ERCOT Independent Review of the Kenedy Switch – Nixon – Seguin Line Upgrade Project

Document Revisions

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1. Introduction

The Kenedy Switch to Nixon 69 kV transmission line is located in Karnes County and Gonzales County. The load growth in Karnes County and Gonzales County and surrounding communities, mostly due to the development of the Eagle Ford Shale (EFS), has recently created the need for transmission improvements in this area which has mostly 69 kV infrastructure. The ratings for the 69 kV transmission lines in this area range from 34 to 42 MVA. Figure I shows the map of the existing transmission system along the Kenedy Switch - Nixon - Seguin.

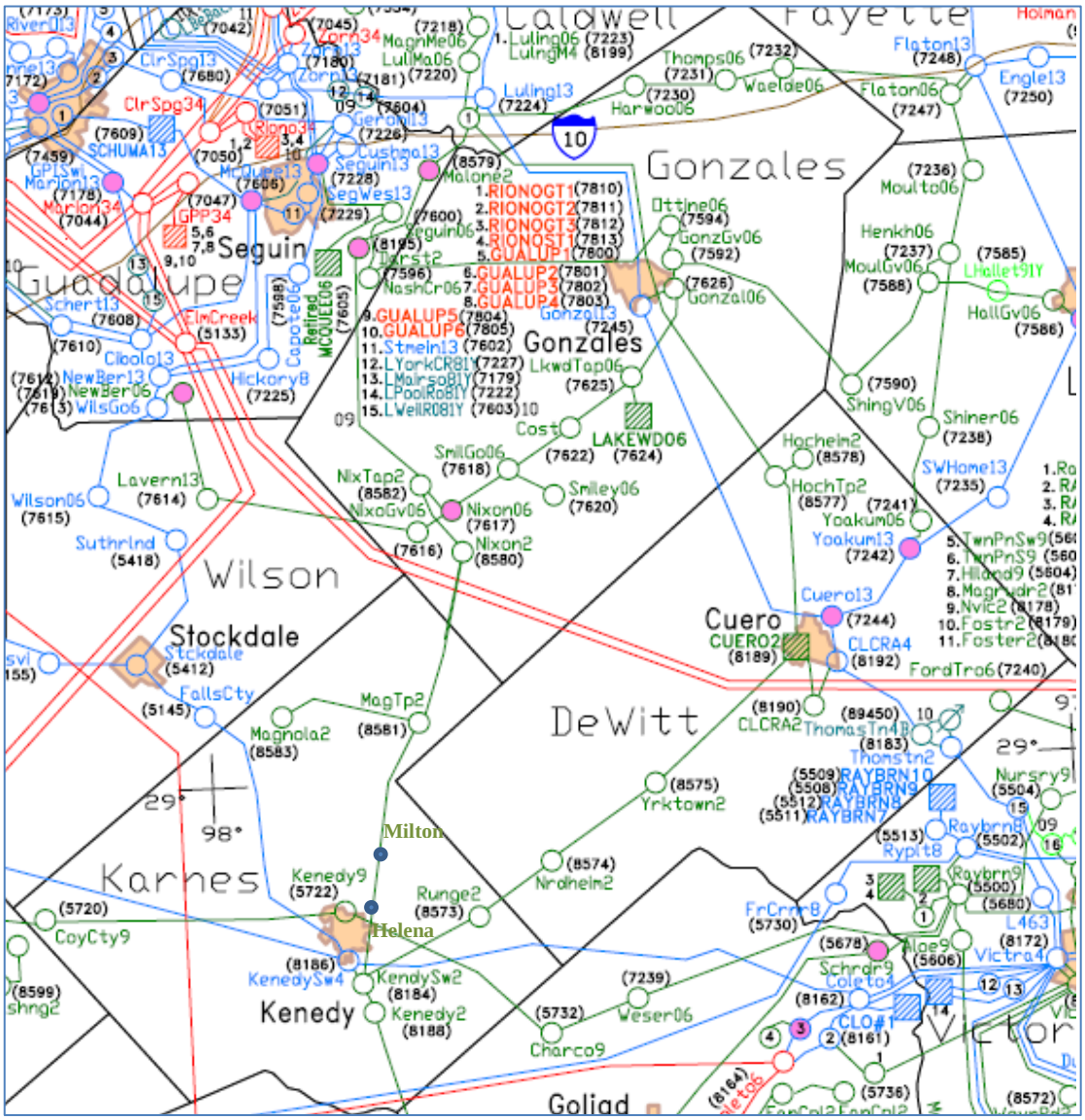

Figure I: Existing transmission system along the Kenedy Switch – Nixon - Seguin

The Milton and Helena Substations were constructed in Karnes County in 2012 to serve a portion of the Eagle Ford Shale related load growth. The transmission service to the Milton and Helena Substations is currently provided by the 35.4-mile, 69 kV, 34.3 MVA Kenedy Switch to Nixon transmission line. The combined initial load forecast for these two stations was 21 MW in 2012. Due to the unprecedented load

