



Aggregate Facility Study
SPP-2005-AG1-AFS

Supplemental Maps of Identified Constraints and Upgrades

SPP Engineering, SPP Tariff Studies

SPP AGGREGATE FACILITY STUDY (SPP-2005-AG1-AFS)

September 23, 2005

Table of Contents

1. Table of Identified Constraints and Upgrades
2. Constraint Maps
3. Upgrade Maps

Table 1 - Identified Constraints and Upgrade Mitigating Constraint

Owner	Identified Constraint	Upgrade	Solution	Earliest Date Upgrade Required (COD)	Estimated Date of Upgrade Completion (EOC)	Estimated Engineering & Construction Cost of Upgrade
AECI	NIXA #1 - SPRINGFIELD 161KV CKT 1	NIXA #1 - SPRINGFIELD 161KV CKT 1	Replace conductor with high ampacity 795 MCM ACSS conductor. No structure changes included.	06/01/15	06/01/15	\$ 106,600
AEPW	ALTUS JUNCTION 69KV	Altus Loop	Convert OMPA 69 kV load to 138 kV and build 138 kV loop around city of Altus	06/01/06	06/01/08	\$ 8,000,000
AEPW	SNYDER - TIPTON & HEADERICK 69KV CKT 1	Altus Loop	Convert OMPA 69 kV load to 138 kV and build 138 kV loop around city of Altus	06/01/06	06/01/08	\$ 8,000,000
AEPW	TAMARAC TAP 138KV	Altus Loop	Convert OMPA 69 kV load to 138 kV and build 138 kV loop around city of Altus	06/01/06	06/01/08	\$ 8,000,000
AEPW	CLARKSVILLE - MUSKOGEE 345KV CKT 1	CLARKSVILLE - MUSKOGEE 345KV CKT 1 AEPW	Rebuild 2.54 miles with 2-795 ACSR & reset Clarksville CT, Replace Switches & Breakers @ Clarksville.	06/01/13	06/01/13	\$ 4,000,000
AEPW	CLINTON CITY - FOSS TAP 69KV CKT 1	CLINTON CITY - FOSS TAP 69KV CKT 1	Replace Clinton City wavetrap	06/01/06	06/01/07	\$ 75,000
AEPW	EXPLORER GLENPOOL - RIVERSIDE STATION 138KV CKT 1	EXPLORER GLENPOOL - RIVERSIDE STATION 138KV CKT 1 AEPW	Reconductor 1.9 miles with ACCC. Replace wave trap jumpers at Riverside.	06/01/10	06/01/10	\$ 1,000,000
AEPW	AIRPORT 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	AMOCO 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	AMOCO TAP 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	CAREY 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	CHILDRESS 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	CLARENDON 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	CLARENDON REA 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	ESTELENE 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	HEDLEY 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	MCLEAN RURAL 115KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	MEMPHIS 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	NORTH MEMPHIS REA 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	NW MEMPHIS 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	RED RIVER ARSENAL 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	SHAMROCK 138KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	SHAMROCK 69KV	Hedley 4 Mvar DVAR	Install a new 4 Mvar DVAR	06/01/10	06/01/10	\$ 1,000,000
AEPW	NORTHWEST HENDERSON - OAK HILL #1 138KV CKT 1	NORTHWEST HENDERSON - OAK HILL #1 138KV CKT 1	Replace wavetrap and reset CTs @ NW Henderson	06/01/07	06/01/07	\$ 75,000
AEPW	ORU WEST TAP - RIVERSIDE STATION 138KV CKT 1	ORU WEST TAP - RIVERSIDE STATION 138KV CKT 1	Replace wavetrap jumpers @ Riverside	06/01/10	06/01/10	\$ 10,000
AEPW	SHAMROCK 115KV	SHAMROCK 115KV	Install 9.6 MVAR capacitor bank	06/01/07	06/01/07	\$ 300,000
AEPW	ALTUS JUNCTION - OMPA-ALTUS PARK 69KV CKT 1	Snyder - Altus Jct 138KV	Build new Snyder (54098) to Altus Jct (54103) 138 kV lin	06/01/06	06/01/08	\$ 15,000,000
AEPW	ALTUS JUNCTION 138KV	Snyder - Altus Jct 138KV	Build new Snyder (54098) to Altus Jct (54103) 138 kV lin	06/01/06	06/01/08	\$ 15,000,000
AEPW	CARNEGIE - FORT COBB 138KV CKT 1	Snyder - Altus Jct 138KV	Build new Snyder (54098) to Altus Jct (54103) 138 kV lin	06/01/06	06/01/08	\$ 15,000,000
AEPW	CARNEGIE - HOBART JUNCTION 138KV CKT 1	Snyder - Altus Jct 138KV	Build new Snyder (54098) to Altus Jct (54103) 138 kV lin	06/01/06	06/01/08	\$ 15,000,000
AEPW	DAVIDSON 69KV	Snyder - Altus Jct 138KV	Build new Snyder (54098) to Altus Jct (54103) 138 kV lin	06/01/06	06/01/08	\$ 15,000,000
AEPW	DAVIDSON TAP 69KV	Snyder - Altus Jct 138KV	Build new Snyder (54098) to Altus Jct (54103) 138 kV lin	06/01/06	06/01/08	\$ 15,000,000
AEPW	FORT COBB - SOUTHWEST STATION 138KV CKT 1	Snyder - Altus Jct 138KV	Build new Snyder (54098) to Altus Jct (54103) 138 kV lin	06/01/06	06/01/08	\$ 15,000,000
AEPW	HOBART JUNCTION - TAMARAC TAP 138KV CKT 1	Snyder - Altus Jct 138KV	Build new Snyder (54098) to Altus Jct (54103) 138 kV lin	06/01/06	06/01/08	\$ 15,000,000
AEPW	SNYDER (SNYDER) 138/69/13.8KV TRANSFORMER CKT 1	Snyder - Altus Jct 138KV	Build new Snyder (54098) to Altus Jct (54103) 138 kV lin	06/01/06	06/01/08	\$ 15,000,000
