FACILITY STUDY

For

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(> TEXT OMITTED <)

80 MW Generating Facility
Quay County, New Mexico
SPP #GEN-2001-036

December 16, 2003

Xcel Energy Services
Transmission Planning

Executive Summary

> TEXT OMITTED < (the “Customer”) requested the interconnection of a new wind energy generation facility (> TEXT OMITTED <) to the Xcel Energy 115kV transmission system in New Mexico. The new > TEXT OMITTED < generating facility will be located approximately ten miles east of the 115kV interconnection point to circuit V74. The > TEXT OMITTED < facility will consist of 80 Mitsubishi MWT-1000A wind turbines with a limited output of 1.0 MW each, for a nominal output of 80 MW.

Xcel Energy will construct a new 115kV switching station (Norton) to accommodate the nominal power output of this new wind generating facility into the transmission grid. The switching station will connect to the Xcel Energy 115kV transmission circuit V74, which is the radial transmission circuit between Campbell Street Substation and Curry County Interchange, connecting Tucumcari, NM to Clovis, NM. The switching station will include three circuit breakers in a ring bus configuration, with three 115kV transmission line terminals. The switching station, which will be owned and maintained by Xcel Energy, Inc, will include SCADA, revenue metering and complete system protection. Additional construction projects include new relays and carrier equipment compatible with that at the new switching station at Curry County Interchange and the upgrade of an existing road from Highway 278 to the Norton Switching Station. Inclusively, the motor-operated ground switch at Campbell Street sub will be replaced by a 115kV circuit switcher.

All work identified in this Facility Study has been estimated to be $ 2,535,195.00.

Construction Projects:
The estimated cost of the required projects for the interconnection of the > TEXT OMITTED < wind energy generating facility is summarized in the table below.

Table 1: Construction Projects Estimated Cost

Project	Description	Estimated Cost
1	Norton Switching Station.	$ 1,730,000.00
2	Communications.	$ 50,000.00
3	Curry County Interchange Relaying.	$ 97,000.00
4	Campbell Street Substation Upgrade.	$ 125,000.00
5	RTU At Wind Farm (Possible).	$ 50,000.00
6	Terminate circuit V74 into Norton.	$ 183,195.00
7	Right-Of-Way.	$ 300,000.00
	Total Cost:	$ 2,535,195.00

1. **Construction of 115kV Norton Switching Station:** See Appendix A for one-line diagram.

   1.1. **Location:** Xcel Energy will construct a new 115kV switching station at the interception point to the Xcel Energy transmission circuit V74, located approximately 15 miles south of Tucumcari, New Mexico.

   1.2. **Bus Design:** The bus design for this new switching station will be a ring-bus configuration with three 115kV line terminals, with the ultimate future configuration being a 3-string breaker and one-half configuration.

   1.3. **Line Terminals:** The 115kV line and static wire terminals will be designed to accommodate 2,000 pounds per phase conductor at maximum tension, with a maximum 15 degree pull off from normal.

   1.4. **Control House:** A control house approximately 12 feet by 20 feet will be installed to contain the metering, protection and control devices, terminal cabinets, and any fiber-optic cable terminations, etc.

   1.5. **Security Fence:** The switching station will have a chain-link fence with steel posts set in concrete and a rock yard surface.

   1.6. **Ground Grid:** A complete ground-grid will be installed per ANSI/IEEE STD 80-1986.

   1.7. **Site Grading:** Company contractor, per company specification, will perform initial site grading and erosion control of the interconnection facility. Soil compaction shall be not less that 95% of laboratory density as determined by ASTM-D-698.

   1.8. **Relay and Protection Scheme:** The Norton to Curry line relaying will be directional comparison blocking (DCB) over power line carrier with a Pulsar TC10B. A SEL 321-1 (DCB) and a SEL 311-C (step distance) will be used. A SEL 279H-2 relay will be used for reclosing and a SEL 501-0 will be used for breaker failure.

The Norton to Campbell Substation (Tucumcari) line relaying will be step distance. A SEL 321-1 and a SEL 311-C will be used. A SEL 279H-2 relay will be used for reclosing and a SEL 501-0 will be used for breaker failure.

The Norton to the Interconnection Customer owned line relaying will be step distance. A SEL 321-1 and a SEL 311-C will be used. A SEL 279H-2 relay will be installed; however there will not be any automatic reclosing. The SEL 279H-2 will be used for line/bus conditions and sync check along with supervisory closing of the breaker. A SEL 501-0 will be used for breaker failure.