growth, the updated load forecasts for the Helena Substation and Milton Substation together in 2015 and 2017 are 46.4 MW and 47.2 MW respectively. As a result, the Kenedy Switch – Helena 69 kV line exceeds its emergency rating under the contingency loss of Nixon – AEP Nixon 69 kV line in 2015 and exceeds its normal rating under pre-contingency conditions in 2017. The Nixon – AEP Nixon – Milton 69 kV line exceeds its emergency rating under the contingency loss of Kenedy Switch – Helena 69 kV line in 2015 and 2017.

2. Description of the proposed project

In order to address the reliability issues and the load growth in Karnes County and Gonzales County and surrounding communities mostly due to the development of the Eagle Ford Shale (EFS), LCRA TSC, Guadalupe Valley Electric Cooperative (GVEC), American Electric Power Service Corporation (AEP) and South Texas Electric Cooperative (STEC) have recently jointly proposed the following transmission project:

- Upgrade and convert the existing 69 kV transmission lines between the Kenedy Switch, Nixon, and Seguin Substations to 138 kV with 795 ACSR conductor. Upgrade the facilities at the Kenedy Switch (AEP), Helena, Magnolia Tap, Magnolia (AEP), Milton, Nixon (AEP), Nixon, and Seguin substations to 138 kV
- Add a new 138/69 kV substation named Deer Creek at the intersection of the GVEC Seguin-Gonzales and the LCRA TSC Nixon-Luling 69 kV transmission lines and add a 138/69 kV 45 MVA autotransformer at Deer Creek. Terminate the 138 kV transmission line from Nixon and Seguin at the Deer Creek 138 kV bus and terminate the 69 kV transmission line from Luling and Gonzales at the Deer Creek 69 kV bus
- Relocate the existing 138/69 kV, 45 MVA autotransformer from the Seguin Substation to the Nixon Substation

The total cost for these improvements is estimated to be $55.3 Million.

3. Reliability Analysis

The analysis of the system needs primarily focused on steady-state thermal and voltage reliability of the ERCOT transmission system as the load at Helena and Milton substations increases. Reliability analysis was performed using PowerWorld. N-1 (AC contingency) was performed on the summer peak cases for 2013, 2015 and 2017 as part of the ERCOT 2012 Five-Year Transmission Plan.

Several 69 kV lines in the Kenedy to Luling area exceed their emergency ratings under several different contingencies. The resulting study overloads and contingencies are shown in Table I and Figure II. To relieve these overloads, the existing 69 kV transmission lines between the Kenedy Switch, Nixon, and Seguin Substations need to be upgraded and converted to 138 kV with 795 ACSR conductor. These upgrades are needed by 2013 since the area has experienced unprecedented load growth due to Eagle Ford Shale oil and gas exploration and production.

Overloaded Element	Contingency	Percent Overload		
		2013	2015	2017
Kenedy Switch - Helena 69 kV line	Base case	-	-	105.4
	Nixon - Nixon South 69 kV line	142.5	146.6	-
	Nixon South - Milton 69 kV line	115.9	119.17	-
	Lavernia - Wilson Goab 69 kV line	116.1	114.8	-
	Olmos Switching 138/69 kV autotransformer	114.8	116.0	-
	Olmos Switching - Wilson Goab 69 kV line	116.1	114.8	-
	Luling - Malone 69 kV line	112.1	109.8	-
	Lakewood Tap - Gonzales 69 kV line	110.5	109.7	-
	Darst Creek - Malone 69 kV line	109.4	107	-
	Cost - Lakewood Tap 69 kV	107.9	106.8	-
	Lavernia - Nixon GVEC 69 kV line	106.3	103.8	-
	Gonzales 138/69 kV autotransformer	105.1	103.4	-
Luling - Malone 69 kV line	Kenedy Switch - Helena 69 kV line	100.6	106.5	110
Malone - Darst Creek 69 kV		-	-	101.2
Nixon South - Milton 69 kV line		154.6	163.3	172.2
Nixon South - Nixon South 69 kV line	Kenedy Switch - Helena 69 kV line	176.6	186.1	195.9
	Kenedy Switch 138/69 kV autotransformer	105.4	116.1	111.1