AEPW	VERNON TAP 69KV	Snyder - Altus Jct 138KV	Build new Snyder (54098) to Altus Jct (54103) 138 kV lin	06/01/06	06/01/08	\$ 15,000,000
AEPW	WALTERS 69KV	Snyder - Altus Jct 138KV	Build new Snyder (54098) to Altus Jct (54103) 138 kV lin	06/01/06	06/01/08	\$ 15,000,000
AEPW	WEATHERFORD SOUTHEAST (WITH SE) 138/69/13.8KV TRANSFORMER CKT 1	WEATHERFORD SOUTHEAST (WITH SE) 138/69/13.8KV TRANSFORMER CKT 1	Install new 90 MVA Auto	04/01/06	06/01/07	\$ 1,600,000
AEPW	WELSH REC - WILKES 138KV CKT 1	WELSH REC - WILKES 138KV CKT 1	Replace line switches and switch 1L76 @ Wilke	06/01/10	06/01/10	\$ 250,000
AEPW	WHITNEY (WHITNEY1) 138/69/12.47KV TRANSFORMER CKT 1	WHITNEY 138/69/12.5KV TRANSFORMER	Move load from 69 kV to 138 kV	06/01/07	06/01/07	\$ 1,750,000
AEPW	WHITNEY (WHITNEY2) 138/69/12.47KV TRANSFORMER CKT 2	WHITNEY 138/69/12.5KV TRANSFORMER	Move load from 69 kV to 138 kV	06/01/07	06/01/07	\$ 1,750,000
AEPW	ELK CITY (ELKCTY-4) 138/69/13.8KV TRANSFORMER CKT 1	ELK CITY (ELKCTY-4) 138/69/13.8KV TRANSFORMER CKT 1	Replace switches	06/01/10	06/01/10	\$ 85,000
EMDE	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV CKT 1	JAMESVILLE - SUB 415 - BLACKHAWK JCT. 69KV CKT 1	Construct new 161 kV line from Bolivar Burns #73 59464 to a new 161 kV bus at FairGrove #397 (FRG397 5 Bus #59596)	06/01/15	06/01/15	\$ 15,350,000
EMDE	SUB 110 - ORONOJO JCT. (ORONOJO) 161/69/12.5KV TRANSFORMER CKT 1	Oronogo new 161/12 kV 22.4 MVA transformer	Install new 161/12 kV 22.4 MVA transformer and take load off 69 kV system	06/01/15	06/01/15	\$ 2,000,000
EMDE	OZARKS (OZARK) 161/69/12.5KV TRANSFORMER CKT 1	OZARKS (OZARK) 161/69/12.5KV TRANSFORMER CKT 1	Replace 75 MVA auto-xfmr at Ozark SE with 100 MVA auto-xfmr	06/01/10	06/01/10	\$ 1,000,000
EMDE	SUB 110 - ORONOJO JCT. - SUB 167 - RIVERTON 161KV CKT 1	SUB 110 - ORONOJO JCT. - SUB 167 - RIVERTON 161KV CKT 1	Reconductor Oronogo 59467 to Riverton 59469 with Bundlec 556 ACSR	06/01/15	06/01/15	\$ 5,400,000
EMDE	SUB 209 - HERMITAGE 69KV	SUB 209 - HERMITAGE 69KV	Install 2 - stages 6 MVAR each for a total of 12 MVAR capacitor bank at Hermitage 59425	06/01/15	06/01/15	\$ 1,040,000
EMDE	SUB 330 - OZARK NORTHWEST - SUB 415 - BLACKHAWK JCT. 69KV CKT 1	SUB 330 - OZARK NORTHWEST - SUB 415 - BLACKHAWK JCT. 69KV CKT 1	Reconductor 69 kV portion of line from 59570 to 59604 with 336 ACSR	06/01/10	06/01/10	\$ 480,000
EMDE	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV CKT 1	SUB 389 - JOPLIN SOUTHWEST - SUB EXPLORER SPRING CITY TAP 69KV CKT 1	Reconductor 69 kV line from 59438 to 59592 with 556 ACSR	06/01/15	06/01/15	\$ 400,000
EMDE	SUB 390 - PURDY SOUTH 69KV	SUB 390 - PURDY SOUTH 69KV	Lindy at 59563 is dropped for contingency	06/01/15	06/01/15	\$ 400,000
GRRD	412SUB - KANSAS TAP 161KV CKT 1	412SUB - KANSAS TAP 161KV CKT 1	Install 2 - stages 6 MVAR each for a total of 12 MVAR capacitor bank at Purdy #390 59404	06/01/10	06/01/10	\$ 1,040,000
GRRD	412SUB - KERR 161KV CKT 1	412SUB - KERR 161KV CKT 1	Reconductor 9.7 miles with 1590MCM ACSR	06/01/15	06/01/15	\$ 1,488,000
KACP	WEST GARDNER (WGARD 11) 345/161/13.8KV TRANSFORMER CKT 11	WEST GARDNER (WGARD 11) 345/161/13.8KV TRANSFORMER CKT 11	Reconductor 12.5 miles with 1590MCM ACSR	06/01/15	06/01/15	\$ 1,918,000
MIPU	BLUE SPRINGS EAST - DUNCAN ROAD 161KV CKT 1	BLUE SPRINGS EAST - DUNCAN ROAD 161KV CKT 1	Replace existing transformer with larger one	06/01/06	06/01/07	\$ 3,000,000
MIPU	EAST - WOODBINE 161KV CKT 1	EAST - WOODBINE 161KV CKT 1	Conductor	06/01/07	06/01/07	\$ 1,605,500
MIPU	BELTON SOUTH - TURNER ROAD SUBSTATION 161KV CKT 1	MONTROSE - SHARPER - STILWELL 161 kV	Structure replacement - Higher line rating	06/01/10	06/01/10	\$ 150,000
MIPU	BELTON SOUTH 161/69KV TRANSFORMER CKT 1	MONTROSE - SHARPER - STILWELL 161 kV	Two new lines, S Harper - NewTap(Stilwell/Montose), S Harper-NewTap2(Stilwell/Archie)	06/01/07	06/01/07	\$ 4,000,000
MIPU	GRD OAK - SHARPER 161KV CKT 1	MONTROSE - SHARPER - STILWELL 161 kV	Two new lines, S Harper - NewTap(Stilwell/Montose), S Harper-NewTap2(Stilwell/Archie)	06/01/07	06/01/07	\$ 4,000,000
MIPU	MARTIN CITY - TURNER ROAD SUBSTATION 161KV CKT 1	MONTROSE - SHARPER - STILWELL 161 kV	Two new lines, S Harper - NewTap(Stilwell/Montose), S Harper-NewTap2(Stilwell/Archie)	06/01/07	06/01/07	\$ 4,000,000
MIPU	RALPH GREEN 69KV	RALPH GREEN 69KV	12MVAR at Ralph Green	06/01/07	06/01/07	\$ 350,000
OKGE	BEEELINE - EXPLORER GLENPOOL 138KV CKT 1	BEEELINE - EXPLORER GLENPOOL 138KV CKT 1	Reconductor .92miles of line with Drake ACCC/TW	06/01/10	06/01/10	\$ 200,000

