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Feasibility Study Report for PSCo OASIS Request # GI-2004-2

Generation Interconnection Request for a 238 MW Wind Generation Facility Expansion of Colorado Green Wind Farm

Xcel Energy Transmission Planning
May 28, 2004

Executive Summary

Public Service Company of Colorado (PSCo) Transmission received a generation interconnection request to determine the feasibility of interconnecting an additional 238 MW of new Customer owned wind turbine generation to the Colorado Green Wind Farm. The point of interconnection to the PSCo transmission system is at the PSCo Lamar 230 kV substation bus. The Customer proposed commercial operation date is September 30, 2005.

The Customer requested that the Interconnection Feasibility Study consider the generation as both an ER (Energy Resource) and an NR (Network Resource). The ER portion of this study determined that the customer could provide approximately **0 MW** of energy before network reinforcements for delivery would be required; however, non-firm capacity may occasionally be available depending upon the status and flow direction of the Lamar HVDC Link.

There are no interconnection costs associated with the expansion of the existing Colorado Green Wind Farm to the PSCo system. The Customer has proposed to utilize the Customer owned existing 44-mile 230kV transmission line from the Colorado Green Wind Farm to the PSCo Lamar substation. Modifications to the PSCo Lamar substation are not required to accommodate the additional generation. It is assumed that the Customer will engineer, permit, construct, and pay for their 7 mile 230 kV transmission line that will interconnect the expansion facilities to the existing Colorado Green Substation.

To accommodate a NR request, transmission infrastructure additions are required. Based on estimated permitting, engineering, and construction time lines, a NR request cannot be met by the Customer requested date of September 30, 2005.

As a NR request, PSCo evaluated the network upgrades requirements to deliver the full 238 MW increase of the wind facility to PSCo native load customers (400 MW total from Colorado Green). The time required to engineer, permit, and construct these PSCo facilities is at least **54** months from the execution of the Large Generator Interconnection Agreement. The cost of the network upgrades is estimated to be \$ 117,474,000 including the advancement of approximately \$21,000,000 identified in the System Impact Study for

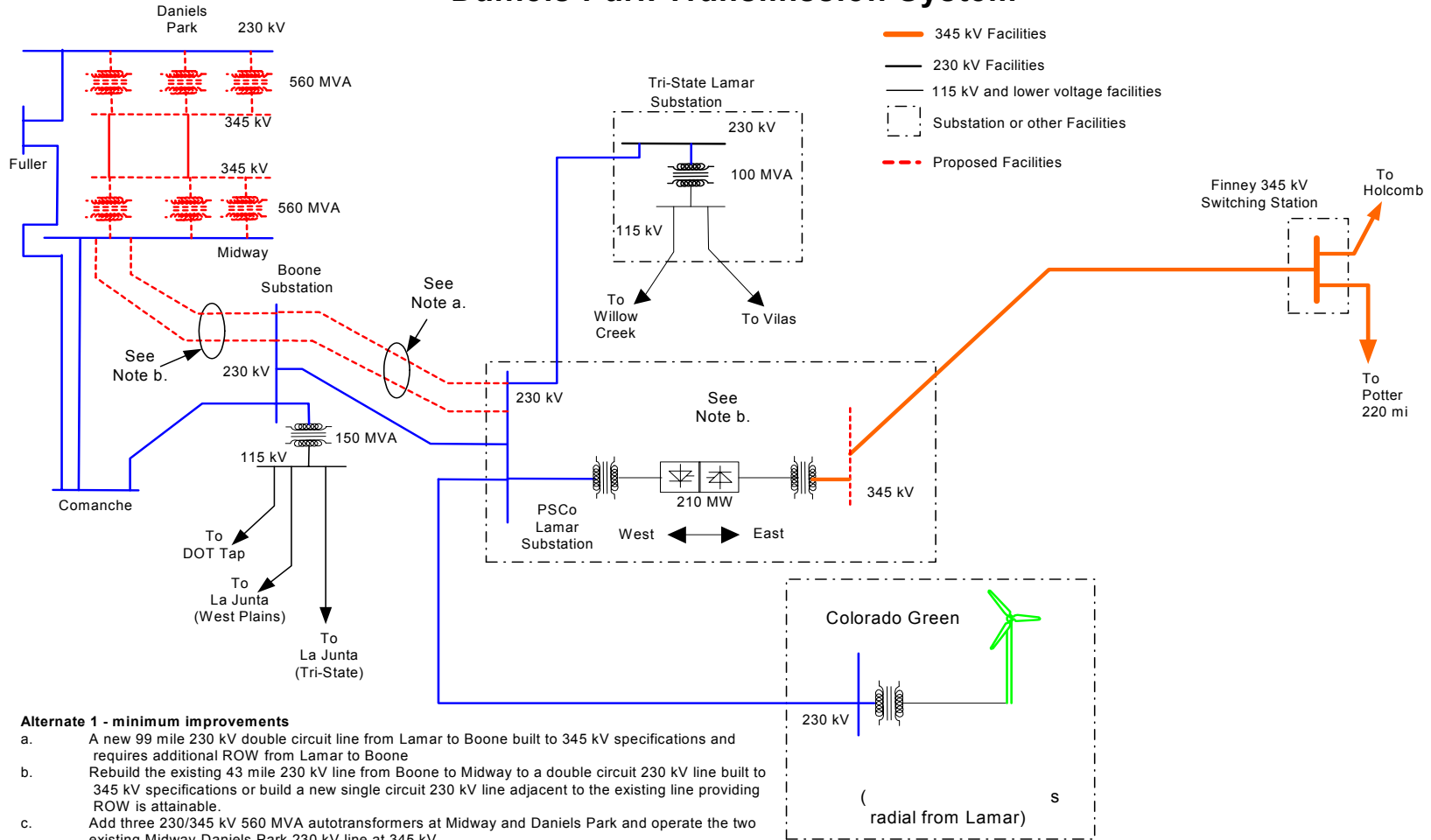
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GI-2003-3. The cost responsibilities associated with these PSCo facilities, if constructed, would be handled as per applicable FERC policies.

A diagram of the system upgrades is shown below in Figure 1.

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Figure 1: Single line diagram of the Finney to Daniels Park Transmission System



Alternate 1 - minimum improvements

- a. A new 99 mile 230 kV double circuit line from Lamar to Boone built to 345 kV specifications and requires additional ROW from Lamar to Boone
- b. Rebuild the existing 43 mile 230 kV line from Boone to Midway to a double circuit 230 kV line built to 345 kV specifications or build a new single circuit 230 kV line adjacent to the existing line providing ROW is attainable.
- c. Add three 230/345 kV 560 MVA autotransformers at Midway and Daniels Park and operate the two existing Midway-Daniels Park 230 kV line at 345 kV.
- d. Substation expansion at Boone, Midway, Daniels Park, and Lamar.

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Power flow studies show that the 238 MW injection increase into the PSCo system will create a number of contingency overloads on the PSCo system and neighboring systems thus network upgrades are required to relieve these problems. See Appendix A for the contingency output results. These upgrades consist of constructing a new 99 mile double circuit 230 kV line, 345 kV capable from Lamar to Boone; constructing a new 43 mile single circuit 230 kV line from Boone to Midway; installing three (3) 560 MVA 345/230 kV auto transformers at Midway and Daniels Park substations; and finally, operating the two Midway to Daniels Park transmission lines at 345 kV.

This study also examined the impacts of generator interconnection requests that have a higher queued interconnection request and found that at this time, the 238 MW expansion of Colorado Green would not adversely impact the transmission plans for those requests or require any additional infrastructure.

Impacts on the neighboring utilities were monitored, and were partially addressed in the scope of this study. Should the Customer continue this request and move on to the System Impact Study, all impacts on the PSCo system and Affected Utilities' systems will be further addressed. Further studies would also include participation from these utilities.

Introduction

PSCo Transmission received this large generator interconnection request (GI-2004-2) on February 9, 2004, to interconnect one hundred fifty-nine (159) 1.5 MW, GE doubly fed induction generator (DFIG) wind turbines, for a total of 238 MW generation, with a commercial operation date of September 30, 2005. The proposed wind farm expansion would be located near the existing Colorado Green Wind Farm south of Lamar, Colorado and would interconnect into the PSCo transmission system via the customer's 44 mile radial 230 kV line terminating at the PSCo Lamar Substation. This expansion would result in a total wind farm capacity of 400 MW. The customer has requested that this Project be evaluated as a Network Resource (NR) and an Energy Resource (ER) with the energy going to PSCo customers.

Study Scope and Analysis

The Interconnection Feasibility Study evaluated the feasibility of the proposed interconnection to the PSCo Transmission System. As per section 6.2 of the FERC LGIP, the Study considered the Base Case as well as all Generating Facilities (and with respect to (iii), any identified Network Upgrades) that, on the date the Interconnection Feasibility Study is commenced:

- (i) are directly interconnected to the Transmission System;
- (ii) are interconnected to Affected Systems and may have an impact on the Interconnection Request;

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- (iii) that have a pending higher queued Interconnection Request to interconnect to the Transmission System; and
- (iv) have no Queue Position but have executed an LGIA or requested that an unexecuted LGIA be filed with FERC.

The Study consisted of power flow and short circuit analyses. The power flow analysis provided a preliminary identification of any thermal or voltage limit violations resulting from the interconnection, and for the NR request, a preliminary identification of network upgrades required to deliver the proposed generation. The short circuit analysis provided a preliminary identification of any circuit breaker short circuit capability limits exceeded as a result of the Interconnection and for a NR request, the delivery of the proposed generation.

PSCo adheres to NERC / WECC Reliability Criteria, as well as internal Company criteria for planning studies. During system intact conditions, criteria are to maintain transmission system bus voltages between 0.95 and 1.05 per-unit of system nominal / normal conditions, and steady state power flows within 1.0 per-unit of all elements thermal (continuous current or MVA) ratings. Operationally, PSCo tries to maintain a transmission system voltage profile ranging from 1.02 per-unit or higher at generation buses, to 1.0 per-unit or higher at transmission load buses. Following a single contingency element outage, transmission system steady state bus voltages must remain within 0.90 per-unit to 1.10 per-unit, and power flows within 1.0 per-unit of the elements continuous thermal ratings.

Power Flow Study Models:

The power flow study models were created from the Western Electricity Coordinating Council (WECC) 2004 Heavy Summer Case Operating case. To evaluate the impact of this request on those ahead in the PSCo Interconnection Queue (See Appendix C), another set of load flow cases were used that were based on the WECC 2008 Heavy Summer case. This study included a comprehensive analysis of the impacts to the neighboring transmission systems.

As an NR request, the proposed generation was scheduled to the Denver Metro Area by adjusting (reducing) Denver Metro Area units.

At this Feasibility Study stage, the 238 MW wind farm was modeled as two (2) 119 MW conventional generators with a 0.95 pu lag power factor and a 0.9 pu lead power factor (+0.95/-0.90) capability (+40/-58 MVAR) to simulate the VAR capabilities of the generators. The modeling was based on the assumption that Customer will be using the General Electric (GE) 1.5 MW DFIG turbines that will have power factor and voltage control capability, as proposed and stated in their request.

