STUDY OF FREQUENTLY CONSTRAINED AREAS IN THE SOUTHWEST POWER POOL

BY:

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I. Executive Summary

A. Introduction

This report presents the results of our study of Frequently-Constrained Areas (FCAs) in the Southwest Power Pool (SPP). Our study identifies electrical areas within SPP where one or more transmission constraints are expected to be binding for a significant number of hours. These areas are subject to greater risk of market power abuse than areas that have only occasional and transitory congestion. The FCAs are to be used as part of SPP's market mitigation measures under its proposed market reform. In particular, suppliers in FCAs will be subject to more stringent market power mitigation thresholds than suppliers at other locations.

Our study responds to the order of the Federal Energy Regulatory Commission ("the Commission") in Docket No. ER12-1179. The Commission established that Docket to consider SPP's proposal to establish its Integrated Marketplace for day-ahead, real-time, and operating reserves. SPP also proposed market power mitigation measures that included conduct thresholds for economic withholding in the day-ahead and real-time energy markets. The Commission requested modifications to the proposed thresholds in order to recognize locations that experience a higher likelihood of market power:

> We … direct SPP to address the need for more stringent mitigation for electrical areas defined by one or more transmission constraints that are expected to be binding for a significant number of hours in the year, within which one or more suppliers is pivotal (Commission Order, October 18, 2012).

We agree with the principle that more stringent mitigation measures are warranted for generators in FCAs. FCAs are locations where transmission constraints frequently bind and where individual suppliers have the ability to create or sustain transmission congestion through the exercise of market power. As noted by the Commission in its Order, this approach has been employed in MISO since 2005.

B. Results

Our study used historical congestion and market data from 2011 and 2012 to identify areas affected by one or more transmission constraints that can be managed by a limited number of participants through the operation of generating resources. Based on our analysis, we recommend three FCAs:

(1) Texas Panhandle. This is the area of North Texas encompassing the SPS area. The constraints arise due to attempts to schedule lower-cost power in the northern part of SPP to supply Southwest Public Service load near Lubbock.

(2) Kansas NW Import Interface. This is the area of Northwest Kansas where transfers of lower-cost power supplies from Nebraska are limited due to limits on the 345 kV system into Kansas.

(3) Kansas City Area. This is the area north of Kansas City where suppliers face constraints delivering lower-cost power from the north and west into the Kansas City load areas. Some of this congestion is due to loop flow.

Our study focused on transmission constraints for which there is at least one pivotal supplier. A pivotal supplier is a market participant that has the ability to dispatch one or more of its resources to cause a constraint to bind in a given hour, assuming all other available generation is dispatched to relieve the constraint. For our analysis, we took into account that the FCAs are intended to address market power in the SPP day-ahead and real-time energy markets. Therefore, to measure market power in the energy markets, we considered whether or not a supplier in a given historical hour can redispatch its resource up to its maximum or down to its minimum to cause congestion which cannot be relieved by all other suppliers.

In applying this approach, we used historical data provided by SPP and identified all market intervals when there was a binding transmission constraint on the SPP system that had at least one associated pivotal supplier. This provided an initial set of binding constraints with at least one supplier who could prevent market redispatch from relieving congestion on that particular constraint.

The next step in our analysis involved identifying electrically-related groups of constraints using characteristics of the physical transmission system. We arranged the binding constraints into groups based on their electrical proximity to one another. These were located in five distinct electrical/geographic groupings that were widespread and encompassed most of the SPP footprint.

In order to arrive at a final determination whether these candidate FCAs in fact will be the recommended FCAs, we established the count of historical binding hours for the constraints associated with these areas.

We first identified the generators in these candidate FCAs by designating "primary constraints" associated with each area. Primary constraints are the constraints in each area that are most frequently binding (in terms of number of hours). To determine the units that are included in each FCA, we identified the units that significantly affected congestion in the area. Each unit's effect on each constraint is measured by its Generation Shift Factor ("GSF"), which indicates the portion of its output that flows over the constraint. Only units with negative GSFs are included in the FCAs because these units relieve the constraint. Hence, economic withholding of these units could increase congestion into the FCA and raise prices.

Before designating the final recommended FCAs, we identified all of the other "secondary" constraints into the five areas in order to accurately gauge the incidence of congestion into each area. We identified these secondary constraints by measuring the share of total congestion relief capability provided by the FCA generators on all (non-primary) constraints. In particular, we identified constraints as "secondary" if the potential FCA generator group as a whole provided a significant portion of the total relief capacity. All constraints satisfying this criterion are included in the FCA along with the primary constraints for purposes of calculating annual constrained hours.