Table 1 - Identified Constraints and Upgrade Mitigating Constraint

Owner	Identified Constraint	Upgrade	Solution	Earliest Date Upgrade Required (COD)	Estimated Date of Upgrade Completion (EOC)	Estimated Engineering & Construction Cost of Upgrade
OKGE	CLARKSVILLE - MUSKOGEE 345KV CKT 1	CLARKSVILLE - MUSKOGEE 345KV CKT 1 OKGE	Change 2-345kV breakers to 3000A, a trap to 3000A, 5 switches to 3000A, and 2 differential relays	06/01/13	06/01/13	\$ 955,000
OKGE	CLASSEN - SW 5TAP 138KV CKT 1	CLASSEN - SW 5TAP 138KV CKT 1	Replace 800A trap at Classer	06/01/06	06/01/07	\$ 50,000
OKGE	EXPLORER GLENPOOL - RIVERSIDE STATION 138KV CKT 1	EXPLORER GLENPOOL - RIVERSIDE STATION 138KV CKT 1 OKGE	Reconductor 1.82 miles	06/01/10	06/01/10	\$ 400,000
OKGE	KNOBHILL (KNOBHIL4) 138/69/13.2KV TRANSFORMER CKT 1	KNOBHILL (KNOBHIL4) 138/69/13.2KV TRANSFORMER CKT 1	Replace bus tie with 100MVA transome	06/01/10	06/01/10	\$ 1,500,000
SWPS	CUNNINGHAM STATION 230/115KV TRANSFORMER CKT 1	LEA COUNTY INTERCHANGE 230/115KV TRANSFORMER	Add 2nd 150 MVA transformer at Lea Co Intg	12/01/10	12/01/10	\$ 3,000,010
SWPS	LEA COUNTY INTERCHANGE 230/115KV TRANSFORMER CKT 1	LEA COUNTY INTERCHANGE 230/115KV TRANSFORMER	Add 2nd 150 MVA transformer at Lea Co Intg	12/01/10	12/01/10	\$ 3,000,010
SWPS	MUSTANG STATION 230/115KV TRANSFORMER CKT 1	MUSTANG STATION 230/115KV TRANSFORMER CKT 1	Upgrade existing transformer 230/115 kV 252 MV	12/01/10	12/01/10	\$ 2,500,000
SWPS	CANYON EAST - CANYON WEST 115KV CKT 1	Potter - Roosevelt 345KV	New 345 kV circuit & 345/230 kV 560 MVA transformer Add Potter - Roosevelt 2-795 ACSR	06/01/10	06/01/10	\$ 45,104,390
SWPS	CANYON EAST - OSAGE SWITCHING STATION 115KV CKT 1	Potter - Roosevelt 345KV	New 345 kV circuit & 345/230 kV 560 MVA transformer Add Potter - Roosevelt 2-795 ACSR	06/01/10	06/01/10	\$ 45,104,390
SWPS	FRIONA - HEREFORD INTERCHANGE 115KV CKT 1	Potter - Roosevelt 345KV	New 345 kV circuit & 345/230 kV 560 MVA transformer Add Potter - Roosevelt 2-795 ACSR	06/01/10	06/01/10	\$ 45,104,390
SWPS	HAPPY INTERCHANGE - PALODU 115KV CKT 1	Potter - Roosevelt 345KV	New 345 kV circuit & 345/230 kV 560 MVA transformer Add Potter - Roosevelt 2-795 ACSR	06/01/10	06/01/10	\$ 45,104,390
SWPS	MANHTP3 - OSAGE SWITCHING STATION 115KV CKT 1	Potter - Roosevelt 345KV	New 345 kV circuit & 345/230 kV 560 MVA transformer Add Potter - Roosevelt 2-795 ACSR	06/01/10	06/01/10	\$ 45,104,390
SWPS	NICHOLS STATION 230/115KV TRANSFORMER CKT 2	Potter - Roosevelt 345KV	New 345 kV circuit & 345/230 kV 560 MVA transformer Add Potter - Roosevelt 2-795 ACSR	06/01/10	06/01/10	\$ 45,104,390
SWPS	PALODU - RANDALL COUNTY INTERCHANGE 115KV CKT 1	Potter - Roosevelt 345KV	New 345 kV circuit & 345/230 kV 560 MVA transformer Add Potter - Roosevelt 2-795 ACSR	06/01/10	06/01/10	\$ 45,104,390
SWPS	POTTER COUNTY INTERCHANGE (POTTR CO) 345/230/13.2KV TRANSFORMER CKT 1	Potter - Roosevelt 345KV	New 345 kV circuit & 345/230 kV 560 MVA transformer Add Potter - Roosevelt 2-795 ACSR	06/01/10	06/01/10	\$ 45,104,390