As previously stated, the Customer to PSCo point of interconnection (POI) will be located at PSCo's Lamar 230 kV switch yard, terminating the Customer's 44 mile radial 230 kV line constructed from the Customer's wind turbine generation facility collector site to the PSCo Lamar Substation. The customer has supplied the 230/34.5 kV step-up transformer

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impedances along with the impedance of the 7 mile 230 kV line from the expansion collector site to the Colorado Green Substation.

Power Flow Study Results and Conclusions**Energy Resource (ER) Study Results:**

The ER results were determined by using the GE PSLF load flow program, which showed that the system as planned in 2006 does **not** have any available transmission capacity. This determination is based upon the area transmission system having only one (1) transmission line from Boone to Lamar coupled with the fact that the existing generation in the Lamar area has scheduled the available PSCo capacity; however, non-firm capacity maybe available from time to time depending upon the status and flow direction of the Lamar HVDC Link.

Network Resource (NR) Study Results:

The NR study determined the network upgrades that will be required to accept the full 238 MW expansion from the Colorado Green Wind Farm. Appendix A at the end of this document shows the PSLF single contingency analysis study results that determine the need for infrastructure. The studies simulated maximum injections into Lamar substation, including a full 210 MW east to west schedule over the Lamar DC tie along with 400 MW from Colorado Green. A loss of the Lamar to Boone 230kV line results in overloading of the Tri-State 230/115 kV autotransformer. Current operating procedures for the loss of the Boone to Lamar 230 kV line are:

- 1) the existing Colorado Green Wind Farm will trip off and stay off-line and
- 2 the Lamar HVDC tie will perform a fast power order reduction to zero (MW) and control the Lamar 230 kV bus voltage.

The addition of just one transmission line from Lamar to Boone will not eliminate all N-1 overload violations. If the new line is lost for an extended period of time, power reductions in either the Lamar HVDC Tie or the Colorado Green Wind Farm will be required. A third line from Lamar to Boone is required to handle all the power transfers and not impose the underlying 115 and 69 kV neighboring systems to undue stresses.

Also, transmission capacity from Boone to Denver is currently limited and any additional schedules result in the need for additional transmission. Outages in the Comanche and Midway area result in thermal overloads on Aquila and Colorado Springs Utilities (CSU) systems up to 125 percent of some equipment ratings. Constructing a new 230 kV line from Boone to Midway takes care of problems on the Aquila transmission system as the result of the Colorado Green Expansion. An outage of a 230 kV line from Midway to Daniels Park overloads parts of the CSU system. Upgrading the two (2) 230 kV lines from Midway to Daniels Park to 345 kV operation removes the impacts of the Colorado Green expansion on the CSU transmission

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system. This will require adding autotransformers at both Midway and Daniels Park and constructing 345 kV switchyards at these substations.

These transmission upgrades include:

- constructing a new double circuit 230 kV line, 345 kV capable from Lamar to Boone,
- constructing a new single circuit 230 kV line from Boone to Midway,
- installing three (3) 345/230 kV auto transformers at Midway and Daniels Park,
- and finally operating the two Midway to Daniels Park transmission lines at 345 kV.

Figure 1 previously showed a system one-line of the required system upgrades. Appendix B shows the one-line diagrams of the substations and their required changes.

Even though this option to deliver the Lamar energy is recommended in this study, additional studies may determine other options.

To consider the impact of this request on all other generator requests ahead in the PSCo Interconnection queue, this study examined the required infrastructure associated with those requests. Appendix C shows the generator requests ahead of this one. The results of examining all the earlier queued requests show that 238 MW Colorado Green expansion will not force any infrastructure changes or requirements as the results of generation scheduled ahead of this request regardless of the in-service date.

Short Circuit Study Results

The short circuit analysis at the Lamar Substation consisted of faulting the 230kV bus at Lamar, Boone, and Colorado Green with three-phase and phase to ground faults. The customer and the proposed turbine manufacturer supplied short-circuit data required to complete the short circuit studies. The tables below show the results of the short circuit study. The results are given at 1, 3, and 6 cycles, with 6 cycles being typical circuit breaker interrupting time and the current required for a circuit breaker to interrupt.

Table 1 – Short Circuit Results (kA) with the Current Colorado Green Facilities

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Fault	Description	Fault Current (kA, RMS)			Status	
		1 cycle	3 cycles	6 cycles	CGI	DC Link
1	LLLG Fault at Lamar 230	2.12	1.77	1.45	Trip	Blocked
2	LLLG Fault at Boone 230	8.13	7.25	7.25	Trip	0 Power
3	LLLG Fault at Colorado Green 230	1.41	1.23	1.23	Trip	0 Power
4	LLLG Fault at Lamar 115	2.5	2.3	2.5	Trip	0 Power
5	LLLG Fault at Boone 115	7.8	7.9	7.6	Trip	Voltage Control (High Q)
6	SLG Fault at Lamar 230	2.7	3.4	2.7	Delayed Trip	Low PQ
7	SLG Fault at Boone 230	7.1	7.4	7.1	No Trip	Voltage Control (High Q)
8	SLG Fault at Colorado Green 230	1.23	1.8	1.52	No Trip	Voltage Control (High Q)
9	SLG Fault at Lamar 115	3.3	4.4	4.1	No Trip	Voltage Control (High Q)
10	SLG Fault at Boone 115	7.2	8.1	7.4	No Trip	Voltage Control (High Q)

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Table 2 - Short Circuit Results (kA) with the 238 MW Colorado Green Expansion Using the GE 1.5 MW Turbines with Low Voltage Ride Through (LVRT) Capability

Fault	Description	Fault Current (kA, RMS)			Status		
		1 cycle	3 cycles	6 cycles	CG I	CG II	DC Link
1	LLLG Fault at Lamar 230	4.9	3.7	3.7	Trip	No Trip	Blocked
2	LLLG Fault at Boone 230	10.6	9.5	9.9	Trip	No Trip	0 Power
3	LLLG Fault at Colorado Green 230	2.3	1.8	1.3	Trip	No Trip	Low Power, Voltage Control
4	LLLG Fault at Lamar 115	3.9	4.1	3.2	Trip	No Trip	Low Power, Voltage Control
5	LLLG Fault at Boone 115	8.1	8.0	7.6	Trip	No Trip	High Q, Voltage Control
6	SLG Fault at Lamar 230	4.9	5.3	4.2	Trip	No Trip	Low Power
7	SLG Fault at Boone 230	9.9	9.8	9.4	Trip	No Trip	Low Power
8	SLG Fault at Colorado Green 230	2.8	2.7	2.8	Trip	No Trip	High Q, Voltage Control
9	SLG Fault at Lamar 115	4.6	5.1	4.9	No Trip	No Trip	High Q, Voltage Control
10	SLG Fault at Boone 115	7.8	8.5	8.0	No Trip	No Trip	High Q, Voltage Control

Note that the fault currents in Table 2 also include the impacts of the additional infrastructure to deliver the requested expansion.

Table 3 – Fault Current Contribution (kA) from the Colorado Green 238 MW Expansion for Faults at Lamar 230 kV Bus

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PSCAD Short Circuit Study for Colorado Green II Wind Farm May 19, 2004

Case	Fault	Description	+ve Sequence 60 Hz Short Circuit Currents at 6 cycles (from Fourier Analysis) kA, RMS / Degrees				
			Into the Fault	From Boone 230 Line	From CG 230 Line	From Auto Transformer	From DC
1 (base case without network upgrades)	1	LLLG Fault at Lamar 230	1.316 ∠-20.6	1.402 ∠-26.6	0.4767 ∠143.7	0.3745 ∠-15.1	0.0121 ∠0.0
	6	SLG Fault at Lamar 230	2.526 ∠-4.5	1.315 ∠-28.5	0.6812 ∠62.45	0.4213 ∠-14.9	*0.6437 ∠-1.935
2 (CG II Added with network upgrades)	1	LLLG Fault at Lamar 230	3.409 ∠-42.2	3.792 ∠-28.9	1.116 ∠195.8	0.3323 ∠-19.1	0.0086 ∠0.0
	6	SLG Fault at Lamar 230	4.170 ∠-15.5	3.516 ∠-29.8	1.152 ∠103.0	0.4015 ∠-20.2	*0.9118 ∠-17.4

**DC Current is still in a transient mode, causing fluctuations in FFT measurements*

Table 4 – Fault Current Contribution (kA) from the Colorado Green 238 MW Expansion for Faults at Colorado Green 230 kV Bus

Case	Fault	Description	+ve Sequence 60 Hz Short Circuit Currents at 6 cycles (from Fourier Analysis) kA, RMS / Degrees				
			Into the Fault	From Lamar 230 Line	From CGI Wind Farm 1	From CGI Wind Farm 2	From CGII 230 Line
1 (base case without network upgrades)	3	LLLG Fault at Colorado Green 230	1.049 ∠-15.6	1.238 ∠-25.3	0.2154 ∠112.8	0.0703 ∠103.8	n/a
	8	SLG Fault at Colorado Green 230	1.472 ∠9.0	1.107 ∠-18.4	0.3609 ∠56.0	0.3644 ∠55.4	n/a
2 (CG II added with network upgrades)	3	LLLG Fault at Colorado Green 230	1.280 ∠-14.2	2.034 ∠-28.5	0.2171 ∠112.4	0.1330 ∠100.7	0.5519 ∠140.8
	8	SLG Fault at Colorado Green 230	2.773 ∠11.6	1.879 ∠-31.2	0.3405 ∠63.4	0.3420 ∠62.8	1.256 ∠50.4

As shown in the tables, the Colorado Green Wind Farm will contribute minimal current to the total fault current at Lamar, but not enough to exceed any of the 40 kA circuit breaker fault duty interrupting capabilities. Also the fault currents in tables 1 and 2 are slightly higher than in tables 3 and 4 since tables 1 and 2 are based on the highest instantaneous value on any phase (converted to RMS) as opposed to positive sequence fundamental frequency components of the current as shown in tables 3 and 4.

Costs Estimates and Assumptions:

To provide delivery for the Customer requested generation at the PSCo Lamar substation; network upgrades must be made on the PSCo transmission system. As stated earlier, there are no costs associated with the Interconnection and 0 MW of delivery.

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The estimated indicative total cost for the PSCo network upgrades for 238 MW of delivery is:

\$117,470,000

The estimated cost shown is an “indicative” (+/-30%) preliminary budgetary cost in 2004 dollars and is based upon typical construction costs for previously performed similar construction. These estimated costs include all applicable labor and overheads associated with the engineering, design, and construction of these new PSCo facilities. This estimate does not include any costs for any Customer-owned, supplied, and installed equipment and associated design and engineering. This estimate also does not include any costs that may, or may not be required for other entities’ systems because this study did not find any requirements for any Affected Systems as the results of the 238 MW generation increase at Colorado Green.

The following lists the improvements required to accommodate the interconnection and the delivery of the proposed 238 MW increase of the existing Colorado Green facility. The cost responsibilities associated with these facilities, if constructed, would be handled as per applicable FERC policies.

Further interaction of the new wind turbines with the Lamar HVDC link during fault and steady state conditions will be addressed as part of the System Impact Study. Additional studies may define other alternatives.

