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Tucson Electric Power  
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April 30, 2014 AZ CORP COMMISSION  
DOCKET CONTROL

Docket Control  
Arizona Corporation Commission  
1200 West Washington  
Phoenix, Arizona 85007

ORIGINAL

Re: Tucson Electric Power Company's Annual Summer Preparedness Report  
Decision No. 69680, Docket No. L-00000C-95-0084-00000

Enclosed please find Tucson Electric Power Company's ("TEP") annual summer preparedness report ("Report"). Since the last Report was filed, the UNSE 115kV line to Nogales was upgraded from 115kV to 138kV and its origination point was changed from the Western Nogales Substation to the TEP Vail Substation so references to the 115kV line to Nogales that appeared in previous year's reports now reference the 138kV line to Nogales. This Report documents the ability of TEP's Green Valley area 46 kV system to timely restore service to: a) all customers served from Green Valley Substation and Canoa Ranch Substation following outage of the 138 kV South to Green Valley line; b) applicable load of UNS Electric, Inc. ("UNS Electric") customers via the 46 kV tie from Canoa Substation to Kantor Substation for an outage of the UNS Electric 138 kV line to Nogales; and c) all TEP customers and applicable load of UNS Electric customers for the concurrent outage of the South to Green Valley 138 kV line and the UNS Electric 138 kV line to Nogales.

TEP is filing this report in accordance with Decision No. 69680 (July 6, 2007), Docket No. L-00000C-95-0084-00000, which modified the Certificate of Environmental Compatibility granted in Decision No. 59221 (August 8, 1995).

Since the last Report was filed, the 138 kV project between the Canoa Ranch and Duval CLEAR / Cyprus Sierrita Substations was completed in June 2013. TEP filed noticed of the completion of the project on June 27, 2013 in this docket. With the completion of this project, TEP has the ability to serve loads at Green Valley substation and Canoa Ranch substation from either of two 138kV lines from South Loop substation. Because of the completion of this project TEP will be asking for a waiver of the condition requiring an annual filing of a summer preparedness report.

If you have any questions regarding the report, please contact me at (520) 884-3680.

Sincerely,

Jessica Bryne  
Regulatory Services

Arizona Corporation Commission  
DOCKETED

APR 30 2014

cc: Compliance Section, ACC

DOCKETED BY



**Tucson Electric Power**

**2014 Green Valley and Kantor  
Substation Summer Preparedness**

**Prepared By:  
Tucson Electric Power Company**

**April 2014**

## **EXECUTIVE SUMMARY**

Transmission Planning for UNS Energy Corporation has evaluated the ability for existing transmission and sub-transmission facilities to serve load in the community of Green Valley and load served out of the Kantor substation in Santa Cruz County. As a result of evaluating contingencies involving an outage of TEP's 138 kV transmission, or UNS Electric, Inc.'s (UNSE) 138kV transmission, it has been determined that area transmission and distribution systems are able to adequately serve load in the areas supplied by the Green Valley and new Canoa Ranch substations (TEP) and Kantor substation (UNSE) for the 2014 summer peak load period. Future plans in the Green Valley area are included in the TEP and UNSE 10 Year Plans that were filed at the Arizona Corporation Commission (ACC) in January, 2014.

### **BACKGROUND**

#### **Green Valley**

Green Valley's power delivery needs are met by 138 kV transmission and 46 kV distribution circuits originating at TEP's South substation (Exhibit A). The Canoa Ranch-Duval Clear 138kV line has been completed, increasing the reliability for the load served out of Canoa Ranch and Green Valley Substations, by looping them together with South.

- Green Valley T3            138/13.8 kV, 50.0 MVA, 60.0 MVA Emergency
- Canoa Ranch T1            138/13.8 kV, 50.0 MVA, 60.0 MVA Emergency

The 46 kV system is comprised of two 46 kV distribution circuits, 46-C-550 (rated 49 MVA) and 46-C-552 (rated 49 MVA). The TEP transformers served by this distribution, and available to back-up loss of the 138 kV circuit, include:

#### **46-C-550**

- Green Valley T1            46/13.8 kV, 25.0 MVA, 30.0 MVA Emergency
- Green Valley T2            46/13.8 kV, 25.0 MVA, 30.0 MVA Emergency

#### **46-C-552**

- Canoa T1                    46/13.8 kV, 4.7 MVA, 5.6 MVA Emergency
- Cyprus Esparanza T2      46/13.8 kV, 14.4 MVA, 14.4 MVA Emergency (new since 2009)
- Raw Water Supply T3      46/13.8 kV, 9.4 MVA, 11.3 MVA Emergency

The two 46 kV transformers at Green Valley (T1 & T2) are used strictly as back-up and are not loaded under normal conditions.