SWPS	ROOSEVELT COUNTY INTERCHANGE - TOLK INTERCHANGE 230KV CKT 1	Potter - Roosevelt 345KV	New 345 kV circuit & 345/230 kV 560 MVA transformer Add Potter - Roosevelt 2-795 ACSR	06/01/10	06/01/10	\$ 45,104,390
SWPS	ROOSEVELT COUNTY INTERCHANGE - TOLK INTERCHANGE 230KV CKT 2	Potter - Roosevelt 345KV	New 345 kV circuit & 345/230 kV 560 MVA transformer Add Potter - Roosevelt 2-795 ACSR	06/01/10	06/01/10	\$ 45,104,390
WFEC	ANADARKO - CYRIL 69KV CKT 1	ANADARKO - CYRIL 69KV CKT 1	Reconductor 13 miles from 336 to 795 ACSR	06/01/06	06/01/07	\$ 3,250,000
WFEC	ANADARKO - GEORGIA 138KV CKT 1	ANADARKO - GEORGIA 138KV CKT 1	Replace switches, CTS and Wavetraps at Anadarko Switch, rebuild Anadarko Switch to Georgia Street from 477 to 795 for 3 miles	06/01/10	06/01/10	\$ 100,000
WFEC	ANADARKO 138/69KV TRANSFORMER CKT 1	ANADARKO 138/69KV TRANSFORMER CKT 1	Install 2nd 112 MVA auto in parallel with existing Ur	06/01/06	06/01/07	\$ 2,000,000
WFEC	CYRIL - MEDICINE PARK JCT 69KV CKT 1	CYRIL - MEDICINE PARK JCT 69KV CKT 1	Reconductor 12.9 miles from 336 to 795 ACSR	06/01/06	06/01/07	\$ 3,300,000
WFEC	FLETCHER - MEDICINE PARK JCT 69KV CKT 1	FLETCHER - MEDICINE PARK JCT 69KV CKT 1	Reconductor 4 miles from 336 to 795 ACSR	06/01/15	06/01/15	\$ 1,800,000
WFEC	FT SUPPLY 138/69KV TRANSFORMER CKT 1	FT SUPPLY 138/69KV TRANSFORMER CKT 1	Install 2nd 70 MVA auto at Ft Suppl	06/01/06	06/01/07	\$ 1,500,000
WFEC	HAMON BUTLER - MOREWOOD 69KV CKT 1	HAMON BUTLER - MOREWOOD 69KV CKT 1	Reconductor 1/0 to 336 ACSR - 15.0 miles	06/01/06	06/01/07	\$ 3,400,000
WFEC	ALTUS 69KV	Russell Switch	Increase 12 to 18 MVARs at Russell Switcl	06/01/06	10/01/06	\$ 75,000
WFEC	ALTUS AIF FORCE BASE 69KV	Russell Switch	Increase 12 to 18 MVARs at Russell Switcl	06/01/06	10/01/06	\$ 75,000
WFEC	ALTUS SW 69KV	Russell Switch	Increase 12 to 18 MVARs at Russell Switcl	06/01/06	10/01/06	\$ 75,000
WFEC	DIVERSION 69KV	Russell Switch	Increase 12 to 18 MVARs at Russell Switcl	06/01/06	10/01/06	\$ 75,000
WFEC	ELECTRA SW 69KV	Russell Switch	Increase 12 to 18 MVARs at Russell Switcl	06/01/06	10/01/06	\$ 75,000
WFEC	ESQUANDALE 69KV	Russell Switch	Increase 12 to 18 MVARs at Russell Switcl	06/01/06	10/01/06	\$ 75,000
WFEC	ESQUANDALE JCT 69KV	Russell Switch	Increase 12 to 18 MVARs at Russell Switcl	06/01/06	10/01/06	\$ 75,000
WFEC	GRANITE 69KV	Russell Switch	Increase 12 to 18 MVARs at Russell Switcl	06/01/06	10/01/06	\$ 75,000
WFEC	GYPSUM 69KV	Russell Switch	Increase 12 to 18 MVARs at Russell Switcl	06/01/06	10/01/06	\$ 75,000
WFEC	HOLLIS 69KV	Russell Switch	Increase 12 to 18 MVARs at Russell Switcl	06/01/06	10/01/06	\$ 75,000
WFEC	LOCKETT 69KV	Russell Switch	Increase 12 to 18 MVARs at Russell Switcl	06/01/06	10/01/06	\$ 75,000
WFEC	RUSSELL 138KV	Russell Switch	Increase 12 to 18 MVARs at Russell Switcl	06/01/06	10/01/06	\$ 75,000
WPEK	GREENSBURG - JUDSON LARGE 115KV CKT 1	GREENSBURG - JUDSON LARGE 115KV CKT 1	Replace relaying	06/01/08	06/01/08	\$ 153,114