System Improvements (subject to change upon more detailed analysis):

PSCo Network Upgrades required to deliver the proposed 238 MW increase from Colorado Green as an NR Request

	Description	Cost
Lamar	Two new 230 kV Line terminals to Boone requiring the following equipment: <ul style="list-style-type: none"> • six (6) 2000 Amp, 40 kA circuit breakers • ten (10) 230 kV switches • Associated steel • Electrical bus work • Associated metering, control, and relaying (See One-line in Appendix B)	\$2,543,000

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	Description	Cost
Boone Substation	<p>Three (3) new 230 kV 2000 Amp Line Terminals; two to Lamar and one to Midway. The following equipment will be required:</p> <ul style="list-style-type: none"> • five (5) 2000 Amp, 40 kA circuit breakers • eight (8) 230 kV switches • Misc. supporting steel • Electrical bus work • Associated metering control and relaying <p>(See One-line in Appendix B)</p>	\$ 2,674,000
Midway Substation	<p>One 230 kV line terminal for the new Boone Line; three (3) 345/230 kV 560 MVA autotransformers, two 345 kV line terminations all of which includes the following:</p> <ul style="list-style-type: none"> • six (6) 2000 Amp, 40 kA, 230 kV circuit breakers • ten (10) 230 kV switches • eight (8) 3000 Amp, 50 kA, 345 kV circuit breakers • fourteen (14) 345 kV switches • Misc. supporting steel • Electrical bus work • Associated metering, control, and relaying <p>(See One-line in Appendix B)</p>	\$16,984,000
Daniels Park Substation	<p>Three (3) 345/230 kV 560 MVA autotransformers, two 345 kV line terminations all of which includes the following:</p> <ul style="list-style-type: none"> • six (6) 2000 Amp, 40 kA, 230 kV circuit breakers • ten (10) 230 kV switches • eight (8) 3000 Amp, 50 kA, 345 kV circuit breakers • fourteen (14) 345 kV switches • Misc. supporting steel • Electrical bus work • Associated metering, control, and 	\$21,046,000

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	Description	Cost
	relaying (See One-line in Appendix B)	
Transmission	Construct a new double circuit 230 kV line, 345 kV capable from Lamar to Boone requiring new ROW	\$52,357,000
	One new 230 kV line from Boone to Midway requiring new ROW.	\$21,870,000
	TOTAL COST	\$117,474,000

Assumptions:

Substations

- PSCo (or its contractor) crews will perform all construction and wiring associated with PSCo-owned and maintained equipment.
- Siting, permitting and land acquisition is included in the substation estimates
- Detailed field investigations have not been conducted and could increase these estimates.
- No screening has been estimated at any of the substations. If this is required the cost will be significant at each location.
- The estimated time for design and construction for the PSCo network upgrades is at least 56 months after authorization to proceed has been received, and based upon other identified assumptions for Siting and Land Rights, and Transmission (see below). If there are problems with local and state approvals, this could require an additional year.

Transmission Engineering and Line Construction:

- Any NEPA requirements imposed on transmission as a result of the generation addition will most likely have adverse effects on schedule and deliverables.
- Detailed field investigations have not been conducted and could increase these estimates.
- New transmission ROW is assumed to be adjacent to the existing transmission lines.

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- All necessary transmission line outages can be obtained. If not, construction duration times will be longer.

Siting and Land Rights:

- New transmission ROW is adjacent existing transmission lines.
- Colorado State Land board issues will need to be addressed in future studies.
- Siting, Permitting, and Land Acquisition costs are covered in the Transmission and Substation Costs for each Item above.
- Permitting the new double circuit 345kV trans line from Midway to Daniels Park will be difficult and could require legal action.

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APPENDIX A

Contingency Results

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2006 CASE COMPARISON OUTAGE LIST

FROM BUS #	NAME	KV	ZONE	TO BUS #	NAME	KV	CKT #	CASE																	Contingency							
								RATING MVA	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	CONT LOAD	FROM BUS #	NAME	KV	TO BUS #
70306	P P MINE	69	712	70451	VICTOR	69	1	41	312%	312%	312%	312%	312%	312%	312%	312%	312%	312%	312%	312%	312%	312%	312%	312%	70085	CANONCTY	69	70294	NCANON W	69		
70336	PUEB-TAP	115	704	70456	W.STATON	115	1	77	226%	<90%	230%	233%	235%	235%	232%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%		
70336	PUEB-TAP	115	704	70412	STEM BCH	115	1	77	215%	<90%	220%	224%	224%	224%	221%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70122	COMANCHE	230	70459	WALSENBG	230		
70130	CRPLE CK	69	712	70306	P P MINE	69	1	41	196%	196%	196%	196%	196%	196%	196%	196%	196%	196%	196%	196%	196%	196%	196%	196%	70085	CANONCTY	69	70294	NCANON W	69		
70085	CANONCTY	69	712	70371	S CANONW	69	1	59.8	163%	163%	163%	163%	163%	163%	163%	163%	163%	163%	163%	163%	163%	163%	163%	163%	70086	CANONCTY	115	70085	CANONCTY	69		
70366	ROCKYFRD	69	712	70372	S FWL TP	69	1	23.9	158%	159%	159%	170%	166%	157%	156%	158%	156%	155%	157%	167%	165%	165%	159%	160%	161%	70060	BOONE	115	70249	LAJUNTAW	115	
70353	READER	69	712	70352	READER	115	1	47	153%	154%	154%	155%	155%	101%	153%	154%	153%	153%	151%	152%	152%	152%	153%	153%	154%	70353	READER	69	70352	READER	115	
70353	READER	69	712	70352	READER	115	2	47	153%	154%	154%	155%	155%	101%	153%	154%	153%	153%	151%	152%	152%	152%	153%	153%	154%	70353	READER	69	70352	READER	115	
70054	BMONT TP	69	712	70455	W.STATON	69	1	47.8	130%	130%	130%	130%	130%	<90%	129%	130%	129%	129%	130%	129%	129%	129%	130%	130%	70042	ASPEN TP	69	70051	BLENDE	69		
70250	LAJUNTAW	69	712	70249	LAJUNTAW	115	1	25	120%	119%	119%	118%	119%	<90%	120%	119%	120%	120%	118%	118%	118%	118%	119%	119%	70062	BOONE	69	70063	BOONE TP	69		
70042	ASPEN TP	69	712	70051	BLENDE	69	1	47.8	119%	119%	119%	119%	119%	<90%	119%	119%	119%	119%	119%	119%	119%	119%	119%	119%	70054	BMONT TP	69	70305	OVERTON	69		
70085	CANONCTY	69	712	70294	NCANON W	69	1	41	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	70086	CANONCTY	115	70085	CANONCTY	69		
70062	BOONE	69	712	70060	BOONE	115	1	33	115%	115%	115%	120%	118%	114%	114%	114%	114%	113%	114%	119%	119%	118%	115%	116%	116%	70060	BOONE	115	70249	LAJUNTAW	115	
70236	HYDEPARK	115	712	70339	PUEBLO	115	1	119	111%	<90%	117%	124%	125%	125%	110%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70122	COMANCHE	230	70459	WALSENBG	230	
70049	BELMONT	69	712	70305	OVERTON	69	1	47.8	109%	109%	109%	109%	109%	<90%	109%	109%	109%	108%	108%	109%	109%	109%	109%	109%	70042	ASPEN TP	69	70051	BLENDE	69		
70062	BOONE	69	712	70063	BOONE TP	69	1	35.9	109%	109%	DNS	116%	114%	108%	107%	108%	107%	107%	108%	115%	114%	113%	109%	110%	110%	70060	BOONE	115	70249	LAJUNTAW	115	
70236	HYDEPARK	115	712	70456	W.STATON	115	1	119	105%	105%	111%	119%	119%	119%	105%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70122	COMANCHE	230	70459	WALSENBG	230		
70285	MIDWAYPS	115	704	70456	W.STATON	115	1	79.7	102%	102%	103%	102%	102%	102%	106%	93%	101%	98%	91%	91%	91%	91%	90%	92%	93%	92%	70121	COMANCHE	115	70352	READER	115
70456	W.STATON	115	712	70455	W.STATON	69	1	42	97%	97%	95%	97%	97%	<90%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	70042	ASPEN TP	69	70051	BLENDE	69	
70456	W.STATON	115	712	70455	W.STATON	69	2	42	95%	95%	95%	95%	95%	<90%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	70042	ASPEN TP	69	70051	BLENDE	69	