Having identified all of the primary and secondary constraints into each area, we then counted the number of hours in 2011 and 2012 that the constraints were binding and potentially susceptible to the exercise of market power. We use these counts to determine which of the five candidate FCAs should be defined as an FCA. On the basis of these results we recommend defining the three FCAs identified above.

II. Frequently Constrained Areas in the Southwest Power Pool

In this section we explain the analysis and results of our study. Our study used historical congestion and market data from 2011 and 2012 to identify areas that are affected by one or more transmission constraints and that were significantly affected by one or more participants through the operation of generation units. Based on our analysis, we recommend three Frequently-Constrained Areas:

(1) Texas Panhandle. This is the area of North Texas encompassing the SPS area. The constraints arise due to attempts to schedule lower-cost power in the northern part of SPP to supply Southwest Public Service load near Lubbock.

(2) NW Kansas Import Interface. This is the area of Northwest Kansas where transfers of lower-cost power supplies from Nebraska are limited due to limits on the 345 kV system into Kansas.

(3) Kansas City Area. This is the area north of Kansas City where suppliers face constraints delivering lower-cost power from the north and west into the Kansas City load areas. Some of this congestion is due to loop flow.

A. Identify Potential Local Market Power: Constraints with a Pivotal Supplier

The component of our FCA analysis is to identify constraints that experienced congestion in a significant number of hours and on which one or more market participants could create or sustain that congestion. We identified such participants by determining whether a supplier was "pivotal". A pivotal supplier controls sufficient resources affecting a constraint to utilize them to overload a constraint or prevent it from being relieved by other participants' resources. The two steps in process are to first identify binding constraints over the two-year study period and then to perform a pivotal supplier analysis on each of these constraints. These two steps are described in the following subsections.

1. Binding Constraints

To identify binding constraints, we used five-minute interval data provided by SPP for its real-time balancing market for 2011 and 2012. We identified instances when transmission constraints were binding or relatively close to their limits. Transmission constraints are any flowgate or other transmission limit that was included in the SPP real-time balancing market. These are typically transmission conductors or transformers, but they may also be thermal proxies for certain voltage or stability constraints. We counted an interval as "binding" when it had a non-zero shadow price or the flow was within the maximum of 5 MW or 2 percent of the constraint limit. Table 1 shows the constraints that had the most significant number of binding hours. These constraints accounted for one-half of all constrained hours on all SPP constraints.

Table 1: Major Binding Transmission Constraints 2012

Constraint Name	Number of Binding Hours
SPS North – South Interface	1,671
Osage – Canyon 115 kV line for the loss of the Bushland Deaf Smith 230 kV line	1,483
Iatan – Stranger Creek 345 kV line for the loss of St. Joe – Iatan 345 kV line	1,389
Iatan to Stranger 345 kV line for the loss of the Hawthorn to St. Joseph 345 kV line and Lake Rd to Alabama 161 kV line	902
Redbud – Arcadia 345 kV line for the loss of Redbud – Arcadia 345 kV line	603
Elk City 230/138kV Transformer for the loss of Tuco – Oklaunion 345 kV line	453
Mingo 345/115kV Transformer for the loss of Mingo – Setab 345 kV line	422
Pentagon – Mund 115kV line for the loss of Stranger Creek – Craig 345kV line	399

The transmission constraints affecting the Texas Panhandle (the SPS North-South Interface and Osage-Canyon) are the top two frequently-binding constraints in SPP. The Elk City transformer is also in this area. The table also shows constraints around the Iatan generating station, which involve power flows into the Kansas City area. The Pentagon-Mund 115 kV conductor also is related to this area. The Redbud-Arcadia 345 kV line is near the Oklahoma City load center. The Mingo transformer limits flows into Kansas from Nebraska. With the exception of Oklahoma City, the areas affected by these constraints are recommended FCAs.

2. Pivotal Suppliers

We evaluated each constraint in each interval to determine whether there was one or more pivotal suppliers associated with it. To identify a pivotal supplier, we analyzed each supplier's aggregate resources (i.e., all resources owned by the supplier and its affiliates). For each interval, we then calculated the maximum amount of congestion that could be created by the supplier by decreasing production on its units that relieve the constraint or by increasing production on units that contribute flow to the constraint. The amount of output a supplier was able to decrease on each resource was limited to the historical dispatch point for that resource during that interval less the resource's minimum. Likewise, the amount of output that a supplier was able to increase on each resource was limited to the resource's maximum less the historical dispatch point for that resource during that interval.[1]

The amount by which units can move in this analysis was limited to 30 minutes of ramp capability. We include this in the analysis to reflect that faster ramping units are more effective in both overloading a constraint (by the pivotal supplier) and relieving the constraint (by other suppliers). Therefore, the distribution of faster and slower ramping units can affect a suppliers' ability to exercise local market power.

