138 kV
22 transmission upgrade costs that could be potentially avoided if the proposed 345 kV

1 transmission line was eventually connected to South McAllen 138 kV Substation.
2 During his deposition, Mr. Billo indicated that he felt that ERCOT's view of the
3 situation was to leave it to the Transmission Service Providers ("TSP") and the
4 Commission to determine what is appropriate with regard to meeting the proximity
5 specification (Exhibit JRD-RA-11 at pages 72 and 81).

6 **Q ARE THERE OTHER ROUTES AVAILABLE TO THE COMMISSION IN THIS**
7 **PROCEEDING THAT WOULD MEET THE JOINT APPLICANTS' SOUTH**
8 **MCALLEN CONSTRAINT?**

9 A Yes. The Commission can select any route that can be assembled from the noticed
10 route links in this proceeding in such a manner as to run from North Edinburg
11 Substation through the South McAllen Constraint and then onto Loma Alta
12 Substation. However, all of these other routes would still have to use one of the two
13 general paths that are used by the 32 proposed routes offered by the Joint
14 Applicants. I will collectively refer to the complete set of possible noticed routes that
15 initially proceed west from North Edinburg Substation and pass through the South
16 McAllen Constraint, including the Proposed Western Routes, as the "Noticed Western
17 Routes." I will collectively refer to the complete set of noticed routes that would
18 initially proceed east from North Edinburg Substation and pass through the South
19 McAllen Constraint, including the Eastern Proposed Routes, as the "Noticed Eastern
20 Routes with the SMA Loop" where "SMA Loop" is shorthand for the backtrack to the
21 west necessary on eastern routes in order to meet the Joint Applicants' South
22 McAllen Constraint.

1 **Q WHICH OF THE 32 PROPOSED ROUTES THAT HAVE BEEN OFFERED BY THE**
2 **JOINT APPLICANTS HAS BEEN RECOMMENDED BY THE JOINT APPLICANTS?**

3 **A The Joint Applicants have recommended the Commission select Route 32. Route 32**
4 **is the Western Proposed Route that places the lowest number habitable structures**
5 **within 500 feet of the centerline of the proposed transmission line.**

6 **Q HOW DO THE PROPOSED WESTERN ROUTES AND PROPOSED EASTERN**
7 **ROUTES COMPARE?**

8 **A As shown in Exhibit JRD-RA-1, Route 29 has the lowest habitable structure count (by**
9 **50 structures) of all of the Proposed Eastern Routes. Route 32 is the Joint**
10 **Applicants' recommended route and has the lowest habitable structure count (by**
11 **209 structures) of all of the Proposed Western Routes. Overview maps of Routes**
12 **29 and 32 are respectively presented in Exhibits JRD-RA-2 and JRD-RA-3.**

13 The major differing characteristic of these two routes is with respect to the
14 number of habitable structures within 500 feet of centerline. Route 32 has 688 (60%)
15 fewer habitable structures within 500 feet of centerline than Route 29. Both of these
16 routes have approximately 100 total interventions on their noticed route links and
17 have an estimated cost of approximately \$350 million (Exhibit JRD-RA-1).

18 **Q CAN BETTER NOTICED WESTERN ROUTES AND NOTICED EASTERN ROUTES**
19 **WITH THE SMA LOOP BE ASSEMBLED FROM THE NOTICED ROUTE LINKS?**

20 **A To a degree. I have been able to assemble Routes BAI-1 and BAI-2 from the noticed**
21 **route links. Route BAI-1, a Noticed Eastern Route with the SMA Loop, has 417 fewer**

1 habitable structures within 500 feet than Route 29.^{3,4} Route BAI-2, a Noticed Western
2 Route, improves on Route 32 by shedding 155 habitable structures.⁵ However, both
3 routes still have approximately 100 total interventions on their noticed route links.
4 Exhibit JRD-RA-4 provides routing factor data that I have estimated to date for these
5 two route alternatives from the route factor data for noticed route links that the Joint
6 Applicants provided in response to RFI Rhodes 1-2, the average per unit length costs
7 for the 32 proposed routes offered by the Joint Applicants⁶ and interventions filed to
8 date in this proceeding. Overview maps of Routes BAI-1 and BAI-2 are respectively
9 presented in Exhibits JRD-RA-5 and JRD-RA-6. Note that both Route BAI-1 and
10 Route BAI-2 use the same route links east of the junction of Route Links 185, 187a,
11 349a and 349b to Loma Alta Substation. The differences between the two routes are
12 located west of that junction point in Hidalgo County.

³It is not possible, at this time, to remove the potential double counting of habitable structures near route link junctions that is a natural byproduct of summing the habitable structures along the route links that make up a proposed route. Therefore, at this time, in estimating the achievable reduction in habitable structure counts it is necessary to compare one route to another on the basis of differences in habitable structure counts without double counting removed.

⁴Route BAI-1 would consist of Noticed Route Links 134-135-137a-137b-138-141-147-152-155-162-165-169-184-178-173b-173a-171-170a-352-118c-118a-116-117-119-121-130-180-186-349b-187a-187b-196a-351a-351b-193c-194-201-210-221-223-225-230-233-234-240-243-249-255-265-286-287-294-297-299-317-318-331.

⁵Route BAI-2 would consist of Noticed Route Links 1-4-7-10-17-26-32-33-43-45-51-48-54-56-60-64-342-71a-71b-75-78-81-82-83-85a-85c-84b-84c-87-89-92-94-96-97-105-107-114-117-116-118a-118c-125a-125b-128-175-179-185-187a-187b-196a-351a-351b-193c-194-201-210-221-223-225-230-233-234-240-243-249-255-265-286-287-294-297-299-317-318-331.

⁶To be conservative, Line 8a of Exhibit JRD-RA-4, which caps the average per unit length cost estimates at the estimated cost of Route 32, was used for all estimated cost comparisons drawn from Exhibit JRD-RA-4. This only affects the average per unit length cost estimate for Route BAI-2, whose uncapped approximately \$370 million average per unit length cost estimate is suspect versus the Joint Applicants' cost estimate for Route 32.