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70054	BMONT TP	69	712	70305	OVERTON	69	1	66	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	70042	ASPEN TP	69	70051	BLENDE	69			
70060	BOONE	115	712	70159	DOT TAP	115	1	99.6	<90%	92%	<90%	116%	117%	117%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70061	BOONE	230	70286	MIDWAYPS	230			
70022	APT TAP2	115	712	70159	DOT TAP	115	1	102.6	<90%	<90%	DNS	109%	110%	110%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70061	BOONE	230	70286	MIDWAYPS	230			
70236	HYDEPARK	115	712	70339	PUEBLO	115	1	119	<90%	91%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70352	READER	115	70456	W.STATION	115			
70022	APT TAP2	115	712	70549	APT MEM	115	1	114.9	<90%	<90%	DNS	97%	98%	98%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70061	BOONE	230	70286	MIDWAYPS	230			
70030	APT PARK	115	712	70549	APT MEM	115	1	102.9	<90%	<90%	DNS	96%	97%	97%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70061	BOONE	230	70286	MIDWAYPS	230			
70339	PUEBLO	115	712	70352	READER	115	1	107	<90%	<90%	<90%	93%	93%	94%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70122	COMANCHE	230	70459	WALSENBG	230			
70352	READER	115	712	70456	W.STATION	115	1	99.6	<90%	<90%	<90%	91%	91%	91%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70236	HYDEPARK	115	70339	PUEBLO	115			
70250	LAJUNTAW	69	712	70249	LAJUNTAW	115	1	25	NA	<90%	<90%	<90%	<90%	91%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70710	COGRN 2	230	70700	COLO GRN	230			
73409	KELKER W	115	757	73420	ROCKISLD	115	1	132.9	113%	116%	115%	118%	118%	118%	118%	119%	122%	122%	113%	107%	112%	111%	111%	117%	118%	114%	73408	KELKER E	115	73409	KELKER W	115
73391	CTTNWD N	115	757	73410	KETTLECK	115	1	132.9	111%	120%	117%	124%	124%	125%	125%	134%	135%	114%	103%	113%	110%	107%	113%	115%	119%	73389	BRIARGAT	115	73391	CTTNWD N	115	
73408	KELKER E	115	757	73422	TEMPLTON	115	1	108	100%	102%	102%	105%	105%	105%	106%	109%	109%	99%	93%	98%	97%	97%	104%	105%	101%	73409	KELKER W	115	73420	ROCKISLD	115	
73407	KELKER	230	757	73409	KELKER W	115	2	280	96%	97%	96%	98%	98%	98%	100%	101%	102%	96%	93%	96%	95%	95%	99%	100%	97%	73407	KELKER	230	73409	KELKER W	115	
73407	KELKER	230	757	73409	KELKER W	115	1	280	96%	97%	96%	98%	98%	98%	100%	101%	102%	96%	93%	96%	95%	95%	99%	100%	97%	73407	KELKER	230	73409	KELKER W	115	
73420	ROCKISLD	115	757	73422	TEMPLTON	115	1	132.9	95%	96%	96%	96%	96%	96%	95%	96%	96%	95%	94%	95%	95%	95%	95%	96%	95%	73409	KELKER W	115	73420	ROCKISLD	115	
70308	PALMER	115	704	73414	MONUMENT	115	1	134.8	<90%	102%	99%	109%	110%	111%	111%	123%	122%	95%	<90%	<90%	<90%	<90%	94%	98%	96%	70139	DANIELPK	230	70286	MIDWAYPS	230	
73410	KETTLECK	115	757	73414	MONUMENT	115	1	132.9	<90%	93%	92%	99%	99%	100%	100%	112%	112%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	94%	73460	BLK SQMV	115	73481	FULLER	115	
73389	BRIARGAT	115	757	73391	CTTNWD N	115	1	159.4	<90%	<90%	90%	93%	93%	94%	94%	101%	101%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	73391	CTTNWD N	115	73410	KETTLECK	115	
73412	MIDWAYBR	115	757	73416	RANCHO	115	1	80	<90%	<90%	<90%	93%	93%	93%	92%	99%	95%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	73477	FULLER	230	73481	FULLER	115	
70412	STEM BCH	115	704	70458	WALSENBG	115	1	77	163%	163%	173%	177%	177%	177%	175%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	91%	91%	91%	70122	COMANCHE	230	70459	WALSENBG	230	
70459	WALSENBG	230	704	70458	WALSENBG	115	1	100	108%	111%	110%	112%	112%	112%	111%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70122	COMANCHE	230	70459	WALSENBG	230	
70247	LAJUNTAT	115	712	70248	LAJUNTAT	69	1	25	108%	108%	DNS	108%	108%	108%	108%	108%	108%	108%	108%	108%	108%	108%	108%	108%	108%	70060	BOONE	115	70061	BOONE	230	
70254	LAMAR CO	230	712	70253	LAMAR CO	115	1	100	94%	95%	DNS	92%	93%	93%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70060	BOONE	115	70061	BOONE	230	
70412	STEM BCH	115	704	70413	STMBEACH	69	1	37	91%	91%	91%	91%	91%	91%	91%	90%	90%	<90%	<90%	90%	90%	90%	<90%	<90%	<90%	70458	WALSENBG	115	70457	WALSENBG	69	
70254	LAMAR CO	230	712	70253	LAMAR CO	115	1	100	DNS	DNS	DNS	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70061	BOONE	230	70254	LAMAR	230	
70247	LAJUNTAT	115	712	70248	LAJUNTAT	69	1	25	<90%	<90%	107%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70285	MIDWAYPS	115	70301	NTHRIDGE	115	
70254	LAMAR CO	230	712	70253	LAMAR CO	115	1	100	<90%	<90%	100%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70223	HLP TAP	69	70404	SPRNGFLD	69	
70459	WALSENBG	230	704	70458	WALSENBG	115	1	100	<90%	<90%	<90%	<90%	<90%	<90%	<90%	108%	108%	105%	99%	105%	104%	103%	107%	108%	109%	70121	COMANCHE	115	70352	READER	115	

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70463	WATERTON	115	700	70483	MARTN1TP	115	1	135	134%	134%	134%	134%	134%	134%	134%	135%	135%	134%	133%	135%	134%	134%	135%	135%	135%	70037	ARAPAHOB	115	70165	ENGL3TP	115
70264	LITTLET2	115	700	70483	MARTN1TP	115	1	135	123%	123%	123%	123%	123%	123%	123%	123%	123%	122%	121%	123%	123%	123%	124%	124%	123%	70037	ARAPAHOB	115	70165	ENGL3TP	115
70121	COMANCHE	115	704	70122	COMANCHE	230	A1	176	111%	117%	115%	121%	121%	121%	110%	115%	113%	111%	104%	109%	107%	107%	111%	112%	114%	70121	COMANCHE	115	70122	COMANCHE	230
70121	COMANCHE	115	704	70122	COMANCHE	230	A2	185	106%	111%	110%	115%	115%	115%	105%	109%	108%	106%	99%	104%	103%	102%	106%	107%	109%	70121	COMANCHE	115	70122	COMANCHE	230
70087	CAPHILL1	115	700	70300	NORTH547	115	1	130	110%	109%	112%	113%	112%	111%	110%	109%	109%	107%	104%	110%	107%	108%	110%	110%	107%	70073	CALIFOR1	115	70299	NORTH542	115
70073	CALIFOR1	115	700	70299	NORTH542	115	1	137	103%	101%	104%	105%	104%	104%	103%	<90%	<90%	<90%	<90%	103%	<90%	<90%	<90%	<90%	107%	70087	CAPHILL1	115	70215	HARRISPS	115
70192	FTLUPTON	230	706	70311	PAWNEE	230	1	413.5	102%	102%	104%	103%	103%	103%	103%	102%	103%	101%	100%	NA	NA	NA	NA	109%	101%	70311	PAWNEE	230	70343	QUINCY	230
70121	COMANCHE	115	704	70352	READER	115	1	300	100%	<90%	104%	109%	109%	109%	99%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	109%	70122	COMANCHE	230	70459	WALSENBG	230
70047	BARRLAKE	230	700	70048	GREENVAL	230	1	435	98%	97%	98%	92%	92%	92%	93%	92%	92%	92%	91%	95%	<90%	<90%	94%	93%	92%	70461	WASHINGT	230	70529	JLGREEN	230
70523	SULPHUR	115	700	70524	SULPHUR	230	T1	168	94%	93%	93%	91%	91%	91%	<90%	<90%	<90%	93%	96%	97%	96%	100%	98%	96%	94%	70395	SMOKYHIL	115	70521	PEAKVIEW	115
70023	ALLISON	115	700	70400	SODALAKE	115	1	189	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	93%	94%	94%	94%	94%	94%	94%	70045	BANCROFT	115	70242	KENDRICK	115
70463	WATERTON	115	700	70464	WATERTON	230	T2	100	94%	94%	93%	94%	94%	94%	94%	94%	94%	98%	102%	93%	96%	93%	95%	96%	96%	70463	WATERTON	115	70464	WATERTON	230
70463	WATERTON	115	700	70464	WATERTON	230	T1	100	93%	93%	93%	93%	93%	93%	93%	93%	93%	97%	101%	93%	96%	92%	94%	95%	95%	70463	WATERTON	115	70464	WATERTON	230
70045	BANCROFT	115	700	70242	KENDRICK	115	1	192	93%	93%	93%	94%	94%	94%	94%	94%	94%	93%	93%	94%	93%	93%	94%	94%	94%	70023	ALLISON	115	70400	SODALAKE	115
70088	CAPHILL2	115	700	70148	DENVTM	115	1	131	<90%	<90%	100%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70108	CHEROKEE	115	70276	MAPLETO1	115
70165	ENGL3TP	115	700	70263	LITTLET1	115	1	134.8	<90%	<90%	97%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70264	LITTLET2	115	70483	MARTN1TP	115
70108	CHEROKEE	115	700	70299	NORTH542	115	2	170.9	<90%	<90%	96%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70087	CAPHILL1	115	70215	HARRISPS	115
70045	BANCROFT	115	700	70208	GRAY ST	115	1	192	<90%	<90%	93%	<90%	<90%	<90%	<90%	94%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70023	ALLISON	115	70400	SODALAKE	115
70215	HARRISPS	115	700	70259	LEETSDAL	115	1	141	<90%	<90%	93%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70259	LEETSDAL	115	70260	LEETSDAL	230
70538	CHAM48TH	115	700	70539	CHAM48TH	230	T1	280	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70047	BARRLAKE	230	70048	GREENVAL	230
70108	CHEROKEE	115	700	70174	FEDERHT1	115	1	186	<90%	<90%	92%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70108	CHEROKEE	115	70175	FEDERHT2	115
70108	CHEROKEE	115	700	70175	FEDERHT2	115	2	186	<90%	<90%	92%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70108	CHEROKEE	115	70174	FEDERHT1	115
70276	MAPLETO1	115	700	70300	NORTH547	115	1	184.2	<90%	<90%	92%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70073	CALIFOR1	115	70299	NORTH542	115
70060	BOONE	115	712	730061	BOONE	230	1	150	<90%	92%	DNS	100%	101%	100%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70254	LAMAR CO	230	70253	LAMAR CO	115
70108	CHEROKEE	115	700	70276	MAPLETO1	115	1	206.8	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70073	CALIFOR1	115	70299	NORTH542	115
70254	LAMAR CO	230	712	70700	COLO GRN	230	1	376	NA	NA	DNS	102%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70254	LAMAR CO	230	70253	LAMAR CO	115
70061	BOONE	230	712	70122	COMANCHE	230	1	435.6	<90%	<90%	DNS	93%	93%	91%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70061	BOONE	230	70286	MIDWAYPS	230
70254	LAMAR CO	230	712	70700	COLO GRN	230	2	376	NA	NA	NA	NA	101%	101%	100%	101%	101%	101%	100%	100%	100%	100%	100%	100%	100%	70254	LAMAR CO	230	70700	COLO GRN	230
70254	LAMAR CO	230	712	70700	COLO GRN	230	1	376	NA	NA	NA	NA	101%	101%	100%	101%	101%	100%	100%	100%	100%	100%	100%	100%	100%	70254	LAMAR CO	230	70700	COLO GRN	230