In conjunction with calculating how much power the supplier could cause to flow on the constraint, we also calculated how much relief all other suppliers could provide via redispatch. Again, this redispatch is limited by each resource's dispatch maximum, minimum, and 30 minutes of ramp capability. Given these limitations, a supplier is pivotal if the congestion it can cause less the relief available from others is enough to cause the constraint to be overloaded. Our analysis evaluates all suppliers on all constraints in all intervals and identifies those intervals and constraints where at least one supplier is pivotal.

Table 2 shows the transmission constraints with the eight highest pivotal supplier counts, which accounted for 49 percent of all pivotal supplier hours. Because pivotal supplier hours are more likely in hours when the constraint is binding, the results in Table 2 understandably show an overlap with the constraints that had the highest number of binding hours in (Shown in Table 1).

1 By limiting the resource redispatch range in this way, we did not account for commitment changes. Such changes are difficult to accurately evaluate for a number of reasons, including the fact that such changes may often be limited by operating protocols or tariff requirements or effectively addressed by operator actions.

Table 2: Pivotal Supplier on Binding Constraints in 2012

Constraint Name	Number of Pivotal Hours
SPS North – South Interface	1,604
Osage – Canyon 115 kV line for the loss of the Bushland Deaf Smith 230 kV line	1,414
Iatan – Stranger Creek 345 kV line for the loss of St. Joe – Iatan 345 kV line	1,247
Redbud – Arcadia 345 kV line for the loss of Redbud – Arcadia 345 kV line	579
Elk City 230/138kV Transformer for the loss of Tuco – Oklaunion 345 kV line	453
Mingo 345/115kV Transformer for the loss of Mingo – Setab 345 kV line	397
Pentagon – Mund 115kV line for the loss of Stranger Creek – Craig 345kV line	385
Medicine Lodge 135/115kV Transformer	346

One additional constraint appears on this table that was not in Table 1: the Medicine Lodge constraint. This constraint is associated with the congestion in the NW Kansas interface. As discussed above, aside from the Redbud-Arcadia flowgate, the constraints in the table are all associated with congestion into the areas that we ultimately recommend as FCAs.

Appendix A provides a list (in technical format) of the top 100 binding constraints during 2012, the number of hours they were identified as binding, and the number of hours in which at least one supplier was pivotal on the constraint.

B. Candidate FCAs

Using the binding constraints and the pivotal supplier results, we next identified electrically-related groups of constraints using characteristics of the physical transmission system. We analyzed the electrical location of constraints that bound in a significant number of hours in 2012.[2] We grouped the constraints based on their electrical proximity.

2 In particular, we examined the location of all constraints that bound for at least 40 hours. We also examined the data for 2011 and added constraints that met this same criteria if they were not already identified in the 2012 data.

The constraints were located in five distinct electrical/geographic groupings that define areas that encompassed much of the SPP. These five areas are:

(1) Texas Panhandle
(2) NW Kansas Import Interface
(3) Kansas City Area
(4) Oklahoma City
(5) Tulsa

This list reflects only the "candidate" FCAs. A final determination whether these candidate FCAs will be the recommended as FCAs is based primarily on the historical binding hours for the constraints associated with each of these areas. We establish this count by first identifying the "primary constraints" into each area.

Primary constraints are the constraints in each area that are most frequently binding (in terms of number of hours). To determine the units that are included in each FCA, we identify the units that significantly affect congestion in the area. Each unit's effect on each constraint is measured by its Generation Shift Factor ("GSF"), which indicates the portion of its output that flows over the constraint. Only units with negative GSFs are included in the FCAs because these units relieve the constraint. Hence, economic withholding of these units could increase congestion into the FCA and raise prices.