#### **Kantor**

Kantor substation is one of four substations serving UNSE load in Santa Cruz County. This station is served by the 138 kV radial transmission line supplied by the TEP Vail substation. For loss of this line, the load at Kantor can be picked up via an existing 46 kV tie, 46C552, served from TEP's South substation. The rating of this 46 kV circuit is 49 MVA. The 46/13.2 kV transformer capacity at Kantor is 75.0 MVA. Expected load on 46C552 in 2014 is 28.4 MVA including the Kantor load of 6.4 MVA. Therefore the net 46 kV system capacity exceeds the projected peak demand both for the 46 kV line and the Kantor transformer.

## CONTINGENCY OPERATION

Green Valley – Table 1 below is no longer applicable with the completion of the Canoa Ranch – Duval Clear 138kV line. Green Valley and Canoa Ranch Substations can be picked up via South – Green Valley or South – Canoa Ranch 138kV lines. In the case of one of the 138kV lines being out of service, Green Valley still has the option of being backed up via the 46kV system and Canoa Ranch being picked up via one of the 138kV lines.

As seen in Table 1, there was adequate capacity on the underlying 46 kV system to back up load in Green Valley for loss of the South to Green Valley 138 kV radial transmission line in 2012. This is based on the fact that the load at the Green Valley substation was transferred to the 46 kV system via 46/13.8 kV transformation that exists at the station for this purpose. Load at the new Canoa Ranch substation was picked up via distribution ties back to the Green Valley substation. Now that Green Valley and Canoa Ranch are no longer radial from South, but looped from South, it is less likely that 46kV back-up would be required.

Substation	Rating	2012Load	Available Capacity to Support loss of 138kV <sup>1</sup>
Cyprus Esparanza Wells-T1 (mine)	3.1	0.5	N/A
Canoa-T2 (mine)	3.1	1.7	N/A
Cyprus Raw Water Booster-T1 (mine)	4.7	2.9	N/A
Cyprus Raw Water Supply-T1 (mine)	4.7	3.0	N/A
Green Valley-T1	25.0	0.0	25
Green Valley-T2	25.0	0.0	25
Canoa-T1	4.7	3.8	0.9
Cyprus Esparanza Wells-T2	14.4	12.2	2.2
Cyprus Raw Water Supply-T3	9.4	0.0	9.4
Total 46 kV Xfmr Capacity available to back up 138 kV			62.5
Total 138 kV Circuit Loading		69.7	57.6
46 kV Xfmr Capacity Margin			4.9

**Table 1: 46 kV Margin to Back-up Loss of Green Valley 138 kV**

The worst contingencies regarding the Green Valley area involve loss of one or both of the 345/138 kV transformers at the South substation. Neither the N-1, nor the N-2, contingency causes any overloads above the emergency rating on the remaining 138kV system. In addition, the N-1 contingency does not result in any elements becoming loaded above their continuous rating which indicates an ability to system adjust to achieve normal operating conditions in anticipation of additional outages. Table 2 demonstrates that there are no voltage violations greater than 5% for loss of one transformer or greater than 10% for loss of both transformers.

<sup>1</sup> Mine transformer excess capacity not considered by TEP.

Green Valley Area 138 kV Contingency Voltage Deviations						
	South		Green Valley		Canoa Ranch	
	V	delta V	V	delta V	V	delta V
<b>ALIS</b>	1.033	0.00%	1.027	0.00%	1.027	0.00%
<b>South-T1</b>	1.029	0.39%	1.023	0.39%	1.024	0.29%
<b>South-T1 + T2</b>	0.975	5.61%	0.967	5.84%	0.967	5.84%