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70073	CALIFOR1	115	700	70299	NORTH542	115	1	137	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	102%	102%	100%	97%	<90%	100%	101%	103%	102%	100%	70108	CHEROKEE	115	70276	MAPLETO1	115
70139	DANIELPK	230	700	70331	PRAIRIE	230	1	494.8	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	92%	92%	95%	97%	<90%	<90%	<90%	<90%	94%	70139	DANIELPK	230	70212	GREENWD	230	
70139	DANIELPK	230	700	70212	GREENWD	230	1	494.8	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	90%	92%	<90%	<90%	<90%	<90%	<90%	<90%	70139	DANIELPK	230	70331	PRAIRIE	230	
70285	MIDWAYPS	115	704	70286	MIDWAYPS	230	1	100	<90%	<90%	102%	111%	111%	111%	118%	114%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70121	COMANCHE	115	70352	READER	115	
70625	CORNERPT	230	706	70343	QUINCY	230	1	637	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	122%	<90%	<90%	109%	NA	NA	70139	DANIELPK	230	70625	CORNERPT	230
70343	QUINCY	230	700	70396	SMOKYHIL	230	1	637	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	121%	<90%	<90%	108%	<90%	<90%	70139	DANIELPK	230	70625	CORNERPT	230
70192	FTLUPTON	230	706	70311	PAWNEE	230	1	413.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	107%	<90%	<90%	101%	NA	NA	70625	CORNERPT	230	70343	QUINCY	230
70139	DANIELPK	230	700	70625	CORNERPT	230	1	637	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	102%	<90%	<90%	<90%	NA	NA	70625	CORNERPT	230	70343	QUINCY	230
70047	BARRLAKE	230	700	70048	GREENVAL	230	1	435	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	93%	97%	<90%	<90%	<90%	70192	FTLUPTON	230	70605	HENRYLAK	230
70395	SMOKYHIL	115	700	70396	SMOKYHIL	230	T1	150	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	90%	<90%	<90%	<90%	70395	SMOKYHIL	115	70396	SMOKYHIL	230
70283	MEADOWHL	230	700	70396	SMOKYHIL	230	1	434.6	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	96%	<90%	<90%	70046	BUCKLEY2	230	70396	SMOKYHIL	230	
70254	LAMAR CO	230	712	70700	COLO GRN	230	1	376	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<90%	<90%	<90%	102%	102%	NA	70626	CORNERPT	345	70653	LAMAR CO	345
70254	LAMAR CO	230	712	70700	COLO GRN	230	1	376	DNS	DNS	DNS	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70061	BOONE	230	70254	LAMAR CO	230	
73031	BRUSHTAP	115	752	73305	EFMORGTP	115	1	121.7	102%	101%	103%	101%	101%	101%	100%	99%	99%	101%	102%	NA	NA	NA	NA	105%	101%	70311	PAWNEE	230	70343	QUINCY	230	
73023	BIJOUTAP	115	752	73379	FMWEST	115	1	80	102%	102%	105%	106%	106%	106%	106%	108%	108%	104%	102%	NA	NA	NA	NA	109%	105%	70311	PAWNEE	230	70343	QUINCY	230	
79029	FLAMGORG	69	790	79026	FLAMGORG	138	1	19	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	70018	SODALAKE	230	70100	CHATFLD	230	
73305	EFMORGTP	115	752	73379	FMWEST	115	1	121	<90%	<90%	91%	92%	92%	92%	92%	93%	93%	90%	<90%	NA	NA	NA	NA	94%	91%	70311	PAWNEE	230	70343	QUINCY	230	
73030	BRIGHTNW	115	752	73493	SANDCRK	115	1	85.1	<90%	<90%	92%	<90%	90%	90%	90%	91%	91%	91%	<90%	NA	NA	NA	NA	93%	<90%	70311	PAWNEE	230	70343	QUINCY	230	
73020	BEAVERCK	115	752	73464	ADENA	115	1	109	<90%	<90%	90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	NA	NA	NA	<90%	93%	<90%	70311	PAWNEE	230	70343	QUINCY	230	
73023	BIJOUTAP	115	752	73379	FMWEST	115	1	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	108%	<90%	<90%	105%	NA	NA	70625	CORNERPT	230	70343	QUINCY	230
73031	BRUSHTAP	115	752	73305	EFMORGTP	115	1	121.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	104%	<90%	<90%	100%	NA	NA	70625	CORNERPT	230	70343	QUINCY	230
73305	EFMORGTP	115	752	73379	FMWEST	115	1	121	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	93%	<90%	<90%	91%	NA	NA	70625	CORNERPT	230	70343	QUINCY	230
73030	BRIGHTNW	115	752	73493	SANDCRK	115	1	85.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	92%	<90%	<90%	<90%	NA	NA	70625	CORNERPT	230	70343	QUINCY	230
73020	BEAVERCK	115	752	73464	ADENA	115	1	109	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	92%	<90%	<90%	<90%	NA	NA	70625	CORNERPT	230	70343	QUINCY	230
73088	HOYT	115	752	73464	ADENA	115	1	109	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	NA	NA	NA	90%	<90%	70311	PAWNEE	230	70343	QUINCY	230
70517	PARKERPS	115	704	70523	SULPHUR	115	1	180	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	91%	<90%	<90%	92%	91%	<90%	70395	SMOKYHIL	115	70521	PEAKVIEW	115
									SOLVED	SOLVED	DNS	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	70061	BOONE	230	70122	COMANCHE	230

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SOLVED	SOLVED	DNS	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	70136	CTY LAM	69	70473	WILOW CK	69
SOLVED	SOLVED	DNS	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	70247	LAJUNTAT	115	70472	WILOW CK	115
SOLVED	SOLVED	DNS	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	70253	LAMAR CO	115	70452	VILAS	115
SOLVED	SOLVED	DNS	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	70253	LAMAR CO	115	70472	WILOW CK	115
SOLVED	SOLVED	DNS	DNS	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	70254	LAMAR CO	230	70700	COLO GRN	230

COLOR GUIDE	
AQUILA	
CSU	
TSGT	
WESTERN	
IREA	
PSCo	
SIGNIFICANT DECREASE BUT LOADING >90% OF RATING AS THE RESULTS OF NEW INFRASTRUCTURE	
LOADING <90% OF RATING AS THE RESULTS OF NEW INFRASTRUCTURE	
SIGNIFICANT INCREASE OVER BASE CASE OR PREVIOUS CASE OR UNSOLVED CASE	
SIGNIFICANT DECREASE OVER BASE CASE OR PREVIOUS CASE STILL ABOVE 100% RATING	

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2010 CASE COMPARISON OUTAGE LIST

OVERLOADED CIRCUIT																	CONTINGENCY						
----	FROM	----	TO	----	rating	cont	cont	cont	cont	cont	cont	cont	cont	cont	cont	----	FROM	----	TO	----			
BUS #	--name--	-kV-	zone	BUS #	--name--	-kV-	ID	[MVA]	load	load	load	load	load	load	load	BUS #	--name--	-kV-	BUS #	--name--	-kV-		
70353	READER	69	712	70352	READER	115	1	47	151%	153%	153%	153%	153%	153%	151%	152%	70353	READER	69	70352	READER	115	
70353	READER	69	712	70352	READER	115	2	47	151%	153%	153%	153%	153%	153%	151%	152%	70353	READER	69	70352	READER	115	
70275	MANZANOL	69	712	70419	MANZANOL	115	1	25	122%	<90%	117%	95%	95%	95%	118%	95%	70060	BOONE	115	70419	MANZANOL	115	
70054	BMONT TP	69	712	70455	W.STATON	69	1	47.8	117%	118%	118%	119%	118%	119%	118%	118%	70042	ASPEN TP	69	70051	BLLENDE	69	
70042	ASPEN TP	69	712	70051	BLLENDE	69	1	47.8	112%	112%	112%	113%	112%	113%	112%	113%	70054	BMONT TP	69	70305	OVERTON	69	
70329	PORTLAND	69	712	70330	PORTLAND	115	2	25	<90%	103%	103%	103%	103%	103%	103%	103%	70329	PORTLAND	69	70330	PORTLAND	115	
70456	W.STATON	115	712	70455	W.STATON	69	1	42	98%	98%	98%	98%	98%	98%	98%	98%	70042	ASPEN TP	69	70051	BLLENDE	69	
70456	W.STATON	115	712	70455	W.STATON	69	2	42	96%	96%	96%	96%	96%	96%	96%	96%	70042	ASPEN TP	69	70051	BLLENDE	69	
70049	BELMONT	69	712	70305	OVERTON	69	1	47.8	95%	96%	96%	96%	96%	96%	96%	96%	70042	ASPEN TP	69	70051	BLLENDE	69	
70250	LAJUNTAW	69	712	70249	LAJUNTAW	115	1	25	93%	95%	<90%	<90%	<90%	<90%	<90%	<90%	70275	MANZANOL	69	70419	MANZANOL	115	
70275	MANZANOL	69	712	70419	MANZANOL	115	1	25	<90%	94%	<90%	<90%	<90%	<90%	<90%	<90%	70250	LAJUNTAW	69	70249	LAJUNTAW	115	
70352	READER	115	712	70483	BURNTMIL	115	1	99.6	<90%	92%	91%	93%	93%	92%	92%	<90%	<90%	70339	PUEBLO	115	70352	READER	115
70236	HYDEPARK	115	712	70339	PUEBLO	115	1	119.5	<90%	91%	<90%	92%	92%	91%	91%	<90%	<90%	70352	READER	115	70483	BURNTMIL	115

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73391	CTTNWD N	115	757	73410	KETTLECK	115	1	133	129%	137%	129%	140%	138%	136%	134%	116%	119%	73389	BRIARGAT	115	73393	CTTNWD S	115
70308	PALMER	115	704	73414	MONUMENT	115	1	133	117%	121%	113%	123%	121%	118%	114%	98%	98%	73477	FULLER	230	70139	DANIELPK	230
73409	KELKER W	115	757	73420	ROCKISLD	115	1	120	115%	118%	115%	120%	119%	119%	118%	115%	115%	73408	KELKER E	115	73422	TEMPLTON	115
73407	KELKER	230	757	73409	KELKER W	115	1	280	109%	111%	109%	112%	112%	111%	111%	109%	109%	73446	KELKER S	230	73408	KELKER E	115
73446	KELKER S	230	757	73408	KELKER E	115	1	280	109%	111%	109%	112%	112%	111%	111%	109%	109%	73407	KELKER	230	73409	KELKER W	115
73410	KETTLECK	115	757	73414	MONUMENT	115	1	133	102%	112%	103%	117%	115%	112%	110%	<90%	<90%	73481	FULLER	115	73460	BLK SQMV	115
73419	RD_NIXON	230	757	73446	KELKER S	230	1	319	102%	104%	102%	105%	105%	105%	104%	102%	102%	73407	KELKER	230	73419	RD_NIXON	230
73407	KELKER	230	757	73419	RD_NIXON	230	1	319	102%	104%	102%	105%	<90%	104%	103%	102%	102%	73419	RD_NIXON	230	73446	KELKER S	230
73420	ROCKISLD	115	757	73422	TEMPLTON	115	1	120	98%	98%	101%	<90%	98%	98%	98%	102%	102%	73409	KELKER W	115	73420	ROCKISLD	115
73389	BRIARGAT	115	757	73393	CTTNWD S	115	1	159	97%	103%	97%	105%	104%	102%	101%	<90%	<90%	73391	CTTNWD N	115	73410	KETTLECK	115
73408	KELKER E	115	757	73422	TEMPLTON	115	1	117	96%	98%	96%	100%	100%	99%	98%	95%	95%	73409	KELKER W	115	73420	ROCKISLD	115
73404	FOUNTAIN	115	757	73417	RD_NIXON	115	1	159	94%	96%	94%	97%	96%	96%	95%	94%	94%	73407	KELKER	230	73409	KELKER W	115
73477	FULLER	230	757	73481	FULLER	115	1	100	<90%	<90%	<90%	90%	<90%	<90%	<90%	<90%	<90%	73410	KETTLECK	115	73414	MONUMENT	115
70132	CTY LAJ	69	712	70248	LAJUNTAT	69	1	39	124%	124%	124%	124%	124%	124%	124%	125%	124%	70247	LAJUNTAT	115	70248	LAJUNTAT	69
70136	CTY LAM	69	712	70473	WILOW CK	69	1	19	95%	<90%	<90%	<90%	<90%	<90%	<90%	91%	<90%	70254	LAMAR CO	230	70253	LAMAR CO	115
70247	LAJUNTAT	115	712	70248	LAJUNTAT	69	1	25	95%	95%	95%	95%	95%	95%	95%	95%	94%	70060	BOONE	115	70061	BOONE	230
79029	FLAMGORG	69	790	79026	FLAMGORG	138	1	19	123%	123%	123%	123%	123%	123%	123%	123%	123%	70018	SODALAKE	230	70100	CHATFLD	230
73023	BIJOUTAP	115	752	73379	FMWEST	115	1	80	101%	108%	104%	95%	<90%	<90%	<90%	<90%	<90%	70311	PAWNEE	230	70623	CORNER1	230
73008	ARCHER	115	753	73043	CHEYENNE	115	1	80	98%	102%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70311	PAWNEE	230	70623	CORNER1	230
73211	WELD LM	115	754	73212	WELD LM	230	1	150	94%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70654	COMANCHE	345	70777	COMAN 3	24
73305	EFMORGTP	115	752	73379	FMWEST	115	1	121	90%	95%	93%	<90%	<90%	<90%	<90%	<90%	<90%	70311	PAWNEE	230	70623	CORNER1	230
73211	WELD LM	115	754	73212	WELD LM	230	1	120	<90%	<90%	130%	130%	<90%	131%	128%	126%	126%	70470	WELD PS	115	70471	WELD PS	230
73413	MIDWAYBR	230	757	73412	MIDWAYBR	115	1	100	<90%	<90%	<90%	91%	90%	<90%	<90%	<90%	<90%	73419	RD_NIXON	230	73417	RD_NIXON	115
73023	BIJOUTAP	115	752	73379	FMWEST	115	1	80	<90%	<90%	<90%	<90%	<90%	107%	<90%	<90%	<90%	70311	PAWNEE	230	70192	FTLUPTON	230
73305	EFMORGTP	115	752	73379	FMWEST	115	1	121	<90%	<90%	<90%	<90%	<90%	95%	<90%	<90%	<90%	70311	PAWNEE	230	70192	FTLUPTON	230
70242	KENDRICK	115	700	70045	BANCROFT	115	1	192	113%	113%	113%	114%	113%	114%	114%	113%	113%	70400	SODALAKE	115	70023	ALLISON	115
70470	WELD PS	115	706	70471	WELD PS	230	2	150	116%	126%	112%	<90%	<90%	<90%	<90%	<90%	<90%	70036	ARAPAHOA	115	70384	SHERIDAN	115
70400	SODALAKE	115	700	70023	ALLISON	115	1	189	111%	112%	112%	113%	112%	113%	112%	113%	113%	70242	KENDRICK	115	70045	BANCROFT	115
70354	RIDGE	115	700	70355	RIDGE	230	2	100	110%	109%	111%	108%	104%	102%	109%	105%	104%	70354	RIDGE	115	70355	RIDGE	230
70524	SULPHUR	230	700	70523	SULPHUR	115	1	168	109%	109%	105%	98%	98%	100%	98%	113%	112%	70395	SMOKYHIL	115	70521	PEAKVIEW	115