In order to include only those generators that significantly affect the primary constraints, we established a threshold that the units' GSF must satisfy. These were based on the effects of the largest supplier's resources on the constraints. For each primary constraint, we identified the supplier whose fleet of resources had the largest quantity of relief on the constraint (i.e., the supplier with the greatest capacity to withhold resources). We then found the unit representing the 90th percentile of the supplier's relief capability. We used the GSF of this generator as the cut off for all resources on the primary constraint. Because this GSF level would cause 90 percent of the relief capability of the largest supplier to be captured, it will also result in a large portion of the relief capability available from all suppliers. Hence, the potential FCA generators in these five areas are those with GSFs less than (more negative) than the GSF cutoffs. Table 3 shows the GSF cutoff for key primary constraints into each of the five candidate FCAs.

Table 3: Primary Constraints in Candidate FCAs

Candidate FCA	Constraint Name	GSF Cutoff
Texas Panhandle	Osage - Canyon East 115kV	-6%
NW Kansas Import Interface	Gentleman - Red Willow 345kV	-12%
Kansas City Area	Iatan - Stranger 345kV	-8%
	Lake Road - Alabama 161kV	-3%
Oklahoma City Area	Arcadia Transformer	-6%
	Redbud - Arcadia 345kV	-7%
Tulsa Area	Okmulgee - Henryetta 138kV	-3%

Note: We identified the Gentleman-Red Willow constraint as the primary constraint in the NW Kansas Import Interface FCA. Table 1 and Table 2 do not list this constraint in the top eight because these tables reference 2012 data and the Gentleman Red Willow constraint was more frequently binding in 2011. The constraint also represents a key component of the electrical area and therefore we identified it as the primary constraint.

Before designating the final recommended FCAs, we identified all of the other "secondary" constraints into the five areas in order to accurately gauge the incidence of congestion into each area. To identify secondary constraints, we identified the share of total congestion relief capability provided by the group of potential FCA generators on all non-primary constraints. In particular, we identified constraints as secondary if the potential FCA generator group as a whole provided at least 70 percent of the total relief capacity available on the constraint. Any constraints satisfying this criterion are included in the potential FCA for purposes of counting the annual number of constrained hours.

C. Final Results

Having identified all of the primary and secondary constraints into each area, we then counted the number of hours in 2011 and 2012 in which the constraints were binding and potentially susceptible to the exercise of market power.

A simple approach to this analysis would be to count any hour when any of the FCA constraints are binding. However, we believe that this can include a large number of hours when a large quantity of low-cost relief is available, which may not raise substantial market power concerns. Accordingly, for each set of candidate FCA constraints, we count all five-minute intervals when at least one constraint is binding and one of the FCA generators had a price impact on that constraint of $5 per MWh or more. The price impact is calculated by multiplying the constraint's shadow price by the GSF of the generator with the largest (positive or negative)

GSF. In other words, that constraint must be such that the generator that can most affect congestion on that constraint must have a price impact of $5 per MWh, which is the initial price impact threshold for the market power mitigation measure.

Utilizing this methodology, we identified the frequency of congestion into each candidate FCA. Table 4 shows the results of this count. It shows the results for 2011, 2012, and the average of the two years. This table also shows the share of these constrained hours with at least one pivotal supplier.

Table 4: Count of Constrained and Pivotal Supplier Hours

Candidate FCA		Constrained Hours	Share with Pivotal Supplier
TX Panhandle	Average	2,514	99%
	2011	3,084	100%
	2012	1,943	99%
NW Kansas Imports	Average	1,556	94%
	2011	1,089	89%
	2012	2,022	97%
Kansas City Area	Average	1,105	68%
	2011	901	59%
	2012	1,308	73%
Oklahoma City	Average	339	99%
	2011	173	100%
	2012	504	99%
Tulsa	Average	153	100%
	2011	172	100%
	2012	134	100%

Note: Constrained Hours include only those that at least one FCA generator has at least a $5 impact on an FCA constraint.

In three of these areas (Kansas City, NW Kansas, and the Texas Panhandle), constraints were binding an average of more than 1,000 hours per year and constraints in these areas had pivotal suppliers in at least two-thirds of binding intervals. We find that these results clearly support a recommendation that they be defined as FCAs.

For Oklahoma City and Tulsa, the annual number of binding hours averaged 339 hours and 153 hours, respectively. We do not recommend that either of these areas be defined as FCAs initially. The historical constraints into the Tulsa did not bind frequently enough to warrant its definition as an FCA.

The frequency of congestion into Oklahoma City fluctuated substantially from 2011 to 2012. Part of the reason for this fluctuation was that a transmission upgrade was implemented in June 2012 that required transmission outages to be taken while the upgrade was implemented. Because these outages will not likely reoccur in the future and because the upgrade itself should relieve congestion into Oklahoma City, we do not expect congestion into this area to be frequent enough to justify its definition as an FCA initially.

