VENUS – SHERRY 345 KV CIRCUIT CONSTRUCTION PROJECT

TXU ELECTRIC DELIVERY TRANSMISSION GRID PLANNING

MAY 25, 2006

Introduction

The Venus – Liggett 345 kV project constructs two 345 kV circuits between Venus Switching Station (Venus) and Liggett Switching Station (Liggett). As a result of this construction project, the existing Venus – Liggett 345 kV circuit will be disconnected just north of the Webb Substation. This results in a part of the Webb Substation load being supplied radially from Venus (See Figure 2).

TXU Electric Delivery proposes to construct a new 345 kV circuit between Webb and Century substations. This would be accomplished by disconnecting the 345 kV Sherry tap line from the Everman – Cedar Hill 345 kV circuit and pulling about 1.8 miles of new conductor on existing structures between this tap point and the point just north of Webb that was a part of the original Venus – Liggett 345 kV circuit. This proposed project, Venus – Sherry 345 kV circuit, in conjunction with Venus – Liggett 345 kV circuit project will create two new circuits leaving Venus Switching Station (See Figure 1).

Planning Studies

TXU Electric Delivery examined the performance of the transmission system in the Venus area for summer of 2007. The attached base case was used. It was created from the 2007 base case dated 04/07/2006 by changing the generation to reflect the expected return of mothballed generation and use of only lower emission generators in the DFW Area. The studies indicated the loss of any one of the 345 kV circuits exiting Venus Switching Station (Venus) would not cause an overload.

We then examined the system's ability to sustain the outage of a circuit if one of the 345 kV circuits exiting Venus was out of service. The studies identified potential overloading of the 345/138 kV autotransformer at Venus or some of the 345 kV circuits exiting Venus. These overloads would activate the SPS at Venus.

One of the two 345 kV circuits that supplies Sherry Switching Station (Sherry) and Century Substation is tapped off of the Everman – Cedar Hill 345 kV circuit, and no sectionalizing switches exist at the tap location. The other 345 kV circuit that supplies the two stations comes directly from Everman. The two circuits share structures for about 16 miles. An outage of this double-circuit line will interrupt 345 kV service to two 345/138 kV autotransformers at Sherry and all 167 MW of load at Century. The 345 kV lines can be opened to restore service to the load at Century. If the fault is south of Century, the load must be serviced by back feeding through the 345/138 kV autotransformer at Sherry. The amount of time required to restore service to all of the load could be lengthy due to the amount of switching required to (1) locate and isolate the faulted facilities, (2) to energize a 345 kV circuit to Century by back feeding through the 345/138 kV autotransformer at Sherry, and (3) to adjust the 345 kV voltage at Sherry by changing tap position on the autotransformer.

If this project is not constructed, two of the four Webb Substation transformers would be radially fed from Venus. If the radial Venus – Webb 345 kV circuit is lost, the load served by the two transformers from that circuit would have to be fed from the other two transformers in the Webb Substation by transferring the 25 kV distribution feeders from one pair of transformers to the other pair. The loading on the two remaining

transformers in this situation would be close to the nameplate rating of those two transformers beginning in 2010.

An additional justification for constructing the Venus – Sherry 345 kV circuit is to eliminate a three-ended electrical connection. Because of this three-ended line, there are three separate double-circuit contingencies and three single-circuit contingencies that will open breakers at three 345 kV switching stations. In the instance of one of the double-circuit contingencies there are seven breakers that open at Cedar Hill Switching Station, Sherry Switching Station and Everman Switching Station removing three 345 kV circuits and two 345/138 kV autotransformers from service. The addition of the Venus – Sherry 345 kV line will eliminate the exposure to all of those situations. The exposure to these possible contingencies is enhanced by the fact there are approximately 9.9 miles of double-circuit structures between the Everman and Sherry Switching Stations, with an additional 7.6 miles of line from the three-ended tap point toward Cedar Hill. Not only does this provide more exposure due to the distances between breakers, but also exposes the area to lengthier outages due to the time needed in locating and correcting problems along these long lines. With the addition of the Venus – Sherry 345 kV line this exposure is drastically reduced since one of the two transmission lines leaving Sherry will now head towards Everman and the other circuit will head towards Venus. The length of line between breakers is changed and the number of 345 kV circuits and 345/138 kV autotransformers exposed to a single event is also reduced.

Alternatives

Alternatives to the proposed project were not developed because the proposed project utilizes existing structures. Alternatives would have involved constructing a new line on new right-of-way which would not have been as desirable or feasible as the proposed project.

Recommendation

TXU Electric Delivery recommends the addition of conductor to existing structures at a cost of approximately $1,316,000 to create the Venus – Sherry 345 kV circuit in early 2007. This circuit will greatly improve service reliability to the 167 MW of load at Century Substation and the 81 MW of load at Webb Substation.

