



TNMP Line 69H Rebuild and Conversion Project – ERCOT Independent Review

RPG Meeting
August 16, 2016

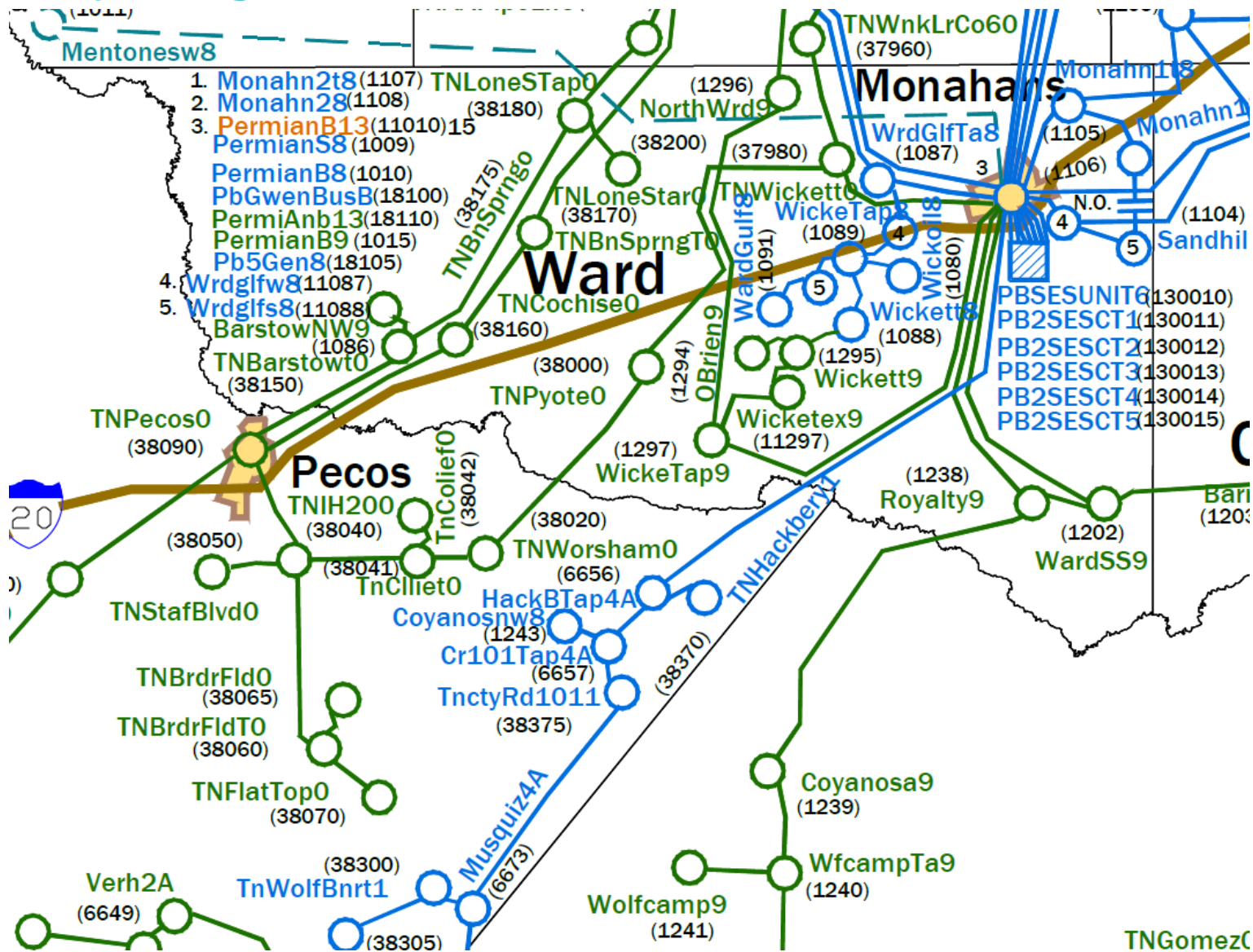
Introduction

- ❑ The TNMP West Texas North (WTN) System, which is mainly served by Line 69H, 69D and 69E, is experiencing steady load growth with a significant amount of the forecasted load from facilities tapped from Line 69H.
- ❑ By 2022, the total coincident peak load forecast in the WTN system will reach 254MW, which will cause reliability criteria violations, and the majority of the criteria violations are located on Line 69H.
- ❑ TNMP submitted the Line 69H Rebuild and Conversion project for the Regional Planning Group review in March 2016.

ERCOT Independent Review Status

- ❑ ERCOT has confirmed the need to address the reliability issues in the TNMP WTN system.
- ❑ ERCOT has evaluated different project options to address the reliability issues in the TNMP WTN system.
- ❑ ERCOT has identified a potential solution to address the reliability needs in the TNMP system.

Study Region



Study Assumption

- ❑ Base Cases:
 - The 2018/2022 West/Far West (WFW) summer peak cases from the 2016 Regional Transmission Plan (RTP).
 - The 2019 Min case from the 2016 RTP

- ❑ Six solar projects (Castle Gap Solar-117MW, Castle Gap Solar 2-63MW, RE Maplewood 2a-100MW, RE Maplewood 2b-200MW, RE Maplewood 2c-100MW, and RE Maplewood 2d-100MW,) that met Planning Guide Section 6.9 requirements were added to the corresponding cases based on their Commercial Operation Date.