Accordingly, we propose that the following areas be designated as FCAs: Texas Panhandle, NW Kansas Import Interface, and the South to Kansas City area. While the study used 2011 and 2012 data, summary 2013 results reported in SPP's market monitoring reports confirm that each proposed area continues to exhibit frequent congestion. Hence, these three areas are the most chronically constrained areas in SPP and raise significant local market power concerns. Defining these areas as FCAs will allow SPP to apply slightly tighter criteria when applying its market power mitigation measures.

We do not recommend SPP define Oklahoma City and Tulsa as FCAs initially because these areas are not chronically constrained. Because the market power mitigation criteria are only slightly less tight (25 percent vs. 17.5 percent), not defining these areas as FCAs will not significantly increase customers' potential exposure to the exercise of market power. Nonetheless, if any suppliers withhold to increase prices in these areas by increasing congestion, this should increase the frequency of congestion and could justify the definition of one of these areas as an FCA in the future. Therefore, we recommend that SPP monitor congestion into all five of these areas and make changes to the FCA definitions as appropriate.

APPENDIX A: BINDING CONSTRAINTS AND PIVOTAL SUPPLIER HOURS

Constraint Name	Number of Binding Hours	Pivotal Supplier Hours	FCA/BCA
SPSNORTH_STH	1,671	1,604	TX Panhandle
OSGCANBUSDEA	1,483	1,414	TX Panhandle
TEMP40_17699	1,389	1,247	Kansas City Imports
IASCLKNASJHA	902	20	Kansas City Imports
REDARCREDARC	603	579	BCA
ELKXFRTUCOKU	453	453	BCA
MINXFRMINSET	422	397	NW Kansas
PENMUNSTRCRA	399	385	Kansas City Imports
TEMP02_17666	366	346	NW Kansas
TEMP56_18602	254	221	TX Panhandle
TEMP03_17735	235	231	BCA
ARCXFRARCNOW	217	215	BCA
GENTLMREDWIL	217	166	NW Kansas
OKMHENOKMKEL	209	203	BCA
GRAXFRSWEELK	195	232	BCA
SPPSPSTIES	186	168	TX Panhandle
TEMP32_18536	184	172	NW Kansas
IATSTRIATSTJ	174	168	Kansas City Imports
TEMP65_18635	174	171	BCA
SHEMABWHBKEO	172	164	BCA
TEMP25_18527	163	151	Kansas City Imports
TEMP49_17929	155	153	NW Kansas
TEMP30_17853	144	137	NW Kansas
TEMP41_18580	130	120	BCA
HECHUNREDMIN	126	116	NW Kansas
TEMP45_18119	126	115	NW Kansas
NEORIVNEODEL	125	119	BCA
GRAXFRGRANIC	122	119	NW Kansas
VALIANTLYDIA	121	112	BCA
MEDXFRREDMIN	119	108	NW Kansas
TEMP15_18082	119	114	BCA
TEMP64_18632	117	116	BCA
TEMP58_18003	115	116	TX Panhandle
TEMP19_17485	110	97	NW Kansas
NEORIVNEOMOR	109	98	BCA
TEMP48_18141	106	99	NW Kansas
TEMP15_18291	101	89	BCA

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Constraint Name	Number of Binding Hours	Pivotal Supplier Hours	FCA/BCA
TEMP44_17975	101	98	NW Kansas
TEMP26_18335	100	92	BCA
TEMP51_17702	98	93	NW Kansas
SSHWALDOLXFR	89	86	BCA
EROAVOFLIMON	88	84	BCA
TEMP01_17821	88	78	NW Kansas
LAKALASTJHAW	85	83	Kansas City Imports
SPSSPPTIES	85	84	BCA
TEMP31_17869	78	72	BCA
CIRKNGIATSTJ	76	74	BCA
RUSDARARKFTS	62	59	BCA
TEMP38_17974	56	55	Kansas City Imports
BRKXF2BRKXF1	52	50	BCA
TEMP73_18633	52	51	Kansas City Imports
ONEBANCLKCHA	51	49	BCA
TEMP47_17733	50	46	BCA
TEMP70_18185	48	50	NW Kansas
SUBTEKFTCRAU	46	46	BCA
TEMP11_18452	45	44	TX Panhandle
REDWILLMINGO	44	25	NW Kansas
TEMP36_17637	43	43	BCA
TEMP35_17872	42	34	BCA
TEMP13_18068	40	41	BCA
TEMP35_18556	38	33	BCA
HOLFLEHOLPLY	36	34	NW Kansas
NEORIVASBLIT	35	32	BCA
IATAN_STJOE	33	20	BCA
KSGHALWICREN	33	33	Kansas City Imports
TEMP11_18270	31	32	BCA
BEAEURMONBRK	30	29	BCA
TEMP47_18135	29	30	BCA
CRAASHVALLYD	28	27	BCA
TEMP04_18009	28	26	BCA
TEMP04_18683	27	27	BCA
LONSARPITVAL	26	25	BCA
TEMP15_17796	26	24	NW Kansas
TEMP28_18528	25	27	Kansas City Imports