The proposed circuit will improve the reliability and flexibility of the 345 kV system around Venus Switching Station and permit the retirement of the SPS at Venus which reduces generation at the Midlothian Energy Project to prevent overloading lines and 345/138 kV autotransformers.

The proposed project also eliminates the three-ended Everman – Sherry – Cedar Hill 345 kV line which will improve the reliability of the 345 kV system in this part of the DFW Area. The transmission controllers will have more flexibility in scheduling construction and maintenance outages and responding to contingencies.

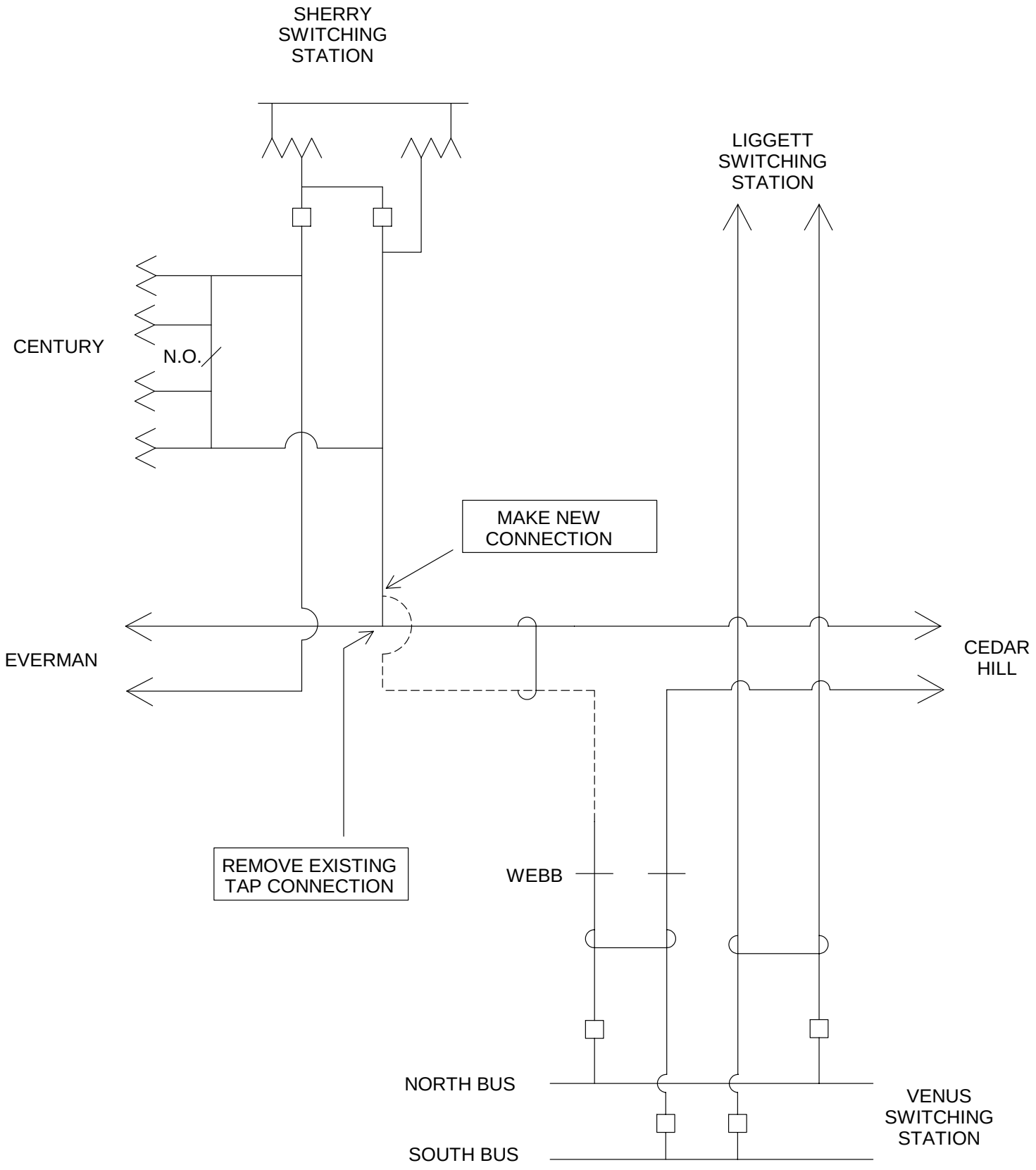
SHERRY
SWITCHING
STATION
LIGGETT
SWITCHING
STATION
CENTURY
N.O.
MAKE NEW
CONNECTION
EVERMAN
CEDAR
HILL
REMOVE EXISTING
TAP CONNECTION
WEBB
NORTH BUS
SOUTH BUS
VENUS
SWITCHING
STATION