1 **Q CAN A BETTER EASTERN ROUTE BE ASSEMBLED FROM THE NOTICED**
2 **ROUTE LINKS BY RELAXING THE JOINT APPLICANTS' SOUTH MCALLEN**
3 **CONSTRAINT?**

4 **A Yes.** If the Joint Applicants' South McAllen Constraint is relaxed, such that the
5 junction of Route Links 169, 184 and 193a is considered close enough to be
6 considered in proximity to South McAllen Substation, it opens up to the Commission
7 the group of routes I will refer to as the "Noticed Eastern Routes without the SMA
8 Loop."

9 Route BAI-3, which I have assembled from noticed links, has the lowest
10 number of habitable structures of the Noticed Eastern Routes without the SMA Loop
11 that I have been able to assemble to date. The routing factors that we have
12 estimated for it to date are presented in Exhibit JRD-RA-4. Exhibit JRD-RA-5
13 provides an overview map for Route BAI-3.⁷ Note that to date, we have only been
14 able to compile routing factor values for total length, estimated cost, number of
15 habitable structures within 500 feet of centerline, and paralleling of linear features
16 (i.e., existing transmission lines, other existing right-of-way and apparent property
17 boundaries).

18 **Q HOW DOES ROUTE BAI-3 COMPARE TO ROUTES BAI-1 AND BAI-2?**

19 **A Versus Routes BAI-1 and BAI-2, Route BAI-3:**
20

- Has an estimated cost that is approximately \$70 million (20%) lower;
- Has approximately 20 (22%) fewer miles not parallel to existing transmission line;
- Has approximately 8 (20%) to 16 (34%) fewer miles not parallel to either existing
22 transmission lines or other existing right-of-way; and
23

⁷Route BAI-3 would consist of Noticed Route Links 134-135-137a-137b-138-141-147-152-155-162-165-169-193a-349a-187a-187b-196a-351a-351b-193c-194-201-210-221-223-225-230-233-234-240-243-249-255-265-286-287-294-297-299-317-318-331. Note that Routes BAI-1, BAI-2 and BAI-3 are identical east of the junction of Links 185, 187a, 349a and 349b.

- Has approximately 4 (18%) to 12 (39%) fewer miles not parallel to either existing transmission lines, other existing right-of-way or apparent property boundaries.

It also has 211 fewer habitable structures within 500 feet than Route BAI-1, but it has 336 more habitable structures within 500 feet than Route BAI-2.

In summary, Route BAI-3, a Noticed Eastern Route without the SMA Loop, is a better route than Routes BAI-1 or BAI-2 with regard to estimated cost and paralleling of existing linear features. It is also shorter in total length and a better route with regard to the number of total interventions on its noticed route links. However, Route BAI-3 does not perform very well versus Route BAI-2, a Noticed Western Route, with regard to the number of habitable structures within 500 feet of centerline.

Q PLEASE EXPLAIN WHY YOU USE THE LENGTH OF A ROUTE NOT PARALLELING VARIOUS TYPES OF LINEAR FEATURES TO MEASURE PERFORMANCE IN REGARD TO THAT PARALLELING.

A Using the length of a route paralleling a particular type of right-of-way or the percentage of the total length of a route paralleling a particular type of right-of-way can be misleading because the alternative routes under consideration may be significantly different in regard to total length. For example, if we had a route of 200 miles that paralleled existing transmission lines for 50% of its length and another alternative route of 100 miles that paralleled existing transmission lines for only 25% of its length, it would not be appropriate to say the 200 mile line outperforms the 100 mile line in regard to paralleling existing transmission lines because the 200 mile route would have 100 miles of length that does not parallel existing transmission lines while the 100 mile route would only have 75 miles of length that does not parallel existing transmission lines. By measuring existing right-of-way paralleling

1 performance by miles that do not parallel that particular type of right-of-way, total line
2 length is removed from the measure and, instead, the focus is appropriately placed
3 on minimizing the number of new transmission line route miles that do not parallel the
4 particular type of right-of-way in question. The merit of this measure was endorsed
5 by the Administrative Law Judges in Docket No. 38597.⁸

6 **Q COULD THE JOINT APPLICANTS HAVE NOTICED MORE LINKS SUCH THAT IT**
7 **WOULD HAVE SIGNIFICANTLY FURTHER IMPROVED ROUTE BAI-3?**

8 A Yes. Route BAI-4 is similar to Route BAI-3 except it uses a modified version of Link
9 169 that contains a 3.5 mile unnoticed section in the northern part of it. Mr. Reinecke
10 describes this modified version of Link 169 in his route adequacy testimony. The use
11 of the unnoticed route link results in a route, Route BAI-4, that is slightly longer (and,
12 thus, slightly more expensive) than Route BAI-3. However, this trade off for Route
13 BAI-4 results in better linear feature paralleling performance and much better
14 habitable structure performance than for Route BAI-3. Exhibit JRD-RA-6 provides an
15 overview map of Route BAI-4.⁹ Exhibit JRD-RA-4 provides the routing data estimated
16 to date for Route BAI-4 by Mr. Reinecke and myself.

17 **Q HOW DOES ROUTE BAI-4 COMPARE TO ROUTES BAI-1 AND BAI-2?**

18 A As compared to Route BAI-1 and Route BAI-2, Route BAI-4:

- 19 • Has an estimated cost that is approximately \$60 million (17%) lower;

⁸*Application of Oncor Electric Delivery 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, Texas*, Docket No. 38597, PFD at 46 (February 9, 2011).

⁹Route BAI-4 would consist of Noticed Route Links 134-135-137a-137b-138-141-147-152-155-162-165-168-169R2-193a-349a-187a-187b-196a-351a-351b-193c-194-201-210-221-223-225-230-233-234-240-243-249-255-265-286-287-294-297-299-317-318-331. Routes BAI-1, BAI-2, BAI-3 and BAI-4 are identical east of the junction of Links 185, 187a, 349a and 349b.

- 1 • Has approximately 20 (22%) fewer miles not parallel to existing transmission
2 lines;
- 3 • Has approximately 8 (20%) to 16 (34%) fewer miles not parallel to either existing
4 transmission lines or other existing right-of-way; and
- 5 • Has approximately 3 (15%) to 12 (38%) fewer miles not parallel to either existing
6 transmission lines, other existing right-of-way or apparent property boundaries.

7 It also has approximately 492 (52%) fewer habitable structures within 500 feet
8 than Route BAI-1 and only approximately 55 (14%) more habitable structures within
9 500 feet than Route BAI-2. Finally, it is shorter in total length than either Route BAI-1
10 or Route BAI-2.