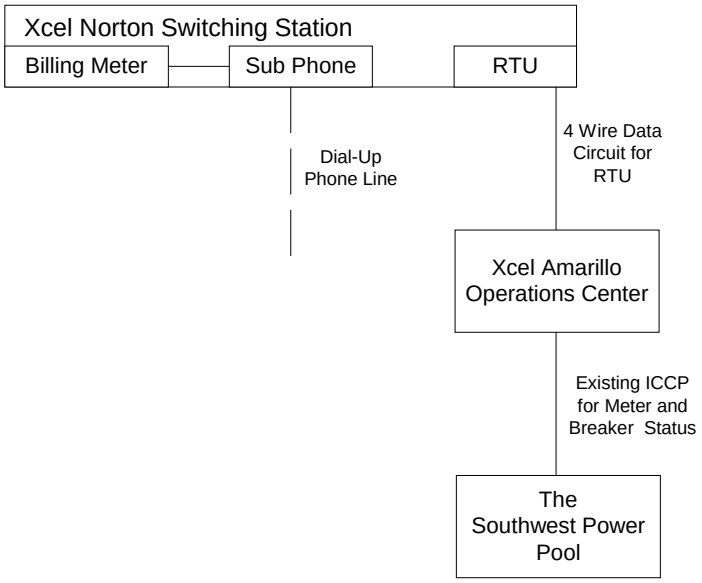
Two sets of 115 kV PTs will be installed on the north and south buses with disconnect switches. There will be a provision made for an automatic throw-over of the PTs. A manual transfer switch will be available for maintenance purposes.

On the Curry and Campbell line there will be single CCVT's for line conditions and the PLC on the Curry line. A line tuning unit and wave trap will also be installed for the PLC communications.

1.9. **Revenue Metering:** On the line to the Interconnection Customer's wind farm, billing meters will be installed along with a 115 kV metering unit (3 PTs and 3 CTs) for full 3 phase 4 wire metering. There will be two meters: one will be primary and the other will be back-up, each will have full 4 quadrant metering. Pulses out of the primary billing meter will be sent via SCADA to the Transmission Owner's Control Center in Amarillo, Texas.

- *The estimated cost for the Norton Switching Station is $ 1,730,000.00.*

2. Communications: A schematic outlining the proposed construction is provided below:



- *The estimated cost for the required communications is $ 50,000.00.*

3. Relay Upgrades at Curry County Interchange:

3.1. The existing relaying on breaker 4985 will be upgraded to a directional comparison blocking (DCB) over power line carrier.

- *The estimated cost to replace these relays is $ 97,000.00.*

4. Campbell Street Substation:

4.1. Xcel Energy will replace the existing ground switch and motor operator scheme presently in place at Campbell Street Substation in Tucumcari, New Mexico. The motor-operated ground switch will be replaced with a 115kV circuit switcher.

- *The estimated cost to upgrade the ground trip scheme is $ 125,000.00.*

5. RTU at Wind Farm:

5.1. If an RTU is required at the > TEXT OMITTED < wind farm, one will be installed.

- *The estimated cost for the installation is $ 50,000.00.*

6. Transmission Line:

6.1. **Circuit V74 Tap:** Xcel Energy will tap the existing transmission circuit V74 in and out of the new Xcel Energy 115kV switching station, and a temporary "shoo-fly" line will be built around Norton, to provide continuous electric service to the FEC-Tucumcari and Campbell Street Substations.

6.2. **115kV Line Terminations:** Xcel Energy will terminate all of its 115kV transmission circuits connecting to the new Xcel Energy switching station. *(The Customer is responsible for terminating its own 115kV transmission line from the wind farm to the 115kV terminal provided at the Norton Switching Station.)*

- *The estimated cost for the V74 transmission line re-termination is $ 183,195.00.*

7. Right-Of-Way:

7.1. **Switching Station Site:** Xcel Energy or assigned contractor will perform all necessary tasks associated with the procurement of real estate for the new Xcel Energy switching station, inclusive of land purchase, surveying, title search, etc.

7.2. **Permitting:** Xcel Energy will perform all tasks associated with permitting the new Norton switching station inclusive of Environmental, Biological, Archaeological and any other required study.

7.3. **Road:** Xcel Energy or assigned contractor will perform work required for the upgrading of an existing road that needs to be all-weather. Upgrades will be done on the road extending from Highway 278 to the Norton Switching Station.