FIGURE 1

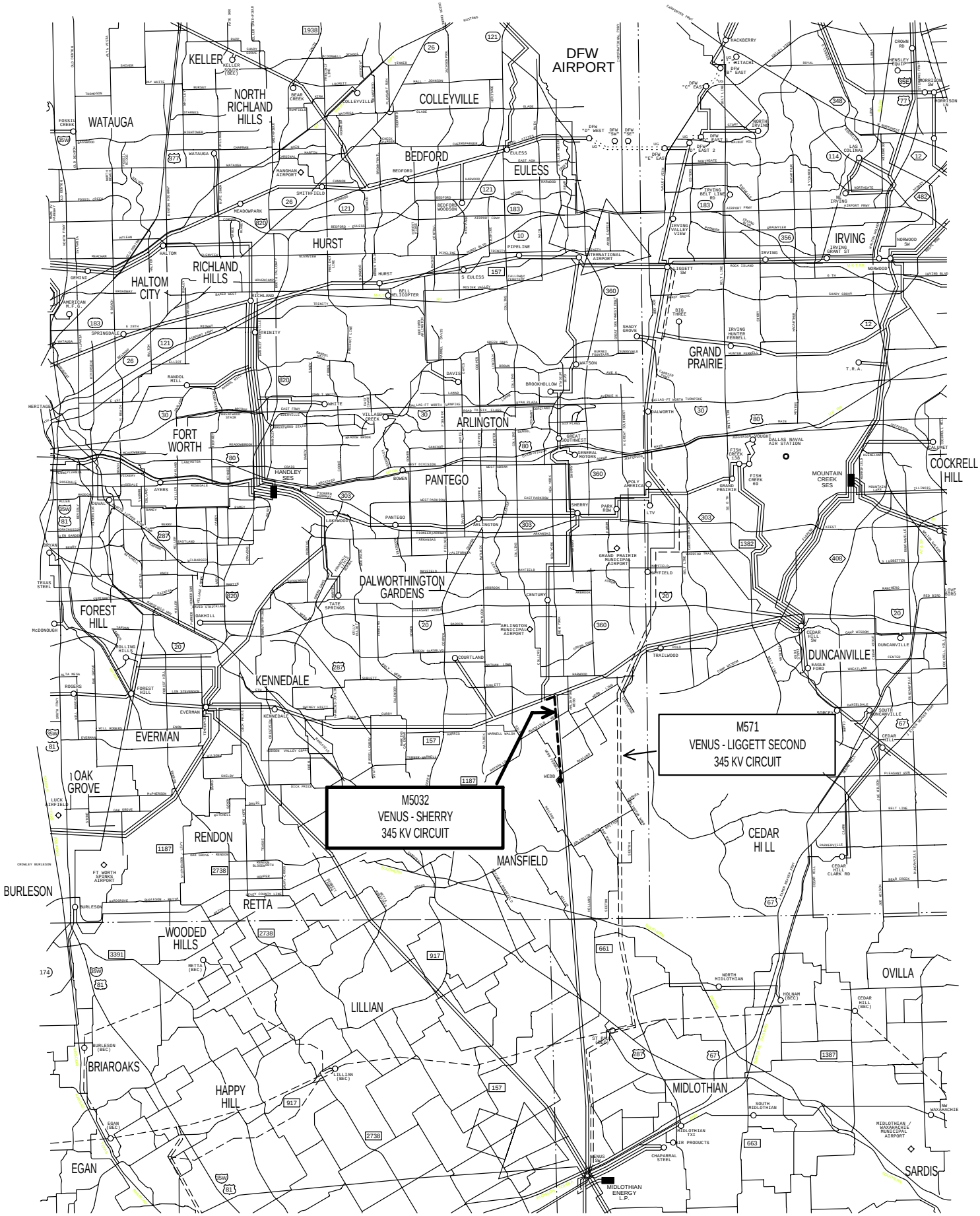
M571
VENUS - LIGGETT SECOND
345 KV CIRCUIT
M5032
VENUS - SHERRY
345 KV CIRCUIT
DFW AIRPORT
KELLER
NORTH RICHLAND HILLS
WATAUGA
COLLEYVILLE
BEDFORD
EULESS
HURST
RICHLAND HILLS
HALTOM CITY
IRVING
GRAND PRAIRIE
ARLINGTON
FORT WORTH
PANTEGO
COCKRELL HILL
DALWORTHINGTON GARDENS
FOREST HILL
DUNCANVILLE
KENNEDALE
EVERMAN
OAK GROVE
RENDON
CEDAR HILL
MANSFIELD
BURLESON
RETTA
WOODED HILLS
OVILLA
LILLIAN
BRIAROAKS
HAPPY HILL
MIDLOTHIAN
EGAN
SARDIS
MIDLOTHIAN ENERGY L.P.

FIGURE 2