WPEK	MEDICINE LODGE 115KV	Pratt City Capacitor	20MVAR at Pratt City 115kV	04/01/06	12/01/06	\$ 1,129,660
WPEK	MEDICINE LODGE 138KV	Pratt City Capacitor	20MVAR at Pratt City 115kV	04/01/06	12/01/06	\$ 1,129,660
WPEK	PRATT 115KV	Pratt City Capacitor	20MVAR at Pratt City 115kV	04/01/06	12/01/06	\$ 1,129,660
WPEK	ST JOHN 115KV	Pratt City Capacitor	20MVAR at Pratt City 115kV	04/01/06	12/01/06	\$ 1,129,660
WPEK	SUN CITY 115KV	Pratt City Capacitor	20MVAR at Pratt City 115kV	04/01/06	12/01/06	\$ 1,129,660
WR	BELL - PECK 69KV CKT 1	BELL - PECK 69KV CKT 1	Rebuild 8.23 mile Bell-Peck 69 kV line	06/01/08	06/01/08	\$ 2,000,000
WR	BELL - SUMNER COUNTY NO. 3 MILLER 69KV CKT 1	BELL - SUMNER COUNTY NO. 3 MILLER 69KV CKT 1	Rebuild 7.3 miles of line	06/01/15	06/01/15	\$ 2,000,000
WR	CRESWELL - OAK 69KV CKT 1	CRESWELL - OAK 69KV CKT 1	Rebuild substations	06/01/11	06/01/11	\$ 143,000
WR	GILL ENERGY CENTER WEST - PECK 69KV CKT 1	GILL ENERGY CENTER WEST - PECK 69KV	Rebuild 10.46 mile Gill-Peck line 138 kV line, but operated a 69 kV	06/01/08	06/01/08	\$ 3,000,000
WR	KELLY - KING HILL N.M. COOP 115KV CKT 1	KELLY - KING HILL N.M. COOP 115KV CKT 1	Reconductor 9.61 mile line with 1192.5 kcmil ACSR	10/01/05	06/01/08	\$ 2,400,000
WR	KELLY - SOUTH SENECA 115KV CKT 1	KELLY - SOUTH SENECA 115KV CKT 1	Rebuild 10.28 mile line with 1192.5 kcmil ACSR and replace CTS.	04/01/06	06/01/08	\$ 2,900,000
WR	MIDIAN (MIDIAN1X) 138/69/13.2KV TRANSFORMER CKT 1	MIDIAN (MIDIAN1X) 138/69/13.2KV TRANSFORMER CKT 1	Replace Midian 138-69 kV transformer	06/01/06	06/01/07	\$ 1,500,000
WR	RICHLAND - ROSE HILL JUNCTION 69KV CKT 1	RICHLAND - ROSE HILL JUNCTION 69KV CKT 1	Rebuild 5.43 mile Rose Hill Junction-Richland as a 138 kV line but operate at 69 kV.	06/01/10	06/01/10	\$ 1,500,000
WR	ROSE HILL JUNCTION - WEAVER 69KV CKT 1	ROSE HILL JUNCTION - WEAVER 69KV CKT 1	Rebuild 5.73 mile Weaver-Rose Hill Junction as a 138 kV line but operate at 69 kV.	06/01/07	06/01/07	\$ 1,600,000
WR	JARBALO JUNCTION SWITCHING STATION - STRANGER CREEK 115KV CKT 1	STRANGER - THORTON 115 KV CKT 1	Stranger - Thorton 115 kV 7.1 miles	06/01/15	06/01/15	\$ 2,200,000
WR	EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115KV CKT 1	Wichita - Reno Co 345KV	Build 345KV from Wichita to Reno Cc	10/01/05	06/01/10	\$ 42,000,000
WR	EXIDE JUNCTION - SUMMIT 115KV CKT 1	Wichita - Reno Co 345KV	Build 345KV from Wichita to Reno Cc	10/01/05	06/01/10	\$ 42,000,000
WR	NORTH AMERICAN PHILIPS - NORTH AMERICAN PHILIPS JUNCTION (SOUTH) 115KV CKT 1	Wichita - Reno Co 345KV	Build 345KV from Wichita to Reno Cc	10/01/05	06/01/10	\$ 42,000,000
WR	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 1	Wichita - Reno Co 345KV	Build 345KV from Wichita to Reno Cc	10/01/05	06/01/10	\$ 42,000,000
WR	NORTH AMERICAN PHILIPS JUNCTION (SOUTH) - WEST MCPHERSON 115KV CKT 2	Wichita - Reno Co 345KV	Build 345KV from Wichita to Reno Cc	10/01/05	06/01/10	\$ 42,000,000
WR	NORTHVIEW - SUMMIT 115KV CKT 1	Wichita - Reno Co 345KV	Build 345KV from Wichita to Reno Cc	10/01/05	06/01/10	\$ 42,000,000