- *The total estimated cost for all Right-Of-Way is $ 300,000.00.*

8. Construction Power and Distribution Service:

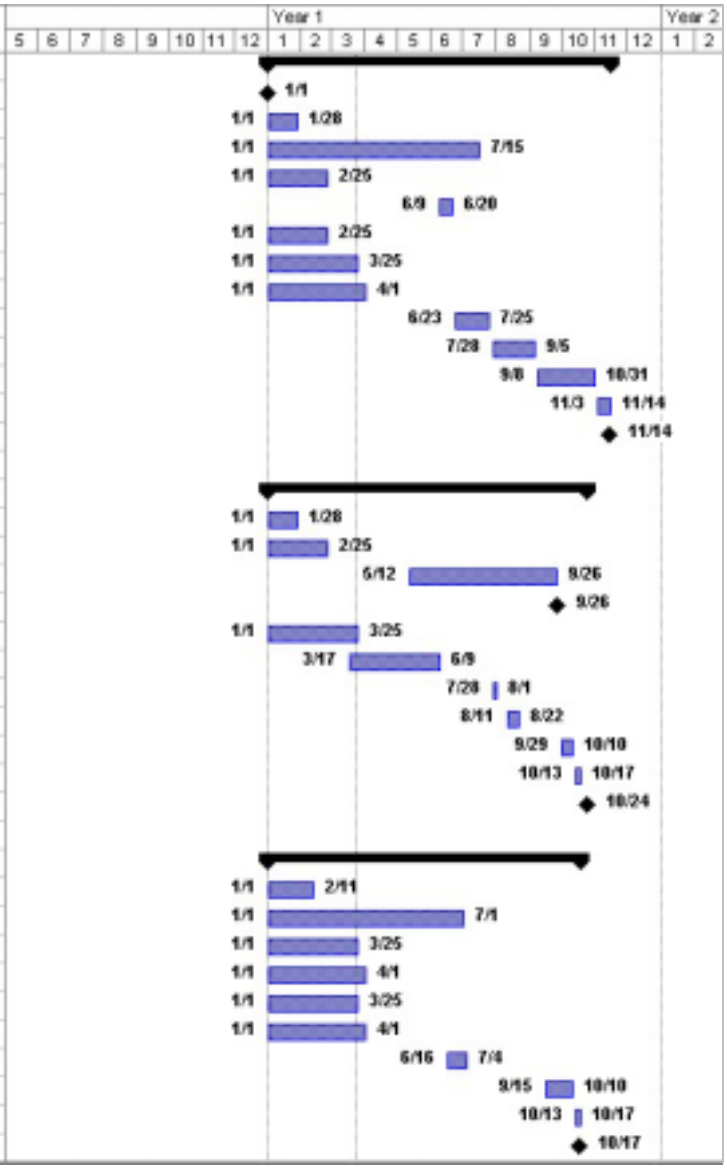
8.1. Construction and Station power, in addition to any distribution service required for the wind generating facility, are the sole responsibility of the Customer.

All additional cost for work not identified in this study is the sole responsibility of the Customer unless other arrangements are agreed upon.

Engineering and Construction Schedule:

It is anticipated that the switching station and all associated components will be constructed and ready to receive power from the Customer's Wind Farm at approximately 12 months from the day an interconnection agreement is signed, unless prior arrangements have been made. This is the earliest Xcel Energy can initiate the project due to other scheduling considerations. An Engineering and Construction schedule is shown below:

ID	Task Name	Duration
1	**Substation Project**	**228 days**
2	Signed Agreement	1 day
3	Preliminary Engineering & material commitment	4 wks
4	Material Delivery	28 wks
5	Land Acquisition	8 wks
6	Survey substation	2 wks
7	Foundation design complete	8 wks
8	Final Engineering - Drawing Revisions - Draftir	12 wks
9	Manifest Construction Drawings	13 wks
10	Complete Final Grading	5 wks
11	Foundation work and Fencing	6 wks
12	Complete steel, bus work & wiring	8 wks
13	Final station testing and inspection	2 wks
14	Completion of Substation	1 day
15		
16	**Transmission Project**	**213 days**
17	Preliminary Engineering	4 wks
18	Design Line	8 wks
19	Order Material	20 wks
20	Material Delivery	1 day
21	Final Engineering	12 wks
22	Manifest Construction Drawings	61 days
23	Complete Survey	1 wk
24	Foundations Completed	2 wks
25	Structures installed	2 wks
26	Wire work	1 wk
27	Completion of Transmission Work	1 day
28		
29	**Replace Relays at Curry & Tuc sub work**	**288 days**
30	Preliminary Engineering & Material Commitment	6 wks
31	Material Delivery	26 wks
32	Final Engineering	12 wks
33	Manifest Construction Drawings	13 wks
34	Foundation design complete	12 wks
35	Final Engineering-Drawing rev. & Drafting	13 wks
36	Replace relay panels and rewire Curry Co.	3 wks
37	Tucumcari Circuit Switcher Project	4 wks
38	Final Testing and Inspection Completed	1 wk
39	Complete projects	1 day