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70139	DANIELPK	230	700	70331	PRAIRIE	230	1	635	102%	113%	104%	118%	116%	104%	117%	102%	<90%	70139	DANIELPK	230	70212	GREENWD	230
70088	CAPHILL2	115	700	70148	DENVTM	115	1	150	102%	100%	107%	115%	104%	102%	107%	98%	99%	70259	LEETSDAL	115	70260	LEETSDAL	230
70265	LOOKOUT	115	700	70266	LOOKOUT	230	1	150	101%	98%	98%	96%	94%	93%	96%	<90%	97%	70265	LOOKOUT	115	70266	LOOKOUT	230
70139	DANIELPK	230	700	70278	MARCY	230	1	434.6	100%	104%	<90%	<90%	<90%	<90%	<90%	95%	98%	70266	LOOKOUT	230	70018	SODALAKE	230
70265	LOOKOUT	115	700	70266	LOOKOUT	230	2	150	100%	96%	96%	96%	92%	92%	95%	97%	95%	70265	LOOKOUT	115	70266	LOOKOUT	230
70139	DANIELPK	230	700	70212	GREENWD	230	1	635	98%	109%	99%	112%	111%	99%	112%	<90%	<90%	70139	DANIELPK	230	70331	PRAIRIE	230
70539	CHAM48TH	230	700	70538	CHAM48TH	115	1	280	98%	96%	102%	<90%	<90%	<90%	<90%	<90%	<90%	70610	REUNION	230	70047	BARRLAKE	230
70354	RIDGE	115	700	70355	RIDGE	230	1	112	97%	96%	98%	96%	92%	91%	96%	93%	92%	70354	RIDGE	115	70355	RIDGE	230
70192	FTLUPTON	230	706	70311	PAWNEE	230	1	413.5	97%	93%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70311	PAWNEE	230	70623	CORNER1	230
70208	GRAY ST	115	700	70045	BANCROFT	115	1	192	95%	96%	91%	<90%	<90%	92%	<90%	99%	98%	70400	SODALAKE	115	70023	ALLISON	115
70463	WATERTON	115	700	70464	WATERTON	230	2	100	95%	97%	99%	105%	103%	98%	<90%	<90%	<90%	70463	WATERTON	115	70464	WATERTON	230
70073	CALIFOR1	115	700	70299	NORTH542	115	1	150	95%	96%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70108	CHEROKEE	115	70276	MAPLETO1	115
70463	WATERTON	115	700	70464	WATERTON	230	1	100	94%	96%	99%	103%	101%	97%	<90%	<90%	91%	70463	WATERTON	115	70464	WATERTON	230
70087	CAPHILL1	115	700	70300	NORTH547	115	1	150	94%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70108	CHEROKEE	115	70299	NORTH542	115
70108	CHEROKEE	115	700	70298	NORTH PS	115	1	170.9	93%	93%	92%	93%	92%	93%	93%	93%	93%	70108	CHEROKEE	115	70277	MAPLETO2	115
70395	SMOKYHIL	115	700	70396	SMOKYHIL	230	1	150	93%	91%	94%	<90%	91%	94%	91%	113%	<90%	70395	SMOKYHIL	115	70396	SMOKYHIL	230
70231	HOPKINS	115	708	79003	BASALT	115	1	66.9	92%	91%	91%	92%	91%	93%	91%	<90%	<90%	70654	COMANCHE	345	70777	COMAN 3	24
70224	HOGBACK	115	700	70400	SODALAKE	115	1	135	91%	<90%	<90%	<90%	<90%	<90%	<90%	95%	92%	70018	SODALAKE	230	70400	SODALAKE	115
73013	B.CK PS	115	706	73020	BEAVERCK	115	1	319	91%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70311	PAWNEE	230	70623	CORNER1	230
70108	CHEROKEE	115	700	70174	FEDERHT1	115	1	186	91%	96%	94%	<90%	94%	95%	94%	91%	92%	70108	CHEROKEE	115	70175	FEDERHT2	115
70108	CHEROKEE	115	700	70175	FEDERHT2	115	2	186	91%	96%	93%	<90%	94%	94%	94%	90%	92%	70108	CHEROKEE	115	70174	FEDERHT1	115
70444	VALMONT	115	703	70447	VALMONT	230	1	280	91%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70266	LOOKOUT	230	70570	PLNENDSS	230
70750	COLO GRN	230	712	70700	COLO GRN	230	1	376	NA	137%	NA	137%	137%	137%	137%	<90%	137%	70254	LAMAR CO	230	70700	COLO GRN	230
70254	LAMAR CO	230	712	70700	COLO GRN	230	1	376	<90%	99%	<90%	99%	99%	100%	99%	<90%	99%	70061	BOONE	230	70122	COMANCHE	230
70087	CAPHILL1	115	700	70300	NORTH547	115	1	150	<90%	95%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70073	CALIFOR1	115	70299	NORTH542	115
70291	MONROEPS	230	700	70260	LEETSDAL	230	1	398.4	<90%	92%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	70139	DANIELPK	230	70278	MARCY	230
73013	B.CK PS	115	706	73020	BEAVERCK	115	1	319	<90%	92%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	73192	STORY	230	70311	PAWNEE	230
70470	WELD PS	115	706	70471	WELD PS	230	2	150	<90%	<90%	<90%	113%	111%	107%	113%	115%	115%	70439	UNC	115	70502	QF UNC	14
70191	FTLUPTON	115	706	70192	FTLUPTON	230	1	280	<90%	<90%	<90%	106%	98%	102%	97%	105%	102%	70192	FTLUPTON	230	70529	JLGREEN	230
70463	WATERTON	115	700	70464	WATERTON	230	3	100	NA	NA	100%	105%	103%	98%	<90%	NA	NA	70463	WATERTON	115	70464	WATERTON	230
70539	CHAM48TH	230	700	70538	CHAM48TH	115	1	280	<90%	<90%	<90%	104%	96%	97%	93%	<90%	102%	70048	GREENVAL	230	70047	BARRLAKE	230
70192	FTLUPTON	230	706	70529	JLGREEN	230	1	495	<90%	<90%	94%	103%	95%	100%	93%	108%	104%	70192	FTLUPTON	230	70605	HENRYLAK	230
70139	DANIELPK	230	700	70601	DANIELPK	345	2	560	<90%	<90%	96%	102%	102%	<90%	NA	<90%	<90%	70139	DANIELPK	230	70601	DANIELPK	345
70139	DANIELPK	230	700	70601	DANIELPK	345	3	560	<90%	<90%	96%	102%	102%	<90%	NA	<90%	<90%	70139	DANIELPK	230	70601	DANIELPK	345