11 **Q WHAT IF THE ERCOT RECOMMENDATION THAT THE PROPOSED**
12 **TRANSMISSION LINE BE ROUTED IN PROXIMITY OF SOUTH MCALLEN**
13 **SUBSTATION HAD NOT BEEN MADE AT ALL?**

14 **A**If the ERCOT South McAllen Substation proximity recommendation had not been
15 made at all, the Joint Applicants could have noticed a large number of additional links
16 to the east and north of the noticed links that were used to assemble the Joint
17 Applicants' 32 proposed routes.

1 **Q WOULD THE AVAILABILITY OF SUCH ADDITIONAL NOTICED LINKS PROVIDE**
2 **ROUTE ALTERNATIVES FOR CONSIDERATION BY THE COMMISSION THAT**
3 **HAVE THE POTENTIAL TO BE SIGNIFICANTLY BETTER THAN THE ROUTE**
4 **ALTERNATIVES CURRENTLY AVAILABLE TO THE COMMISSION IN THIS**
5 **PROCEEDING?**

6 A Yes. Such additional alternative routes would involve significantly less length and
7 would run through less developed areas than the route alternatives currently available
8 to the Commission in this proceeding. For example, while I have not explored all of
9 the possible additional alternatives that could be made available to the Commission,
10 working with Mr. Reinecke, I have identified at least one additional alternative route
11 that is significantly better than any of the alternative routes I have been able to
12 assemble from the route links that are currently noticed in this proceeding.

13 **Q PLEASE DESCRIBE THIS ADDITIONAL ROUTE.**

14 A This would be what I will refer to as Route BAI-5. Route BAI-5 combines the
15 unnoticed Canal Link, described in detail in Mr. Reinecke's route adequacy testimony,
16 with route links that have already been noticed in this proceeding. Specifically, from
17 North Edinburg to Loma Alta, Route BAI-5 consists of Links 134, 135, 137a, 137b,
18 Canal Link, 221, 223, 225, 230, 233, 231, 240, 243, 249, 255, 265, 286, 287, 294,
19 297, 299, 317, 318 and 331. Exhibit JRD-RA-7 provides an overview map of Route

BAI-5.¹⁰ Exhibit JRD-RA-4 provides the routing data estimated to date for Route BAI-5 by Mr. Reinecke and myself.

Q HOW DOES ROUTE BAI-5 COMPARE TO ROUTES BAI-1 AND BAI-2?

A As compared to Route BAI-1 and BAI-2, Route BAI-5:

- Has an estimated cost that is approximately \$100 million (29%) lower;
- Has approximately 27 (29%) fewer miles of length not parallel to existing transmission lines;
- Has approximately 13 (34%) to 22 (46%) fewer miles of length not parallel to either existing transmission lines or other existing right-of-way;
- Has approximately 9 (40%) to 17 (56%) fewer miles of length not parallel to either existing transmission lines, other existing right-of-way or apparent property boundaries;
- Has approximately 31 (29%) to 38 (33%) fewer miles of total length; and
- Has approximately 56 (14%) to 603 (64%) fewer habitable structures within 500 feet of its centerline.

In summary, Route BAI-5 significantly outperforms Routes BAI-1 and BAI-2 with regard to three of the factors the Commission has placed emphasis on in the past (cost, habitable structures and paralleling of linear features) and also has a substantially lower number of interventions on the route links it uses that have already been noticed.

¹⁰Route BAI-5 is identical to Routes BAI-1, BAI-2, BAI-3, and BAI-4 east of the junction of the Canal Link and Link 221. Note that this east-side commonality should not be taken at this time as an endorsement of the selection of that collection of east-side links by the Commission. Rather, I selected that combination of east-side links to: (i) minimize the total number of habitable structures within 500 feet of centerline and (ii) hold that part of the five BAI route alternatives that have been presented in my route adequacy testimony constant since I am only finding fault with the adequacy of the number of noticed route links west of the junction of the Canal Link and Link 221.

1 **Q HOW DOES ROUTE BAI-5 COMPARE TO THE JOINT APPLICANTS'**
2 **RECOMMENDED ROUTE 32?**

3 **A Versus the Joint Applicants' recommended Route 32, Route BAI-5:**

- 4 • Has an estimated cost that is approximately \$100 million (29%) lower;
- 5 • Has approximately 210 (39%) fewer habitable structures within 500 feet of its
6 centerline;
- 7 • Has approximately 29 (31%) fewer miles of length not parallel to existing
8 transmission lines;
- 9 • Has approximately 23 (48%) fewer miles of length not parallel to either existing
10 transmission lines or other existing right-of-way;
- 11 • Has approximately 17 (56%) fewer miles of length not parallel to either existing
12 transmission lines, other existing right-of-way or apparent property boundaries;
13 and
- 14 • Has approximately 40 (34%) fewer miles of total length.

15 **Q PLEASE SUMMARIZE YOUR FINDINGS WITH REGARD TO THE ADEQUACY OF**
16 **THE ROUTES THAT CAN BE ASSEMBLED FROM THE NOTICED ROUTE LINKS**
17 **IN THE JOINT APPLICANTS' APPLICATION.**

18 **A If the Joint Applicants' South McAllen Constraint was relaxed in the manner I have**
19 **discussed or the ERCOT South McAllen proximity specification entirely removed,**
20 **there are likely a number of significantly better routes that could be available to the**
21 **Commission if additional alternative route links were noticed. For example, Route**
22 **BAI-4, which uses noticed links except for a modified version of Link 169, significantly**
23 **outperforms Routes BAI-1 and BAI-2 (the lowest habitable structure eastern and**
24 **western routes that I have been able to assemble from noticed route links that meets**
25 **the South McAllen Constraint) with respect to estimated cost, paralleling existing**
26 **linear features, total length and interventions. As another example, Route BAI-5,**
27 **which uses noticed links except for Mr. Reinecke's Canal Link, significantly**

1 outperforms Routes BAI-1 and BAI-2 with respect estimated cost, habitable
2 structures, paralleling linear features, total length and interventions. Route BAI-5 also
3 significantly outperforms the Joint Applicants' recommended Route 32 with respect to
4 these factors.