Appendix A

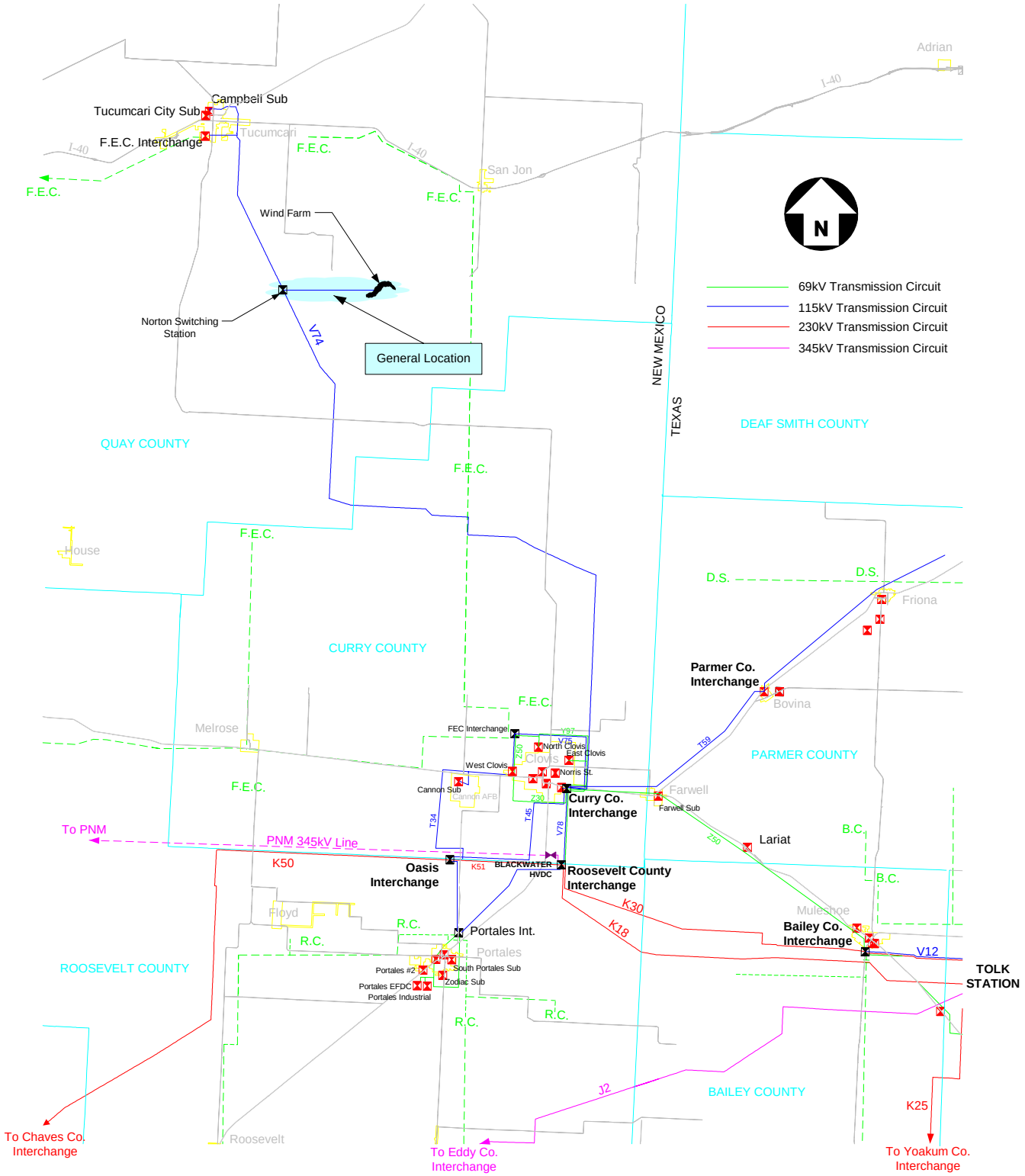


Figure A-1. Local Transmission System

NORTON SWITCHING STATION 115kV