Table 1 - Identified Constraints and Upgrade Mitigating Constraint

Construction Pending - The requested service is contingent upon completion of the following upgrades. Cost is not assignable to the transmission custorm

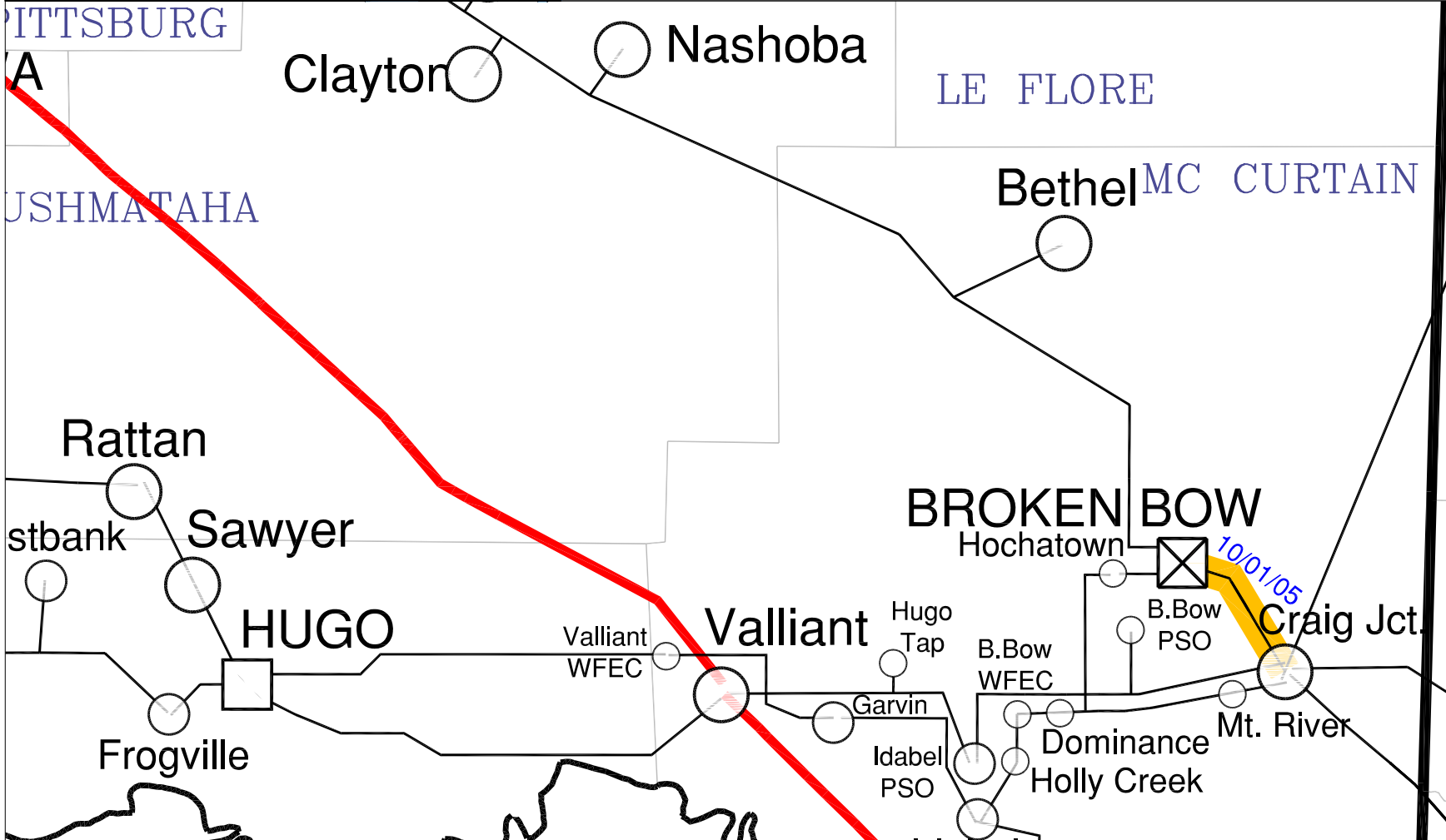
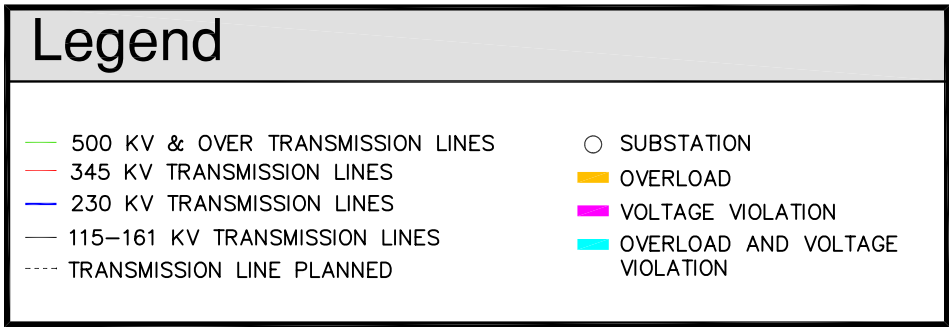
Owner	Identified Constraint	Upgrade	Solution	Earliest Date Upgrade Required (COD)	Estimated Date of Upgrade Completion (EOC)
AEPW	BROKEN ARROW 101ST NORTH - ONETA 138KV CKT 1	AEP Tulsa Project	AEP Tulsa Project	06/01/06	06/01/07
AEPW	SAND SPRINGS - WEST EDISON TAP 138KV CKT 1	AEP Tulsa Project	AEP Tulsa Project	06/01/06	06/01/07
AEPW	BEN279 - EAST CENTERTON 161KV CKT 1	AEPW PLANNED UPGRADE FOR NW ARKANSAS	NW Project phase II scheduled to be in-service 06/2006	10/01/05	06/01/09
AEPW	BEN279 - GENTRY REC 161KV CKT 1	AEPW PLANNED UPGRADE FOR NW ARKANSAS	NW Project phase II scheduled to be in-service 06/2006	10/01/05	06/01/09
AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV CKT 1	AEPW PLANNED UPGRADE FOR NW ARKANSAS	NW Project phase II scheduled to be in-service 06/2006	10/01/05	06/01/09
AEPW	CHAMBER SPRINGS - TONTITOWN 161KV CKT 1	AEPW PLANNED UPGRADE FOR NW ARKANSAS	NW Project phase II scheduled to be in-service 06/2006	10/01/05	06/01/09
AEPW	FLINT CREEK - GENTRY REC 161KV CKT 1	AEPW PLANNED UPGRADE FOR NW ARKANSAS	NW Project phase II scheduled to be in-service 06/2006	10/01/05	06/01/09
AEPW	FLINT CREEK - TONTITOWN 161KV CKT 1	AEPW PLANNED UPGRADE FOR NW ARKANSAS	NW Project phase II scheduled to be in-service 06/2006	10/01/05	06/01/09
AEPW	FLINT CREEK - GENTRY REC 161KV CKT 1	Flint Creek to East Centerton 345 kV	SPP Expansion Plan Project to build 345 kV line from East Centerton to Flint Creek and install 345/161 kV auto at East Centerton.	06/01/10	06/01/11
AEPW	KNOX LEE - OAK HILL #2 138KV CKT 1	KNOX LEE - OAK HILL #2 138KV	SPP Expansion Plan Project to Replace relay, wave trap and switch at Knoxlee and switch at Oak Hill #2	06/01/06	06/01/07
AEPW	ALTO (ETEC) 138KV	RAYBURN PROJECT	Rayburn Project	06/01/15	06/01/15
AEPW	PINE GROVE (ETEC) 138KV	RAYBURN PROJECT	Rayburn Project	06/01/15	06/01/15
EMDE	JAMESVILLE (JAMESV1) 161/69/13.8KV TRANSFORMER CKT 1	JAMESVILLE (JAMESV1) 161/69/13.8KV TRANSFORMER CKT 1	The upgrade includes 8 miles of a new 161 kV line from AECI's Riverdale Sub (Bus # 96726) to a new EMDE substation location near Ozark (Bus #59621). The Ozark substation will include a 75 MVA 161/69 kV auto-xfmr. The 69 kV side (Bus #59442) of the Auto-	06/01/06	06/01/07