5 **V. South McAllen Substation Proximity Recommendation**

6 **Q YOU HAVE ILLUSTRATED THAT SIGNIFICANTLY BETTER ROUTE**
7 **ALTERNATIVES COULD BE AVAILABLE TO THE COMMISSION IF THE ERCOT**
8 **SOUTH MCALLEN PROXIMITY RECOMMENDATION HAD NOT BEEN MADE AT**
9 **ALL. PLEASE EXPLAIN THE BASIS OF ERCOT'S SOUTH MCALLEN**
10 **PROXIMITY RECOMMENDATION.**

11 **A** The basis of the ERCOT South McAllen proximity recommendation is discussed in
12 the ERCOT December 19, 2011 report titled "ERCOT Independent Review of the
13 Sharyland and BPUB Cross Valley Project, Version 1.0" ("ERCOT Report"). A black
14 and white copy of this report is provided in Attachment 6 to the Joint Applicants'
15 Application in this proceeding. The ERCOT Report shows the basis of the South
16 McAllen proximity recommendation is long-term considerations for the lower Rio
17 Grande Valley (ERCOT Report at pages 19 through 20). Using forecasted 2020
18 summer peak load power flow model base case that was updated in April 2011,¹¹
19 ERCOT identified three 138 kV transmission line overloads¹² that could occur

¹¹The update included the highly speculative addition of 250 MW of load above forecasted load in the Brownsville area (Attachment 6 of Application at Report page 19).

¹²An "overload" means that the transmission circuit or line in question is loaded in excess of 100% of its rating. The three 138 kV transmission lines in question are: (i) the Azteca to Hidalgo Energy Center 138 kV line; (ii) the Azteca to SE Edinburg 138 kV line; and (iii) the Aderhold to Hidalgo Energy Center 138 kV line.

1 following the G-1 + N-1 contingency¹³ that could be addressed by providing a 345 kV
2 source of power from North Edinburg Substation to the existing South McAllen
3 138 kV Substation (ERCOT Report at pages 19 and 20). The report also identified
4 that alternatively the overloaded 138 kV lines could be upgraded at a cost
5 \$35.4 million (*Id.*).

6 The ERCOT Report also noted other 138 kV transmission lines that had
7 post-contingency loadings of 92% of rating or higher. These heavy post-contingency
8 transmission line loadings could potentially manifest themselves as post-contingency
9 line overloads sometime after 2020. ERCOT notes that five of these heavy
10 post-contingency line loadings¹⁴ could also be addressed by a 345 kV source of
11 power from North Edinburg 345 kV Substation (*Id.* and ERCOT Report at page 25).
12 Adding in additional upgrades to address these other possible future 138 kV line
13 loading issues raises the total potential cost for 138 kV transmission upgrades
14 avoided by providing a 345 kV source from North Edinburg Substation to South
15 McAllen 138 kV Substation to \$95 million (ERCOT Report at 20).

16 **Q WHAT DOES THIS ALL MEAN?**

17 **A** The ERCOT report indicates that under the assumptions ERCOT used, if the
18 proposed North Edinburg to Loma Alta 345 kV transmission line is routed in the
19 proximity of South McAllen Substation and a connection from the proposed 345 kV

¹³A G-1 + N-1 contingency involves the pre-existing outage of one generation unit followed by the contingency loss of any one additional system element (e.g., a transmission circuit, another generation unit, etc.). This is a North American Reliability Corporation ("NERC") Category C.3 Contingency where the non-consequential controlled loss of firm load is allowed to relieve the overload (NERC Reliability Standard TPL-003-2b at Table 1). However, the current ERCOT Planning Guides are stricter than the NERC Reliability Standards with regard to this type of contingency and do not allow the non-consequential controlled loss of firm load to be used to address post-contingency overloads (ERCOT Planning Guide, June 1, 2013 at Section 4.1.1.2(b)).

¹⁴Specifically, the heavy post-contingency loadings on: (i) the S. Edinburg-Pharr Sub. 138 kV line; (ii) the Edinburg-McColl 138 kV line; (iii) the Elsa to Aderhold 138 kV line; (iv) the West McAllen to North McAllen 138 kV line; and (v) the North McAllen to Edinburg 138 kV line.

1 transmission line to existing South McAllen 138 kV Substation (including a new
2 345/138 kV transformer at South McAllen Substation) is added before 2020,
3 \$35.4 million to \$95 million in 138 kV transmission line upgrades could potentially be
4 avoided. However, the ERCOT Report does not support the conclusion that routing
5 the proposed transmission line in proximity is necessary. At best it supports the
6 conclusion that potentially \$35.4 million to \$95 million in potential post-2016 and
7 post-2020 138 kV transmission upgrades could be avoided by routing the proposed
8 345 kV transmission line in proximity of South McAllen Substation provided a
9 connection (including a 345/138 kV transformer) is later added to South McAllen
10 138 kV Substation. However, these are potential gross savings. They do not
11 consider:

- 12 • The additional cost to route the proposed transmission line in proximity to South
13 McAllen 138 kV Substation;
- 14 • The additional adverse impact to landowners and the community in the area due
15 to routing the proposed transmission line in proximity to South McAllen 138 kV
16 Substation; and
- 17 • The additional cost that will eventually need to be expended to connect to South
18 McAllen 138 kV Substation including the cost for a new 345/138 kV transformer at
19 South McAllen Substation.

20 They also do not consider that the Joint Applicants in this proceeding have not
21 proposed to route the proposed transmission line to South McAllen 138 kV Substation
22 in order to allow an eventual connection to South McAllen 138 kV Substation. The
23 Joint Applicants have only proposed to route the proposed transmission line within
24 their unilaterally defined proximity circle. This will require yet additional costs to be
25 incurred for a completely new substation and/or additional 345 kV or 138 kV
26 transmission lines to eventually connect to South McAllen 138 kV Substation or
27 existing 138 kV lines in the area.

1 As I have discussed earlier in my testimony, I have been able to identify an
2 example of an unnoticed alternative route for the proposed transmission line in this
3 proceeding that is not routed in proximity to South McAllen 138 kV Substation (Route
4 BAI-5) that has an estimated cost that is approximately \$100 million less than either
5 the Joint Applicant's recommend Route 32 or the better route factor performing Route
6 BAI-1 and BAI-2 alternatives. So, the extra cost that would need to be incurred to
7 route the proposed 345 kV transmission line in proximity of South Mc Allen 138 kV
8 substation by itself exceeds the projected 138 kV transmission upgrade costs that
9 might be avoided by performing such routing provided an eventual connection was
10 made to South McAllen 138 kV Substation. Furthermore, as I have indicated, Route
11 BAI-5 performs better than these other alternative routes with respect to other routing
12 factors the Commission has previously placed emphasis on such as the number of
13 habitable structure within 500 feet of centerline and the paralleling of linear features
14 (i.e., existing transmission lines, other existing right-of-way and apparent property
15 boundaries).