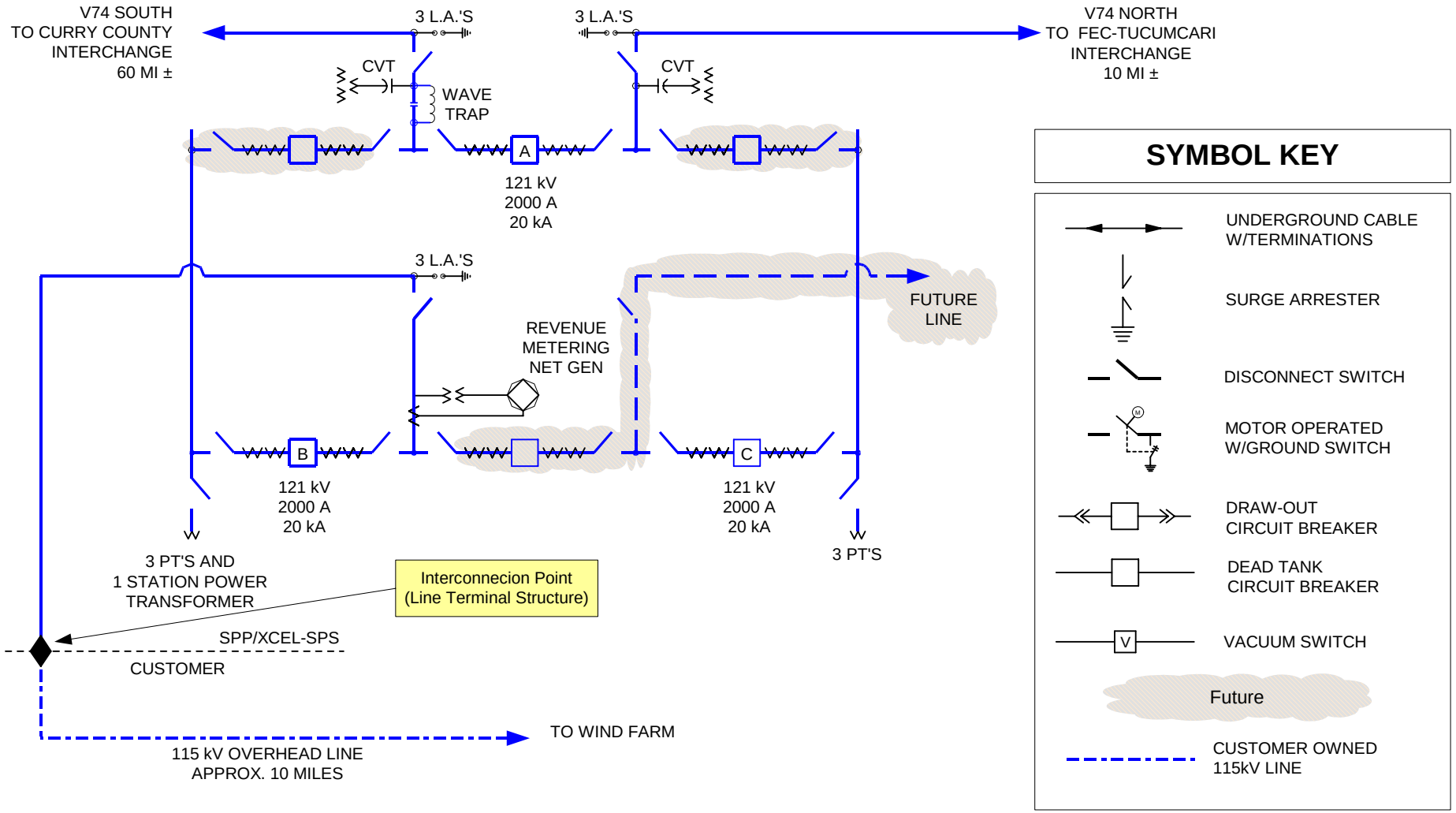


Figure A-2. One-line Diagram of Norton Switching Station