EMDE	JAMESVILLE (JAMESV2) 161/69/13.8KV TRANSFORMER CKT 2	JAMESVILLE (JAMESV1) 161/69/13.8KV TRANSFORMER CKT 1	The upgrade includes 8 miles of a new 161 kV line from AECI's Riverdale Sub (Bus # 96726) to a new EMDE substation location near Ozark (Bus #59621). The Ozark substation will include a 75 MVA 161/69 kV auto-xfmr. The 69 kV side (Bus #59442) of the Auto-	06/01/06	06/01/07
MIPU	ST JOE - WOODBINE 161KV CKT 1	ST JOE - WOODBINE 161KV CKT 1	Structure replacement - Higher line rating	06/01/07	12/01/05
MIPU	COLE CAMP 69KV	Warsaw interconnection	New Warsaw interconnection with AEC	06/01/15	06/01/15
SUNC	HOLCOMB - PLYMELL 115KV CKT 1	HOLCOMB - PLYMELL 115KV CKT 1	Expansion Plan Project to Reconduct	06/01/06	06/01/08
SWPS	TUCO INTERCHANGE 230/115KV TRANSFORMER CKT 1	TUCO INTERCHANGE 230/115KV TRANSFORMER CKT 1	Upgrade TUCO Interchange 230/115 kV transformer for SPP 2004-006,007,008,009 WTMPA Services	06/01/08	06/01/08
SWPS	TUCO INTERCHANGE 230KV	TUCO INTERCHANGE 230KV	SPS Proposed Plan to Add +150/-50 SVC on 230 kV bus at TUCO, 2 50 MVAR Shunt Capacitors on 230 kV bus at TUCO, and 50 MVAR Shunt Capacitors on 230 kV bus at Swisher, 50 MVAR Shunt Capacitors on 230 kV bus at Lubbock South, and 50 MVAR Shunt Capacitors on	06/01/07	06/01/07
WPEK	ALEXANDER 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	BEMIS 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	EAST HALL TAP 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	ELLSWORTH 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	GLEN ELDER 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	GREAT BEND 2ND AND KANSAS 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	GREAT BEND FREY STREET 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	GREAT BEND TAP 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	JEWELL 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	MULLERGREN 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	NORTH WEST GREAT BEND 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	OTIS 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	PHILLIPSBURG 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	PLAINVILLE 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	RUSSELL 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	SALINE RIVER 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	SEWARD 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	SMITH CENTER 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WPEK	WALDO 115KV	Plainville Capacitor	40MVAR at Plainville 115kV assigned in Expansion Plan with required in-service date of 6/1/2006	06/01/06	06/01/07
WR	CRESWELL - PARIS 69KV CKT 1	CRESWELL - PARIS 69KV CKT 1	Approved Expansion Plan Project 6/1/2006 In-Service Date	06/01/06	06/01/07