16 **Q YOU HAVE ALSO MENTIONED THERE WOULD BE A COST TO EVENTUALLY**
17 **CONNECT THE PROPOSED 345 KV TRANSMISSION LINE TO SOUTH MCALLEN**
18 **138 KV SUBSTATION AND THAT IT WOULD AT LEAST INVOLVE THE**
19 **INSTALLATION FO A NEW 345/138 KV TRANSFORMER. THE ERCOT REPORT**
20 **MAKES NO EXPLICIT MENTION OF THIS TRANSFORMER. PLEASE EXPLAIN**
21 **WHY THIS TRANSFORMER WOULD BE NECESSARY.**

22 **A**There are currently no 345 kV facilities at South McAllen 138 kV Substation. As a
23 result, in order to eventually connect the proposed 345 kV transmission line to the
24 existing 138 kV substation, a new 345/138 kV transformer, along with its associated

1 protections systems and switchgear, would need to be installed at South McAllen
2 substation because facilities operating at 345 kV and 138 kV cannot be directly
3 connected together and must instead be connected through such a transformer.

4 **Q DO YOU HAVE AN ESTIMATE OF THE COST FOR SUCH A 345/138 KV**
5 **TRANSFORMER?**

6 A Yes. Within the past year, I was involved with and testified in Michigan Public Service
7 Commission ("MPSC") Case No. U-17041 involving a transmission line proposal of
8 Michigan Electric Transmission Co., LLC ("METC"). One of the alternatives that was
9 under consideration was the addition of a new 345/138 kV transformer in one of
10 METC's existing substations. METC provided in response to a data request in that
11 proceeding a high level cost estimate of \$12.1 million for the purchase and installation
12 of new 345/138 kV transformer in that substation. I have provided a copy of METC's
13 response to that data request in MPSC Case No. U-17041 in my Exhibit JRD-RA-12.
14 Based on this high level estimate from METC for Michigan, it is reasonable to say that
15 the estimated cost to purchase and install a new 345/138 kV transformer at South
16 McAllen 138 kV substation is likely in the range of \$10 million to \$15 million. This
17 does not include the additional cost for an entirely new substation and/or additional
18 138 kV or 345 kV transmission lines (some or all of which would be necessary under
19 the Joint Applicants' actual proposal in this proceeding which does not route the
20 proposed 345 kV transmission line to South McAllen 138 kV Substation).

21 Thus, when using Route BAI-5, the total cost avoided by not routing the
22 proposed 345 kV 345 kV transmission line in proximity of South McAllen 138 kV
23 Substation is at least \$110 million – significantly in excess of the \$35.4 million to
24 \$95 million in post-2016 and post-2020 138 kV transmission upgrades that could

1 potentially be avoided if the proposed 345 kV transmission line was routed in
2 proximity to South McAllen 138 kV Substation and a connection from the
3 transmission line was eventually made to the substation.

4 **Q JOINT APPLICANTS' WITNESS MR. CASKEY NOTES THAT THE ERCOT**
5 **TECHNICAL ADVISORY COMMITTEE ("TAC") ENDORSED THE PROPOSED**
6 **TRANSMISSION LINE INCLUDING THE SOUTH MCALLEN SUBSTATION**
7 **PROXIMITY RECOMMENDATION AND THE ERCOT BOARD OF DIRECTORS**
8 **("BOARD") LATER UNANIMOUSLY APPROVED IT (CASKEY DIRECT AT 18).**
9 **SHOULD THE COMMISSION PUT MUCH WEIGHT ON THESE**
10 **DETERMINATIONS?**

11 **A** For several reasons, not in this particular case. First, starting with the ERCOT
12 Report, the January 5, 2012 presentation to TAC made by Mr. Billo (Exhibit
13 JRD-RA-11 at Exhibit Billo 6) and the June 17, 2012 presentation made by Mr. Billo
14 to the Board (Exhibit JRD_RA-11 at Exhibit Billo 7), there is no indication in these
15 documents that the additional cost to route the proposed 345 kV transmission line in
16 proximity to South McAllen 138 kV Substation or the additional cost to connect the
17 proposed 345 kV transmission line to South McAllen Substation was ever considered,
18 much less provided, to the TAC or the Board.

19 Second, these documents present the proposed 345 kV transmission line
20 routed in proximity of South McAllen 138 kV Substation (Option 5 in the documents)
21 as a straight line route from North Edinburg to South McAllen Substation to Loma Alta
22 Substation (Attachment 6 of Application at Report page 24; Exhibit JRD-RA-11 at
23 Exhibit Billo 6 at page 11; and Exhibit JRD-RA-11 at Exhibit Billo 7 at page 10). So,
24 even though the TAC and Board members were likely aware that such route would be

1 longer than a straight line route from North Edinburg to Loma Alta, and, presumably,
2 more expensive, they would not have known at that time how much the Joint
3 Applicants actual proposed routes have had to detour around the greater McAllen
4 area (and deviate from a straight line route) to get from North Edinburg Substation to
5 the proximity of South McAllen 138 kV Substation.

6 In addition, neither the minutes of the January 5, 2012 TAC meeting (Exhibit
7 JRD-RA-11 at Exhibit Billo 15), where the proposed transmission line was endorsed,
8 nor the minutes of the January 17, 2012 meeting where the Board voted on the
9 proposed transmission line (Exhibit JRD-RA-11 at Exhibit Billo 14) provide any
10 evidence that the issue of the additional cost to route the proposed transmission line
11 in proximity to South McAllen Substation and eventually connect the proposed
12 transmission line to South McAllen Substation was ever considered.

13 Lastly, as Mr. Billo acknowledged during his deposition, ERCOT does not
14 typically get involved with routing analysis (Exhibit JRD-RA-11 at page 11).
15 Moreover, while ERCOT provides stakeholder representation for market participant
16 and consumer interests, it does not stakeholder participation with regard to
17 transmission line routing issues. So, while cost considerations are something that the
18 TAC and the Board would be expected to consider, other additional adverse routing
19 impacts to landowners and the community where the project would be located due to
20 routing the proposed transmission line in proximity of South McAllen Substation are
21 not.