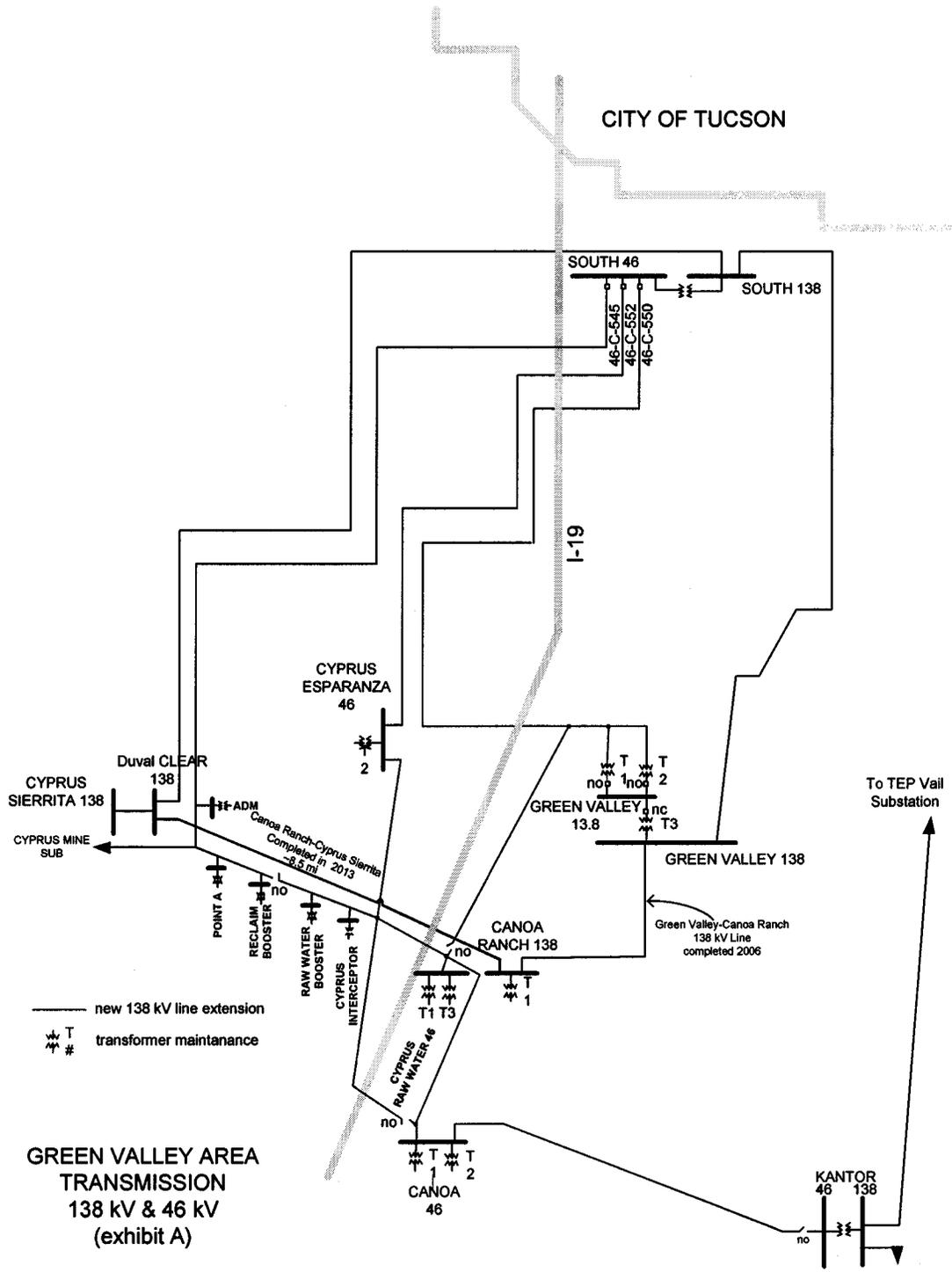
**Table 2: Green Valley Area 138 kV Contingency Voltage Deviations**

**Kantor**

The TEP 46 kV circuit 46C552, served from South substation, is used to back up the Kantor substation for loss of the 138 kV radial serving Santa Cruz county. The 46 kV circuit is rated at 49 MVA and also serves Cyprus Esparanza Wells, Canoa, Cyprus Raw Water Booster, and Cyprus Point A. The remaining capacity available after backing up Kantor is shown as "46C552 Margin" in the following table:

Substation	Rating	2013Load
Cyprus Esparanza Wells-T1 (mine)	3.1	.10
Canoa-T2 (mine)	3.1	1.7
Cyprus Raw Water Booster-T1 (mine)	4.7	2.5
Cyprus Raw Water Supply-T1 (mine)	4.7	2.8
Canoa-T1	4.7	3.4
Cyprus Esparanza Wells-T2	14.4	11.1
Cyprus Raw Water Supply-T3	9.4	0.0
Kantor	75.0	6.3
46C552 Line Load w/ Kantor	49	27.9
46C552 Line Margin		21.10

**Table 3: 46C552 kV Loading**



**GREEN VALLEY AREA TRANSMISSION**  
**138 kV & 46 kV**  
 (exhibit A)