Table II: 2012 Five-Year Transmission Plan overloads and contingencies

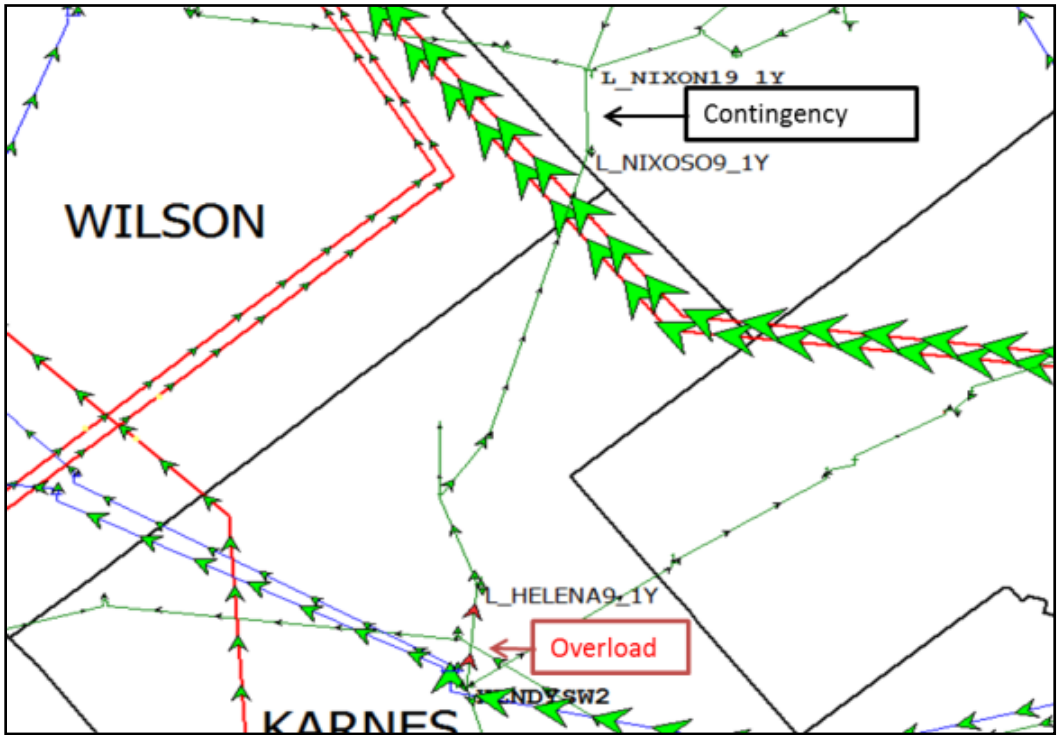

Figure IIII: 2012 Five-Year Transmission Plan overload and contingency

4. Conclusion

Based on the reliability need identified in the 2012 Five-Year Transmission Plan, it was determined that the proposed project would relieve the projected thermal and voltage violations caused by the area load additions mainly associated with Eagle Ford Shale oil and gas exploration and production. Therefore, ERCOT recommend the following transmission system improvements proposed by LCRA TSC, GVEC, AEP and STEC:

- Upgrade and convert the existing 69 kV transmission lines between the Kenedy Switch, Nixon, and Seguin Substations to 138 kV with 795 ACSR conductor. Upgrade the facilities at the Kenedy Switch (AEP), Helena, Magnolia Tap, Magnolia (AEP), Milton, Nixon (AEP), Nixon, and Seguin substations to 138 kV
- Add a new 138/69 kV substation named Deer Creek at the intersection of the GVEC Seguin-Gonzales and the LCRA TSC Nixon-Luling 69 kV transmission lines and add a 138/69 kV 45 MVA autotransformer at Deer Creek. Terminate the 138 kV transmission line from Nixon and Seguin at the Deer Creek 138 kV bus and terminate the 69 kV transmission line from Luling and Gonzales at the Deer Creek 69 kV bus
- Relocate the existing 138/69 kV, 45 MVA autotransformer from the Seguin Substation to the Nixon Substation

5. Designated Provider of Transmission Facilities

In accordance with ERCOT Protocol Section 3.11.4.8, ERCOT staff is to designate transmission providers for projects reviewed in the RPG. The default providers will be those that own the end points of the new projects. These providers can agree to provide or delegate the new facilities or inform ERCOT if they do not elect to provide them. If different providers own the two ends of the recommended projects, ERCOT will designate them as co-providers and they can decide between themselves what parts of the recommended projects they will each provide.

LCRA TSC, Guadalupe Valley Electric Cooperative (GVEC), American Electric Power Service Corporation (AEP) and South Texas Electric Cooperative (STEC) own the endpoints of the transmission facilities associated with this project. Therefore, ERCOT designates LCRA TSC, GVEC, AEP and STEC as co-providers of all transmission facilities recommended in this report.