22 **VI. Conclusions and Recommendations**

23 **Q PLEASE SUMMARIZE YOUR FINAL CONCLUSIONS AND RECOMMENDATIONS.**

24 **A** I conclude:

- 1 • The Application unreasonably denies the Administrative Law Judge (“ALJ”) and
2 the Commission the opportunity to examine route alternatives of potentially
3 significantly lower cost and routing impact than those that can be assembled from
4 the route links that have been noticed in this proceeding; and
- 5 • The underlying cause of this issue was the decision by ERCOT to recommend the
6 proposed 345 kV transmission line be routed in proximity to the existing South
7 McAllen 138 kV Substation without considering:
 - 8 ○ The additional dollar cost and other additional adverse routing
9 impacts that would need to be incurred in order to route the
10 proposed transmission line in proximity to South McAllen 138 kV
11 Substation; and
 - 12 ○ The dollar cost that would need to be later incurred to connect the
13 proposed 345 kV transmission line to South McAllen 138 kV
14 Substation (including the cost for a new 345/138 kV transformer at
15 that substation).

16 My review indicates that ERCOT estimated that routing the proposed
17 transmission line in proximity to South McAllen 138 kV Substation, after later
18 constructing a connection to South McAllen 138 kV Substation (including installing a
19 new 345/138 kV transformer at South McAllen Substation), would potentially avoid
20 \$35.4 million to \$95 million in future (post-2016 and post-2020) 138 kV transmission
21 upgrades, but ERCOT did not factor into its analysis: (i) the additional cost for routing
22 the proposed transmission line in proximity to South McAllen 138 kV Substation,
23 (ii) the additional adverse impact to landowners and the community in the area
24 necessary in order to route the proposed transmission line in proximity to South
25 McAllen 138 kV Substation and (iii) the additional cost that would need to be incurred
26 later to connect the proposed 345 kV transmission line to South McAllen 138 kV
27 Substation (including the cost for a new 345/138 kV transformer at South McAllen
28 Substation).

29 In addition, the Joint Applicants have not proposed to route the proposed
30 345 kV transmission line to South McAllen 138 kV Substation. Instead, they have
31 proposed to route the 345 kV transmission line within a proximity circle that is placed

1 with South McAllen Substation just inside its northern boundary. This would require
2 an entirely new substation and/or new 138 kV or 345 kV transmission lines to connect
3 to either South McAllen 138 kV Substation or existing 138 kV transmission lines in the
4 area. This would add yet additional cost. If a connection is not ultimately made to
5 South McAllen 138 kV Substation, it would also require additional study by ERCOT to
6 determine whether such an alternative provided the same post-contingency 138 kV
7 line loading relief as that ERCOT identified for a South McAllen 138 kV Substation
8 connection.

9 Working with Mr. Reinecke, I have been able to identify that, if ERCOT's
10 South McAllen proximity routing specification is eliminated, additional alternative
11 routes could be noticed that have significantly better performance with regard to
12 estimated cost, habitable structures, paralleling linear features (i.e., existing
13 transmission lines, other existing right-of-way and apparent property boundaries) and
14 length than any of the alternative route possibilities that can be assembled from the
15 route links noticed by the Joint Applicants in the proceeding. Specifically,
16 Mr. Reinecke and I have identified one example of such an additional alternative
17 route – Route BAI-5. As compared to the Joint Applicants' recommended route
18 (Route 32), Route BAI-5:

- 19 • Has an estimated cost that is approximately \$100 million (29%) lower;
- 20 • Has approximately 210 (39%) fewer habitable structures within 500 feet of its
21 centerline;
- 22 • Has approximately 29 (31%) fewer miles of length not parallel to existing
23 transmission lines;
- 24 • Has approximately 23 (48%) fewer miles of length not parallel to either existing
25 transmission lines or other existing right-of-way;
- 26 • Has approximately 17 (56%) fewer miles of length not parallel to either existing
27 transmission lines, other existing right-of-way or apparent property boundaries;
28 and

- Has approximately 40 (34%) fewer miles of total length.

I also estimate an additional cost savings of at least \$10 million from Route BAI-5 by avoiding the need to eventually purchase and install a 345/138 kV transformer at South McAllen 138 kV Substation.¹⁵ This transformer would be necessary to connect the proposed 345 kV transmission line to the existing 138 kV substation. Thus, while not routing the proposed 345 kV transmission line in proximity of South McAllen 138 kV Substation might potentially require \$35.4 million to \$95 million in additional post-2016 and post-2020 138 kV transmission upgrades, it can avoid at least \$110 million in additional cost necessary to route the proposed 345 kV transmission line in proximity of South McAllen Substation and eventually provide a connection to that substation.¹⁶ Therefore, especially when taken in conjunction with the other additional adverse impacts of routing the proposed transmission line in proximity to South McAllen Substation that I have noted above, routing the proposed transmission line in the vicinity of South McAllen does not appear to be either necessary or reasonable.

Based on these conclusions, I recommend the Commission:

- Find the Joint Applicants have not filed an adequate number of routes for consideration by the Commission.
- Advise the Joint Applicants that:
 - There may routes the Commission could potentially select for the proposed transmission line if the Joint Applicants were to relax their South McAllen Constraint or present alternatives that do not route the

¹⁵This does not include the additional cost for a new substation or interconnecting 345 kV or 138 kV transmission lines (some or all of which would be needed under the Joint Applicants' actual proposal in this proceeding since the Joint Applicants are not routing the proposed 345 kV transmission line to South McAllen Substation).

¹⁶Again, this does not include the additional avoided cost of a new substation or additional 345 kV or 138 kV transmission lines (some or all of which will be needed under the Joint Applicants' actual proposal in this proceeding since the Joint Applicants are not routing the proposed transmission line to South McAllen 138 kV Substation).

1 proposed transmission line in the proximity of South McAllen
2 Substation; and

3 – They should not constrain themselves to only alternatives that route
4 the proposed transmission line in the proximity of South McAllen
5 Substation.

6 These recommendations will allow the Commission to weigh the advantages
7 of avoiding potential long-term 138 kV upgrades in the greater McAllen area against
8 the advantages of avoiding the additional adverse impacts (including the additional
9 cost) of routing the proposed transmission line in the proximity of South McAllen
10 Substation. This is a weighing of factors that the Commission should be making.
11 Such a weighing of factors should not be delegated to ERCOT.