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Constraint Name	Number of Binding Hours	Pivotal Supplier Hours	FCA/BCA
TEMP37_17875	25	21	BCA
TEMP63_18628	25	22	Kansas City Imports
WELLS_WEBER	21	21	BCA
TEMP23_18498	20	18	BCA
TEMP52_17988	20	19	BCA
TEMP66_18169	20	19	BCA
RUSDARANOFTS	19	19	BCA
TEMP04_18430	19	17	BCA
TEMP27_17785	19	19	NW Kansas
TEMP40_18695	19	16	BCA
ONEBANNESTUL	18	17	BCA
TEMP38_18397	18	17	BCA
TEMP55_17995	18	20	BCA
VALHUGVALLYD	18	18	BCA
TEMP26_17866	17	16	BCA
TEMP37_18563	16	14	TX Panhandle
NPLSTOGTLRED	15	15	NW Kansas
PLAKCISTRCRA	15	15	Kansas City Imports
TEMP32_17681	15	13	NW Kansas
MEDXFRSPEMUL	14	15	BCA
VOLPHICONMOS	14	11	BCA
TAHH59MUSFTS	13	13	BCA
TEMP04_17557	13	15	BCA
TEMP09_17741	13	12	BCA
GGS	12	12	NW Kansas
RANPALAMASWI	12	11	TX Panhandle
TEMP34_17972	12	10	Kansas City Imports
TEMP50_18037	12	12	BCA
TEMP58_18606	12	12	BCA
COOPER_S	11	4	Kansas City Imports
STMDSJFASJCO	11	11	BCA
TEMP01_18428	11	12	BCA

APPENDIX B: FCA GENERATORS

Generator PNODE Name	Kansas City Imports	NW Kansas	Texas Panhandle
EDEMWWF_EDEUNWINDFARM	X		
INDNIN_SMKHLUNWINDFARM	X		
INDNMO_CTY_GUN1	X		
INDNMO_CTY_GUN2	X		
INDNSUBIUN3	X		
INDNSUBIUN4	X		
INDNSUBJUN1	X		
INDNSUBJUN2	X		
INDNSUB_AUN1	X		
INDNSUB_AUN2	X		
INDNSUB_AUN3	X		
INDNSUB_AUNRCT1	X		
INDNSUB_HUN5	X		
INDNSUB_HUN6	X		
KACY6TH_KACYUNBOWERSOCK	X		
KACYKC_SMKHLUNWINDFARM	X		
KACYNEARMANUN1	X		
KACYNEARMANUNCT4	X		
KACYQUIND1UNCT1	X		
KACYQUIND1UNCT2	X		
KACYQUIND1UNCT3	X		
KACYQUIND1UNST1	X		
KACYQUIND1UNST2	X		
KCPLBULLCRK5UNUNIT1	X		
KCPLBULLCRK5UNUNIT2	X		
KCPLBULLCRK5UNUNIT3	X		
KCPLBULLCRK5UNUNIT4	X		
KCPLCIMRONUNCIMRON_WIND		X	
KCPLC_GARDNRUNGARD1	X		
KCPLC_GARDNRUNGARD2	X		
KCPLC_HIGGNSUNHIG4	X		
KCPLHAWTHORNUNHAW5	X		
KCPLHAWTHORNUNHAW6	X		
KCPLLACYGNEUNLAC1	X		
KCPLLACYGNEUNLAC2	X		
KCPLLEVEEUNHAW7	X		
KCPLLEVEEUNHAW8	X		