- ❑ Transmission projects included in the base case.
 - AEP/Oncor Barrilla Junction Area Improvement Project.
 - Oncor Riverton-Sand Lake 138 kV Upgrade Project.

Study Assumption

- ❑ The following model corrections/updates were made based on the inputs from the TSPs.
 - TNMP WTN transmission system updates.
 - Line limits and parameters correction for the Fort Stockton Switch to TNMP Fort Stockton Plant 69 kV line and the AEP Fort Stockton Plant to TNMP Fort Stockton Plant 69 kV line.
 - Rose rock and Hovey solar connection update (Solstice instead of Barrilla Junction).
 - Yucca Drive/Wink to Culberson transmission system updates.
- ❑ Load updates from TNMP, AEP and Oncor in the area were incorporated.
- ❑ Contingencies and criteria of reliability analysis.
 - NERC TPL-001-4 contingency events (P0, P1, P2-1, P3, P6 and P7) were analyzed.

Reliability Analysis Results

□ N-1 Results:

Branch	Length (miles)	Max % Loading	
		2018	2022
IH-20 to Pecos 69kV ckt 1	2.3	109.4	141.9
Wickett to Pyote 69kV ckt 1	3.1	119.6	131.7
Pyote to Worsham 69kV ckt 1	15.4	109.9	121.6
IH-20 to Collie Field Tap 69kV ckt 1	3.0	109.1	120.5
Worsham to Quito Draw 69kV ckt 1	0.1	<100	110.7

Reliability Analysis Results

□ N-1 Results:

Name	Nom kV	Min Voltage Cont.	
		2018	2022
COLLIE FIELD	69	0.59	0.57
COLLIE FIELD TAP	69	0.61	0.58
BIRDS OF PREY CUSTOMER	69	0.62	0.59
BIRDS OF PREY	69	0.62	0.59
QUITO DRAW TAP	69	0.65	0.63
WORSHAM	69	0.65	0.63
PYOTE	69	0.81	0.80

Project Options

❑ Option 1 (TNMP Preferred Option)

- Rebuild Line 69H from IH-20 to Wickett to 138kV standards with 1926 ACSR conductor (~39 miles)
- Rebuild three existing substations (Pyote, Worsham and Collie Field Tap) along Line 69H to 138kV standards.
- Connect to IH-20 38kV substation.
- Build new Wickett 138kV ring substation.
- Install Wickett 138/69kV autotransformer.
- Build Wickett to Oncor Wolf 138kV transmission line with 1926 ACSR conductor (~6.0 miles)

Estimated cost: \$50.6 million

Project Options

❑ Option 2

- Rebuild Line 69H from IH-20 to Wickett to 138kV standards with 1926 ACSR conductor but operate at 69kV (~39 miles)
- Rebuild three existing substations (Pyote, Worsham and Collie Field Tap) along Line 69H to 138kV standards.
- Install 20 Mvar capacitor bank at Collie 69kV tap substation.

Estimated cost: \$36.5 million

Project Options

❑ Option 3

- Create 138kV tie connection to Oncor Yucca Drive – Sand Lake – Culberson 138kV double circuit transmission line.
- Build 138kV ring substation and 69 kV ring substation at tie location.
- Install 138/69kV autotransformer at tie location.
- Rebuild Line 69H from the new 138 kV ring substation to IH20 to 138kV standards with 1926 ACSR conductor (~37 miles)
- Rebuild three existing substations (Pyote, Worsham and Collie Field Tap) along Line 69H to 138kV standards.

Estimated cost: \$48.4 million

Note: For this option, three possible tie connections to the Oncor Yucca Drive – Sand Lake – Culberson 138kV double circuit transmission line were studied: tie to the White Oil to Pyote line, tie to the Yucca Drive to Barstow line, and tie to both the White Oil to Pyote line and the Yucca Drive to Barstow line.

Options Evaluation

- ❑ The three options, including the three variations for Option 3, were evaluated using the 2022 WFW summer peak case.
- ❑ Option 2 has unsolved contingency in N-1 analysis.
- ❑ Both Option 1 and Option 3 can resolve the reliability issues identified in the need analysis.
- ❑ Option 1 improved the overall loading in the transmission system from Barilla Junction to Rio Pecos while all three variations of option 3 still have certain line overloaded or loaded above 99%.

Options Evaluation

- ❑ Option 1 requires one mile of new right-of-way, and option 2 does not require new right-of-way.

- ❑ Based on the information provided in the TNMP submission, a few things to be noted for Option 3:
 - Option 3 requires the building of new substations close to some Oncor planned substations, and may not be consistent with Oncor's transmission plans in the area.

- ❑ ERCOT also evaluated option 1 with the 2019 Min case, and no reliability criteria violations were found.

ERCOT Recommendation

- ❑ ERCOT recommend option 1 as the preferred option:
 - Option 1 resolved the identified reliability issues.
 - Option 1 also improved the line loading in the transmission system from Barilla Junction to Rio Pecos.
 - Option 1 is consistent with other TSP's plans for the area.
 - Option 1 has minimal uncertainties in the cost estimate.

Next Steps

- ❑ ERCOT will make final recommendation to the TAC (September) and BOD (October).
- ❑ ERCOT will finalize the report by the end of August.

Questions?