12 **Q DOES THIS CONCLUDE YOUR DIRECT ROUTE ADEQUACY TESTIMONY?**

13 **A** Yes, it does.

Qualifications of James R. Dauphinais

1 **Q PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A James R. Dauphinais. My business address is 16690 Swingley Ridge Road,
3 Suite 140, Chesterfield, MO 63017, USA.

4 **Q PLEASE STATE YOUR OCCUPATION.**

5 A I am a consultant in the field of public utility regulation and a Managing Principal with
6 the firm of Brubaker & Associates, Inc. ("BAI"), energy, economic and regulatory
7 consultants.

8 **Q PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND**
9 **EXPERIENCE.**

10 A I graduated from Hartford State Technical College in 1983 with an Associate's Degree
11 in Electrical Engineering Technology. Subsequent to graduation I was employed by
12 the Transmission Planning Department of the Northeast Utilities Service Company as
13 an Engineering Technician.

14 While employed as an Engineering Technician, I completed undergraduate
15 studies at the University of Hartford. I graduated in 1990 with a Bachelor's Degree in
16 Electrical Engineering. Subsequent to graduation, I was promoted to the position of
17 Associate Engineer. Between 1993 and 1994, I completed graduate level courses in
18 the study of power system transients and power system protection through the
19 Engineering Outreach Program of the University of Idaho. By 1996 I had been
20 promoted to the position of Senior Engineer.

1 In the employment of the Northeast Utilities Service Company, I was
2 responsible for conducting thermal, voltage and stability analyses of the Northeast
3 Utilities' transmission system to support planning and operating decisions. This
4 involved the use of load flow, power system stability and production cost computer
5 simulations. It also involved examination of potential solutions to operational and
6 planning problems including, but not limited to, transmission line solutions and the
7 routes that might be utilized by such transmission line solutions. Among the most
8 notable achievements I had in this area include the solution of a transient stability
9 problem near Millstone Nuclear Power Station, and the solution of a small signal (or
10 dynamic) stability problem near Seabrook Nuclear Power Station. In 1993 I was
11 awarded the Chairman's Award, Northeast Utilities' highest employee award, for my
12 work involving stability analysis in the vicinity of Millstone Nuclear Power Station.

13 From 1990 to 1996, I represented Northeast Utilities on the New England
14 Power Pool Stability Task Force. I also represented Northeast Utilities on several
15 other technical working groups within the New England Power Pool ("NEPOOL") and
16 the Northeast Power Coordinating Council ("NPCC"), including the 1992-1996 New
17 York-New England Transmission Working Group, the Southeastern
18 Massachusetts/Rhode Island Transmission Working Group, the NPCC CPSS-2
19 Working Group on Extreme Disturbances and the NPCC SS-38 Working Group on
20 Interarea Dynamic Analysis. This latter working group also included participation
21 from a number of ECAR, PJM and VACAR utilities.

22 From 1990 to 1995, I also acted as an internal consultant to the Nuclear
23 Electrical Engineering Department of Northeast Utilities. This included interactions
24 with the electrical engineering personnel of the Connecticut Yankee, Millstone and

1 Seabrook nuclear generation stations and inspectors from the Nuclear Regulatory
2 Commission ("NRC").

3 In addition to my technical responsibilities, from 1995 to 1997, I was also
4 responsible for oversight of the day-to-day administration of Northeast Utilities' Open
5 Access Transmission Tariff. This included the creation of Northeast Utilities' pre-
6 FERC Order No. 889 transmission electronic bulletin board and the coordination of
7 Northeast Utilities' transmission tariff filings prior to and after the issuance of Federal
8 Energy Regulatory Commission ("FERC" or "Commission") FERC Order No. 888. I
9 was also responsible for spearheading the implementation of Northeast Utilities' Open
10 Access Same-Time Information System and Northeast Utilities' Standard of Conduct
11 under FERC Order No. 889. During this time I represented Northeast Utilities on the
12 Federal Energy Regulatory Commission's "What" Working Group on Real-Time
13 Information Networks. Later I served as Vice Chairman of the NEPOOL OASIS
14 Working Group and Co-Chair of the Joint Transmission Services Information Network
15 Functional Process Committee. I also served for a brief time on the Electric Power
16 Research Institute facilitated "How" Working Group on OASIS and the North
17 American Electric Reliability Council facilitated Commercial Practices Working Group.

18 In 1997 I joined the firm of Brubaker & Associates, Inc. The firm includes
19 consultants with backgrounds in accounting, engineering, economics, mathematics,
20 computer science and business. Since my employment with the firm, I have filed or
21 presented testimony before the Federal Energy Regulatory Commission in
22 Consumers Energy Company, Docket No. OA96-77-000, Midwest Independent
23 Transmission System Operator, Inc., Docket No. ER98-1438-000, Montana Power
24 Company, Docket No. ER98-2382-000, Inquiry Concerning the Commission's Policy
25 on Independent System Operators, Docket No. PL98-5-003, SkyGen Energy LLC v.

1 Southern Company Services, Inc., Docket No. EL00-77-000, Alliance Companies, et
2 al., Docket No. EL02-65-000, et al., Entergy Services, Inc., Docket No.
3 ER01-2201-000, and Remedying Undue Discrimination through Open Access
4 Transmission Service, Standard Electricity Market Design, Docket No. RM01-12-000,
5 Midwest Independent Transmission System Operator, Inc., Docket No. ER10-1791-
6 000 and NorthWestern Corporation, Docket No. ER10-1138-001, et al. I have also
7 filed or presented testimony before the Alberta Utilities Commission, Colorado Public
8 Utilities Commission, Connecticut Department of Public Utility Control, Illinois
9 Commerce Commission, the Indiana Utility Regulatory Commission, the Iowa Utilities
10 Board, the Kentucky Public Service Commission, the Louisiana Public Service
11 Commission, the Michigan Public Service Commission, the Missouri Public Service
12 Commission, the Montana Public Service Commission, the Council of the City of New
13 Orleans, the Public Utility Commission of Texas, the Wisconsin Public Service
14 Commission and various committees of the Missouri State Legislature. This
15 testimony has been given regarding a wide variety of issues including, but not limited
16 to, ancillary service rates, avoided cost calculations, certification of public
17 convenience and necessity, cost allocation, fuel adjustment clauses, fuel costs,
18 generation interconnection, interruptible rates, market power, market structure,
19 off-system sales, prudence, purchased power costs, resource planning, rate design,
20 retail open access, standby rates, transmission losses, transmission planning and
21 transmission line routing.