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Generator PNODE Name	Kansas City Imports	NW Kansas	Texas Panhandle
KCPLMONTROSEUNMON1	X		
KCPLMONTROSEUNMON2	X		
KCPLMONTROSEUNMON3	X		
KCPLNRTHEASTUNNE11	X		
KCPLNRTHEASTUNNE12	X		
KCPLNRTHEASTUNNE13	X		
KCPLNRTHEASTUNNE14	X		
KCPLNRTHEASTUNNE15	X		
KCPLNRTHEASTUNNE16	X		
KCPLNRTHEASTUNNE17	X		
KCPLNRTHEASTUNNE18	X		
KCPLPAOLAUNOSAW24	X		
KCPLPAOLAUNUN1_OSAWACT1	X		
KCPLSPEARVILUNWINDFARM		X	
KCPLS_OTTAWAUNOTTA3	X		
KCPLS_OTTAWAUNOTTA4	X		
KCPLS_OTTAWAUNOTTA6	X		
KCPLS_OTTAWAUNOTTA7	X		
KCPLWOLF_KCPUN17	X		
KCPLW_GARDNRUNBALD7	X		
KCPLW_GARDNRUNBALD8	X		
MPSENSIGNUNENSIGN_WIND		X	
MPSGRAYWINDUNWINDFARM		X	
MPSGRNWD1UN1	X		
MPSGRNWD1UN2	X		
MPSGRNWD1UN3	X		
MPSGRNWD1UN4	X		
MPSPAR_JECMUN1	X		
MPSPAR_JECMUN2	X		
MPSPAR_JECMUN3	X		
MPSPHILLUNDOGWOOD	X		
MPSRGREEN1UN3	X		
MPSSHARPER5UN1	X		
MPSSHARPER5UN2	X		
MPSSHARPER5UN3	X		
MPSSIBLEYUN1	X		
MPSSIBLEYUN2	X		

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Generator PNODE Name	Kansas City Imports	NW Kansas	Texas Panhandle
MPSSIBLEYUN3	X		
MPSTWA1UN1	X		
MPSTWA1UN2	X		
SECIBUCKNER7UNCIMRNCPV_WIND		X	
SECICIM-PL1UN1		X	
SECICIM-PL1UN2		X	
SECIGRDNCT1UN2		X	
SECIGRDNCT1UN3		X	
SECIGRDNCT1UN4		X	
SECIGRDNCT1UN5		X	
SECIGRNBUR1UNGREENWIND		X	
SECIHAGGAR1UNWINDFARM		X	
SECIHOLCOM1UN2		X	
SECIJUD-LR1UN1		X	
SECIMULGRE2UN1		X	
SECISC_SMKHLUNWINDFARM	X		
SECISC_SMKHLUNWINDFARM2	X		
SECISHOOTSTRUNSHOOTSTR_WIND		X	
SPSBLACKHAWUN1		X	
SPSBLACKHAWUN2		X	
SPSCAPROCKUNWINDFARM		X	X
SPSCARLSBADUN5		X	X
SPSCARSONUNEXLN_HPW1_WND		X	
SPSCARSONUNHIGHPLAINS		X	
SPSCHANNINGUNSUZLON8_WIND		X	
SPSCUNNSUBUN1		X	X
SPSCUNNSUBUN2		X	X
SPSCUNNSUBUN3		X	X
SPSCUNNSUBUN4		X	X
SPSDOLLARHIUNSUNE_SPS1		X	X
SPSDUMAS_SUPLT1		X	
SPSDWSFRSCOUNFRISCO_WIND		X	
SPSETTERPLT1		X	
SPSGRTPLAINUNWINDFARM		X	
SPSGSPWRUNGSPWR_WIND		X	
SPSHANSFORDUNEXELON4_WIND		X	
SPSHANSFORDUNJDWIND4		X	