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70139	DANIELPK	230	700	70601	DANIELPK	345	1	560	<90%	<90%	96%	102%	102%	<90%	NA	<90%	<90%	70139	DANIELPK	230	70601	DANIELPK	345
70442	UNIVERS2	115	700	70036	ARAPAOHA	115	1	150	<90%	<90%	92%	102%	94%	90%	98%	<90%	<90%	70259	LEETSDAL	115	70260	LEETSDAL	230
70529	JLGREEN	230	706	70461	WASHINGT	230	1	495	<90%	<90%	93%	102%	93%	98%	92%	106%	103%	70192	FTLUPTON	230	70605	HENRYLAK	230
70192	FTLUPTON	230	706	70605	HENRYLAK	230	1	435	<90%	<90%	<90%	97%	<90%	94%	<90%	101%	98%	70192	FTLUPTON	230	70529	JLGREEN	230
70036	ARAPAOHA	115	700	70037	ARAPAHOB	115	1	247.4	<90%	<90%	<90%	95%	90%	<90%	95%	<90%	<90%	70398	SOUTH1TP	115	70037	ARAPAHOB	115
70165	ENGLE3TP	115	700	70463	WATERTON	115	1	134.8	<90%	<90%	<90%	95%	<90%	<90%	105%	<90%	<90%	70400	SODALAKE	115	70023	ALLISON	
70605	HENRYLAK	230	706	70362	RIVERDAL	230	1	435	<90%	<90%	<90%	93%	<90%	<90%	<90%	98%	94%	70192	FTLUPTON	230	70605	HENRYLAK	230
70259	LEETSDAL	115	700	70260	LEETSDAL	230	1	280	<90%	<90%	<90%	94%	<90%	<90%	<90%	<90%	<90%	70291	MONROEPS	230	70260	LEETSDAL	230
70398	SOUTH1TP	115	700	70045	BANCROFT	115	1	135	<90%	<90%	<90%	93%	<90%	<90%	94%	<90%	<90%	70036	ARAPAOHA	115	70037	ARAPAHOB	115
70395	SMOKYHIL	115	700	70396	SMOKYHIL	230	1	150	<90%	<90%	<90%	93%	<90%	<90%	<90%	95%	99%	70539	CHAM48TH	230	70538	CHAM48TH	115
70444	VALMONT	115	703	70447	VALMONT	230	1	280	<90%	<90%	<90%	93%	<90%	<90%	<90%	<90%	<90%	70191	FTLUPTON	115	70192	FTLUPTON	230
70212	GREENWD	230	700	70331	PRAIRIE	230	1	635	<90%	<90%	<90%	93%	91%	<90%	92%	<90%	<90%	70139	DANIELPK	230	70212	GREENWD	230
70444	VALMONT	115	703	70244	LAFAYETT	115	1	135	<90%	<90%	<90%	91%	<90%	<90%	<90%	<90%	<90%	70191	FTLUPTON	115	70192	FTLUPTON	230
70139	DANIELPK	230	700	70624	CORNER2	230	1	637	<90%	<90%	<90%	<90%	<90%	98%	<90%	<90%	<90%	70624	CORNER2	230	70343	QUINCY	230
70343	QUINCY	230	700	70396	SMOKYHIL	230	1	800	<90%	<90%	<90%	<90%	<90%	96%	<90%	<90%	<90%	70139	DANIELPK	230	70624	CORNER2	230
70605	HENRYLAK	230	706	70362	RIVERDAL	230	1	435	<90%	<90%	<90%	<90%	<90%	90%	<90%	<90%	<90%	70192	FTLUPTON	230	70529	JLGREEN	230
70139	DANIELPK	230	700	70278	MARCY	230	1	434.6	<90%	<90%	<90%	<90%	<90%	NA	91%	<90%	<90%	70602	WATERTON	345	70601	DANIELPK	345
70464	WATERTON	230	700	70602	WATERTON	345	2	560	<90%	<90%	<90%	<90%	<90%	<90%	92%	<90%	<90%	70139	DANIELPK	230	70278	MARCY	230
70087	CAPHILL1	115	700	70300	NORTH547	115	1	150	<90%	<90%	<90%	<90%	<90%	<90%	<90%	103%	99%	70073	CALIFOR1	115	70299	NORTH542	115
70073	CALIFOR1	115	700	70299	NORTH542	115	1	150	<90%	<90%	<90%	<90%	<90%	<90%	<90%	105%	101%	70087	CAPHILL1	115	70215	HARRISPS	115
70539	CHAM48TH	230	700	70538	CHAM48TH	115	1	280	<90%	<90%	<90%	<90%	<90%	<90%	<90%	103%	<90%	70528	SPRUCE	230	70396	SMOKYHIL	230
70396	SMOKYHIL	230	700	70046	BUCKLEY2	230	1	435	<90%	<90%	<90%	<90%	<90%	<90%	<90%	93%	<90%	70481	MONACO12	230	70212	GREENWD	230
70108	CHEROKEE	115	700	70299	NORTH542	115	2	170.9	<90%	<90%	<90%	<90%	<90%	<90%	<90%	91%	<90%	70087	CAPHILL1	115	70215	HARRISPS	115
70396	SMOKYHIL	230	700	70283	MEADOWHL	230	1	434.6	<90%	<90%	<90%	<90%	<90%	<90%	<90%	90%	<90%	70396	SMOKYHIL	230	70046	BUCKLEY2	230
70048	GREENVAL	230	700	70047	BARRLAKE	230	1	435	<90%	<90%	<90%	<90%	<90%	<90%	<90%	<90%	91%	70192	FTLUPTON	230	70605	HENRYLAK	230
70523	SULPHUR	115	700	70517	PARKERPS	115	1	180	102%	101%	98%	94%	93%	96%	93%	107%	106%	70395	SMOKYHIL	115	70521	PEAKVIEW	115
70395	SMOKYHIL	115	700	70521	PEAKVIEW	115	1	186.6	96%	95%	93%	<90%	<90%	92%	<90%	103%	101%	70523	SULPHUR	115	70517	PARKERPS	115
73073	GRANBYPP	69	755	73132	MCKENZIE	69	1	36	<90%	91%	98%	93%	101%	99%	100%	<90%	<90%	70654	COMANCHE	345	70777	COMAN 3	24
73132	MCKENZIE	69	755	73436	MARYLSB	69	1	33	<90%	<90%	96%	90%	97%	95%	97%	<90%	<90%	70654	COMANCHE	345	70777	COMAN 3	24