22 I have also participated on behalf of clients in the Southwest Power Pool
23 Congestion Management System Working Group, the Alliance Market Development
24 Advisory Group and several working groups of the Midcontinent Independent System
25 Operator, Inc. ("MISO"), including the Congestion Management Working Group and

1 Supply Adequacy Working Group. I am currently an alternate member of the MISO
2 Advisory Committee in the end-use customer sector on behalf of a group of industrial
3 end-use customers in Illinois. I am also the past Chairman of the Issues/Solutions
4 Subgroup of the MISO Revenue Sufficiency Guarantee ("RSG") Task Force.

5 In 2009, I completed the University of Wisconsin-Madison High Voltage Direct
6 Current ("HVDC") Transmission course for Planners that was sponsored by MISO. I
7 am a member of the Power and Energy Society ("PES") of the Institute of Electrical
8 and Electronics Engineers ("IEEE").

9 In addition to our main office in St. Louis, the firm also has branch offices in
10 Phoenix, Arizona and Corpus Christi, Texas.

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Routing Factors for the Joint Applicants' Proposed Routes

PUC 14506
SOAH 4/3/15-5207
Exhibit R04-BA-1
Page 1 of 1

Route	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Route 7	Route 8	Route 9	Route 10	Route 11	Route 12	Route 13	Route 14	Route 15	Route 16	Route 17	Route 18	Route 19	Route 20	Route 21	Route 22	Route 23	Route 24	Route 25	Route 26	Route 27	Route 28	Route 29	Route 30	Route 31	Route 32
1. Length of ROW through wetlands	10.9	13.5	13.6	107.7	107.1	100.7	116.1	112.0	105.7	124.5	117.7	118.8	113.0	116.4	114.7	118.4	115.1	114.7	118.4	115.1	114.7	118.4	115.1	114.7	118.4	115.1	114.7	118.4	115.1	114.7	118.4	115.1
2. Number of habitat structures within 500 feet of ROW centerline	1155	499	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	1147	
3. Number of habitat structures within 500 feet of ROW centerline	771	1002	776	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	
4. Number of habitat structures within 500 feet of ROW centerline	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
5. Number of habitat structures within 500 feet of ROW centerline	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
6. Length of ROW parallel to existing transmission line ROW	24.9	36.8	32.2	42.7	40.6	26.1	37.7	32.6	37.7	32.6	37.7	32.6	37.7	32.6	37.7	32.6	37.7	32.6	37.7	32.6	37.7	32.6	37.7	32.6	37.7	32.6	37.7	32.6	37.7	32.6	37.7	
7. Length of ROW parallel to other existing ROW (highways, pipelines, canals, etc.)	40.5	38.9	38.5	43.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	
8. Length of ROW parallel to other existing ROW (highways, pipelines, canals, etc.)	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	
9. Length of ROW through power transmission lines	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
10. Number of additional aerial transmission lines within 1,000 feet of ROW centerline	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
11. Number of additional aerial transmission lines within 1,000 feet of ROW centerline	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
12. Length of ROW through utility National Wildlife Refuge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
13. Length of ROW through utility National Wildlife Refuge	7.1	4.5	4.2	2.6	2.4	4.2	1.1	5.5	1.8	1.3	5.5	1.8	1.3	5.5	1.8	1.3	5.5	1.8	1.3	5.5	1.8	1.3	5.5	1.8	1.3	5.5	1.8	1.3	5.5	1.8	1.3	5.5
14. Length of ROW through utility National Wildlife Refuge	4.6	5.1	6.8	6.0	5.6	7.2	7.1	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
15. Length of ROW through utility National Wildlife Refuge	24.8	28.1	30.0	28.0	26.2	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	26.4	
16. Length of ROW through utility National Wildlife Refuge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
17. Length of ROW through utility National Wildlife Refuge	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	
18. Number of transmission line crossings	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
19. Number of transmission line crossings	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
20. Number of transmission line crossings	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	
21. Number of transmission line crossings	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
22. Number of transmission line crossings	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
23. Number of transmission line crossings	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
24. Number of transmission line crossings	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
25. Number of transmission line crossings	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
26. Number of transmission line crossings	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
27. Number of transmission line crossings	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
28. Number of transmission line crossings	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
29. Number of transmission line crossings	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	
30. Estimated length of ROW within long-term flood zone of public/interstate area*	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	
31. Estimated length of ROW within long-term flood zone of public/interstate area*	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	
32. Length of ROW through riparian wetlands	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
33. Length of ROW through riparian wetlands	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
34. Length of ROW through riparian wetlands	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
35. Length of ROW through riparian wetlands	17.2	15.8	15.8	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	
36. Length of ROW through riparian wetlands	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
37. Number of riparian wetlands crossings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
38. Number of riparian wetlands crossings	155	135	135	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
39. Number of riparian wetlands crossings	155	135	135	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
40. Number of riparian wetlands crossings	155	135	135	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
41. Number of riparian wetlands crossings	155	135	135	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	
42. Length of ROW within Coastal Management Program boundary	7.0	15.4	8.8	7.5	4.1	7.2	6.8	7.2	7.0	8.9	14.1	6.9	7.5	7.0	14.9	15.5	7.2	6.9	14.1	11.8	6.9	7.5	7.0	14.9	15.5	7.2	6.9	14.1	11.8	6.9	7.5	
43. Length of ROW within Coastal Management Program boundary	7.0	15.4	8.8	7.5	4.1	7.2	6.8	7.2	7.0	8.9	14.1	6.9	7.5	7.0	14.9	15.5	7.2	6.9	14.1	11.8	6.9	7.5	7.0	14.9	15.5	7.2	6.9	14.1	11.8	6.9	7.5	
44. Number of additional riparian wetlands crossings	9	4	11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
45. Number of additional riparian wetlands crossings	9	4	11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
46. Number of additional riparian wetlands crossings	9	4	11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
47. Length of ROW across area of riparian wetlands	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	76.4	
48. Length of ROW across area of riparian wetlands	5.38	5																														