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Generator PNODE Name	Kansas City Imports	NW Kansas	Texas Panhandle
SPSHARRSUBUN1		X	
SPSHARRSUBUN2		X	
SPSHARRSUBUN3		X	
SPSHENDRIC2UNRALLS_WIND		X	
SPSHERRING_PRINPLT1_2		X	
SPSHITCHUNNOVUS1_WIND		X	
SPSHOBBSPLT1		X	X
SPSHOPI_SUBUNSUNE_SPS5		X	X
SPSINDUSTR2UNENGCARBON1		X	
SPSINDUSTR2UNRICHARDSON1		X	
SPSJONESSUBUN1		X	X
SPSJONESSUBUN2		X	X
SPSJONESSUBUN3		X	X
SPSJONESSUBUN4			X
SPSLAMR_SPSUNPSCO_DCGEN		X	
SPSLEA_ROADUNSUNE_SPS3		X	X
SPSLLANOUNWNDFRM		X	
SPSLOVINGTOPLT1		X	X
SPSLOVINGTOUNWILDCATWIND		X	X
SPSLP-BRND2UNBRANDON1		X	X
SPSLP-COOP2UNLUBBOCK_WIND			X
SPSLP-HOLL2UNCOOKE_GT1		X	X
SPSLP-HOLL2UNCOOKE_GT2		X	X
SPSLP-HOLL2UNCOOKE_GT3		X	X
SPSLP-HOLL2UNCOOKE_ST1		X	X
SPSLP-HOLL2UNCOOKE_ST2		X	X
SPSLP-MACK2PLT1		X	X
SPSMADDOXSUUN1		X	X
SPSMADDOXSUUN2		X	X
SPSMADDOXSUUN3		X	X
SPSMAJESTICUNMAJESTC2_WIND		X	
SPSMAJESTICUNWINDFARM		X	
SPSMONUMENTUNSUNE_SPS4		X	X
SPSMOORE_COUN3		X	
SPSMOORE_COUNEXELON9_WIND		X	
SPSMOORE_COUNJDWIND9		X	
SPSMOORE_COUNSUNRAYWIND2		X	

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Generator PNODE Name	Kansas City Imports	NW Kansas	Texas Panhandle
SPSMSTNGPLT1		X	X
SPSMSTNGUN4		X	X
SPSMSTNGUN5		X	X
SPSMSTNGUN6_GSEC		X	X
SPSNICHSUBUN1		X	
SPSNICHSUBUN2		X	
SPSNICHSUBUN3		X	
SPSPALO_DURUNWTAMU_WIND		X	
SPSPLXSUBUN1		X	X
SPSPLXSUBUN2		X	X
SPSPLXSUBUN3		X	X
SPSPLXSUBUN4		X	X
SPSQUAYCNTYUNQUAYCOUNTY1		X	X
SPSRIVERVIEUN6		X	
SPSSAN_JUANUNWINDFARM		X	X
SPSSHERMANPLT1		X	
SPSSPEARMA1UNEXELON3_WIND		X	
SPSSPEARMA1UNJDWIND3		X	
SPSSPINSPURUNSPINSPUR_WIND		X	
SPSS_JALUNSUNE_SPS2		X	X
SPSTEXAS_COPLT1		X	
SPSTOLKSUBUN1		X	X
SPSTOLKSUBUN2		X	X
SPSWILDORADUNWINDFARM		X	
WRAECUN39	X		
WRCJOHNUN1	X		
WRCMCPHUN37	X		
WRCMCPHUN38	X		
WRCMCPHUN48	X		
WRCOLBY3UNGST		X	
WRCPWFUNWINDFARM		X	
WREMPECUNCTG_1	X		
WREMPECUNCTG_2	X		
WREMPECUNCTG_3	X		
WREMPECUNCTG_4	X		
WREMPECUNCTG_5	X		
WREMPECUNCTG_6	X		

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Generator PNODE Name	Kansas City Imports	NW Kansas	Texas Panhandle
WREMPECUNCTG_7	X		
WRGORDUN5	X		
WRGORDUN6	X		
WRGORDUNG1	X		
WRGORDUNG2	X		
WRGORDUNGT3	X		
WRHECGTUN32	X		
WRHECGTUN33	X		
WRHECGTUN34	X		
WRHECGTUN35	X		
WRHECUN31	X		
WRIRONWOODUNIRONWOOD_WIND		X	
WRJECUN10	X		
WRJECUN11	X		
WRJECUN12	X		
WRKNOLL1UNGOODMAN		X	
WRLACY_KGEUN13	X		
WRLACY_KGEUN14	X		
WRLECUN25	X		
WRLECUN26	X		
WRLECUN27	X		
WRMURRAUN3	X		
WRMWWFUNWINDFARM	X		
WRNORLUNROLL_MDW	X		
WRPRWINDUNPRWIND_WIND	X		
WRSHARP_WRUNSHARPE_KEPCO	X		
WRTECGTPLT1	X		
WRTECUN20	X		
WRTECUN21	X		
WRWACOUNOXYWACO	X		
WRWOLFUN15	X		
WRWOLFUNWR_KEPCO	X		
WRWR_SMKHLUNWINDFARM	X		
WRWR_SMKHLUNWINDFARM2	X		
WRWR_SMKHLUNWINDFARM_ENEL	X		
WRWR_SMKHLUNWINDFARM_SPRM	X		