COLOR CODES

AQUILA

CONFIDENTIAL

- CSU
- TSGT
- WAPA
- PSCo
- IREA
- OTHER

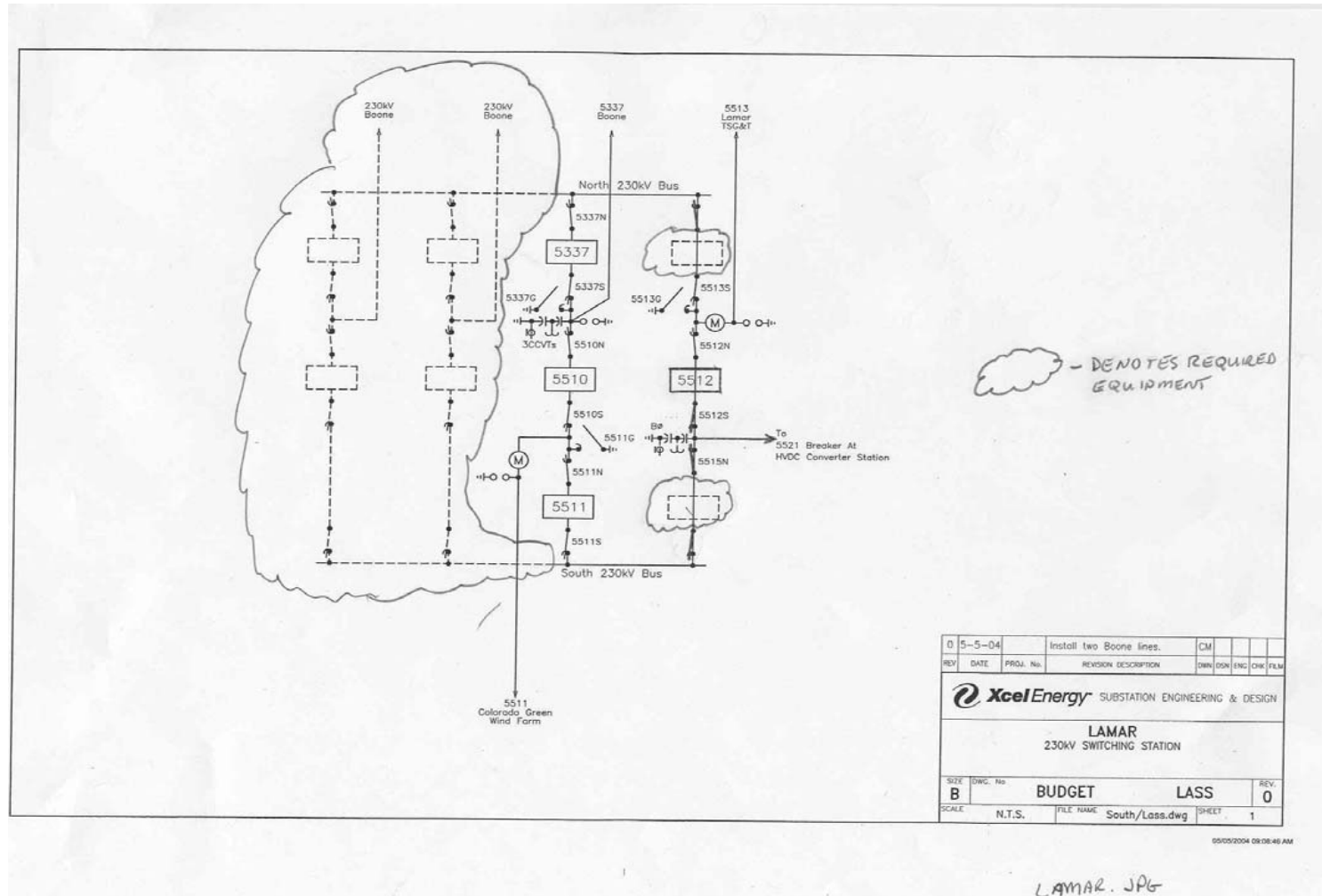
CONFIDENTIAL

APPENDIX B

ONE-LINES

CONFIDENTIAL

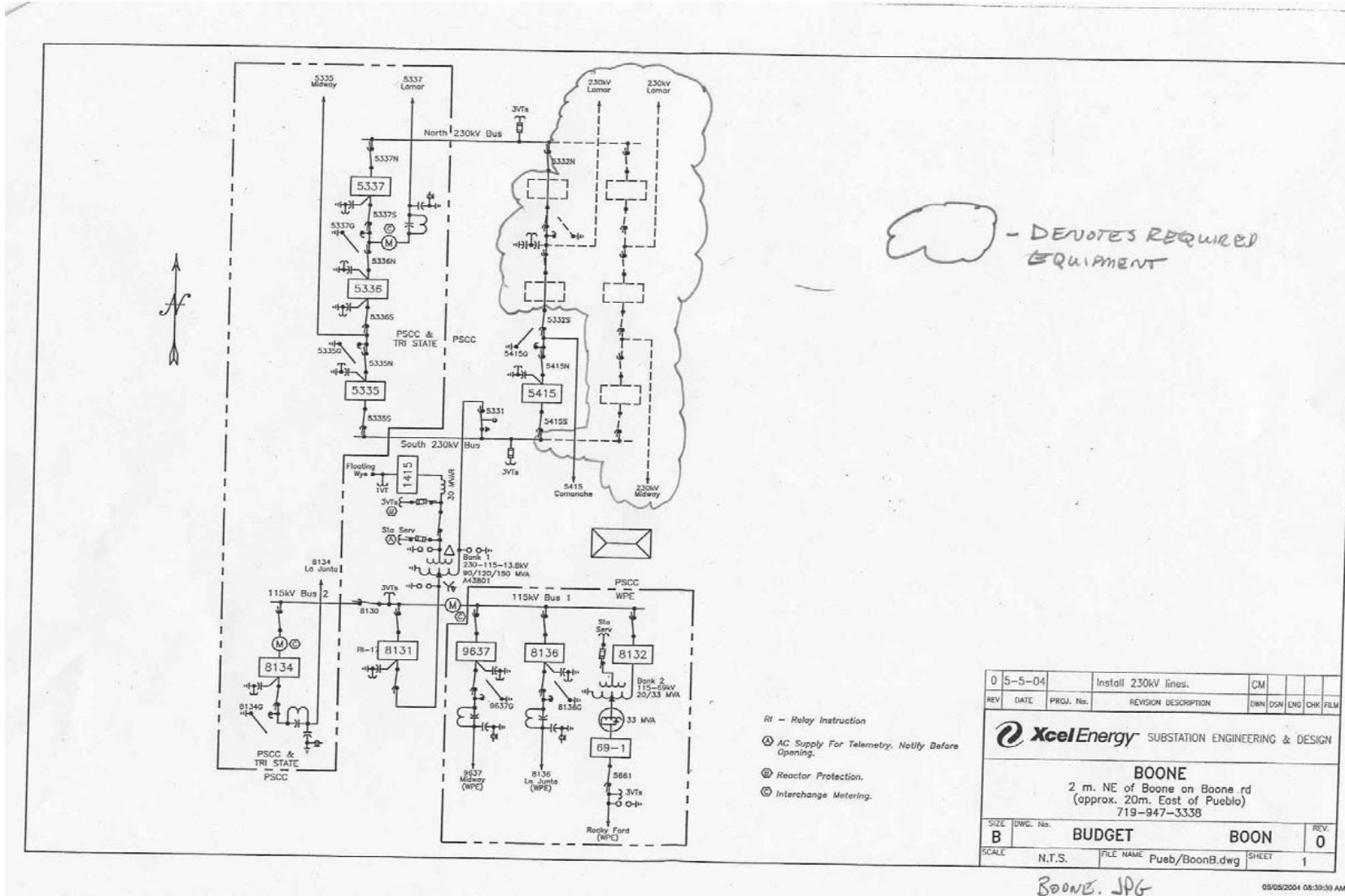
APPENDIX B-1
LAMAR SUBSTATION ONE-LINE



APPENDIX B-2

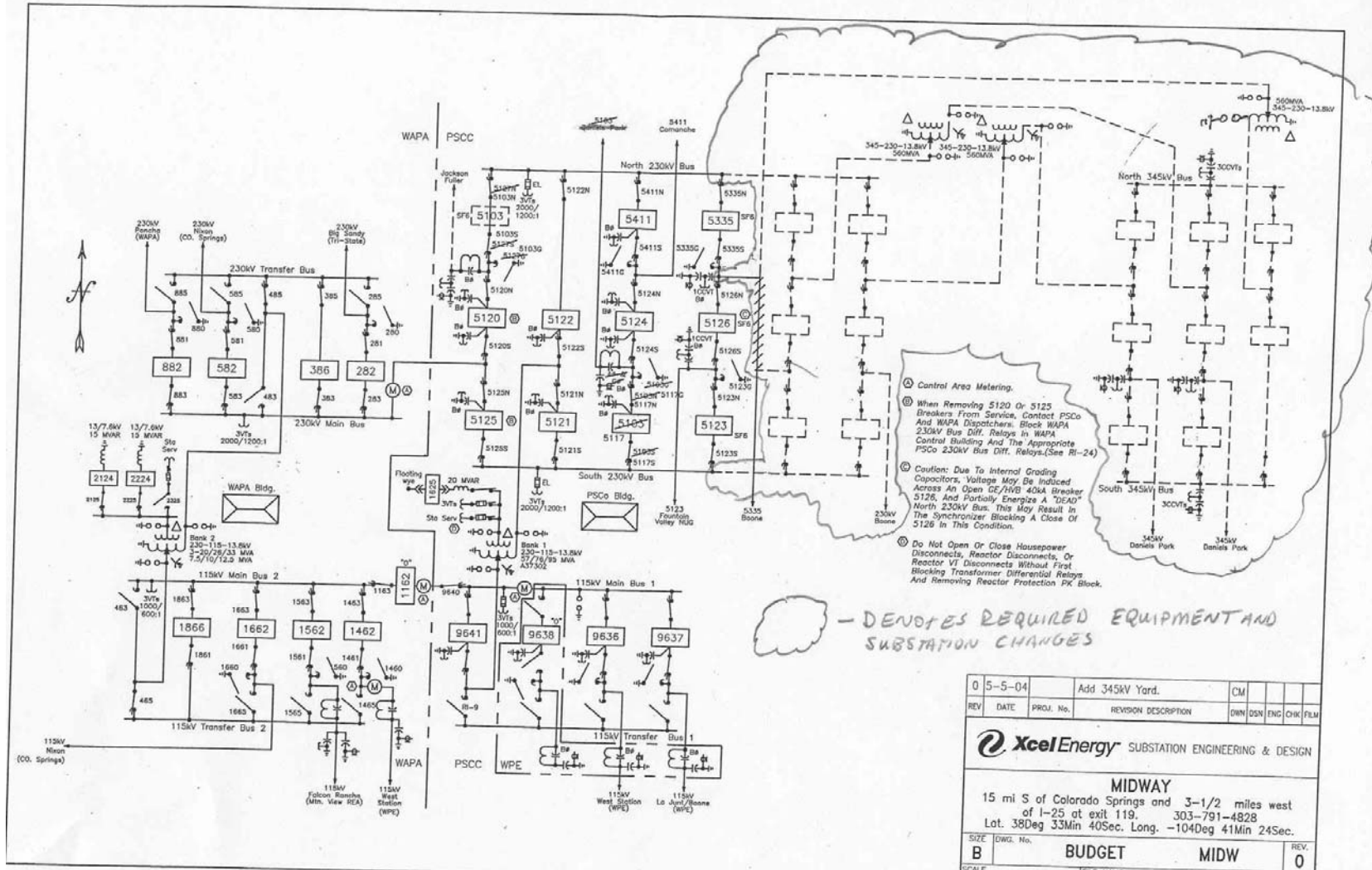
CONFIDENTIAL

BOONE SUBSTATION ONE-LINE



CONFIDENTIAL

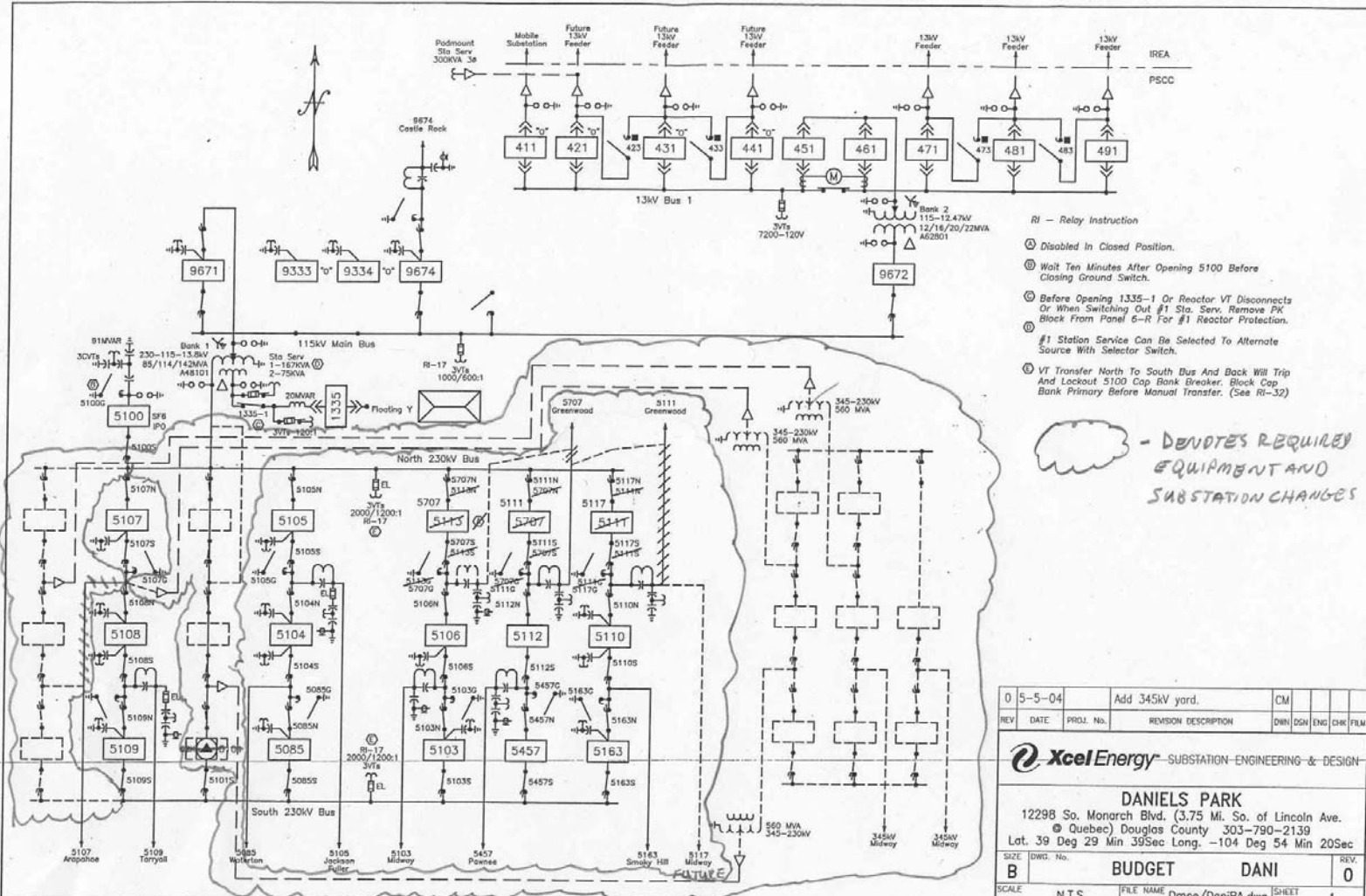
**APPENDIX B-3
MIDWAY SUBSTATION ONE-LINE**



0	5-5-04	Add 345kV Yard.	CM			
REV	DATE	PROJ. No.	REVISION DESCRIPTION	DWN	DSN	ENG/CHK/FILM
SUBSTATION ENGINEERING & DESIGN						
MIDWAY 15 mi S of Colorado Springs and 3-1/2 miles west of I-25 at exit 119. 303-791-4828 Lot. 38Deg 33Min 40Sec. Long. -104Deg 41Min 24Sec.						
SIZE	DWG. No.			REV.		
B	BUDGET	MIDW		0		

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APPENDIX B-4 DANIELS PARK SUBSTATION ONE-LINE



APPENDIX C

PSCo GENERATION INTERCONNECTION QUEUE

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GENERATION INTERCONNECTION REQUESTS

May 6, 2004

Queue Number	Date Received	Generation Type	Service Type	Location County/State	Interconnection Point Station or Line	Net Plant Max MW Sum Win	In-Service Date	Comments/Status/Reason not Completed
GI-2003-1	10/21/2003	Wind	Network Resource	Morgan Co., CO	Pawnee Substation	300 300	12/1/2006	Feasibility Study complete System Impact Study underway
GI-2003-2	11/3/2003	Coal	Network +Energy Resource	Elbert Co., CO	Smokey Hill-Pawnee 230kV line	500 500	6/1/2008	Feasibility Study complete System Impact Study underway
GI-2003-3	11/7/2003	Coal	Network Resource	Pueblo Co., CO	Comanche Substation	750 750	10/1/2009	Feasibility Study complete System Impact Study underway
GI-2003-4	11/11/2003	Wind	Network +Energy Resource	Laramie Co., WY	Ponnequin Substation	30 30	Q2:2004	Feasibility Study complete System Impact Study underway
GI-2003-5	12/29/2003	Coal	Network Resource	Morgan Co., CO	Pawnee Substation	750 750	10/1/2009	Request withdrawn 2/20/04
GI-2004-1	1/19/2004	Wind	Network +Energy Resource	Morgan Co., CO	Story Substation	150 150	12/31/2005	Feasibility Study underway
GI-2004-2	2/9/2004	Wind	Network +Energy Resource	Baca Co., CO	Lamar Substation	238 238	9/31/2005	Feasibility Study underway