Table 1 - Identified Constraints and Upgrade Mitigating Constraint

Expansion Plan Projects - The requested service is contingent upon completion of the following upgrades. Cost is not assignable to the transmission customer

Owner	Identified Constraint	Upgrade	Solution	Earliest Date Upgrade Required (COD)	Estimated Date of Upgrade Completion (EOC)
AEPW	ALUMAX TAP - BANN 138KV CKT 1	ALUMAX TAP - BANN 138KV CKT 1	Replace six (6) 138 kV switches, five at Bann & one at Alumax Tap. Reconductor 0.67 miles of 1024 ACAR with 2156 ACSR. Replace wavetrap & jumpers @ Bann. Replace breaker 3300 @ Bann.	06/01/10	06/01/10
AEPW	ALUMAX TAP - NORTHWEST TEXARKANA 138KV CKT 1	ALUMAX TAP - NORTHWEST TEXARKANA 138KV CKT 1	Reconductor 1.68 miles of 1024 ACAR with 2156 ACSR. Replace wavetrap & jumpers with 2156 ACSR. Replace Switch 2285 @ Alumax Tap.	06/01/06	04/01/08
AEPW	BANN - NW TEXARKANA-BANN T 138KV CKT 1	BANN - NW TEXARKANA-BANN T 138KV CKT 1	Reset Relays	06/01/15	06/01/15
AEPW	BONANZA - BONANZA TAP 161KV CKT 1	BONANZA - BONANZA TAP 161KV CKT 1	Reconductor 0.06 miles of 397.5 ACSR with 795MCM ACSR. Reset relay @ Bonanza	06/01/15	06/01/15
AEPW	BONANZA - HACKETT AECC 161KV CKT 1	BONANZA - HACKETT AECC 161KV CKT 1	Reconductor 2.36 miles of 3/0 CW CU with 795 ACSR	06/01/15	06/01/15
AEPW	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	BROKEN BOW - CRAIG JUNCTION 138KV CKT 1	Reconductor 7.66 miles of 3/0 CW CU with 795 ACSR, May have interim Switching Scheme	10/01/05	04/01/08
AEPW	CHAMBER SPRINGS - FARMINGTON AECC 161KV CKT 1	CHAMBER SPRINGS - FARMINGTON AECC 161KV CKT 1	Reconductor 10.24 miles with 2156 ACSR, replace Chamber Springs wavetrap & Farmington AECC bus.	06/01/15	06/01/15
AEPW	DIANA - PERDUE 138KV CKT 1	DIANA - PERDUE 138KV CKT 1	Replace Breakers 10080 & 9310 & five switches @ Perdue.	06/01/11	06/01/11
AEPW	EAST CENTRAL HENRYETTA - OKMULGEE 138KV CKT 1	EAST CENTRAL HENRYETTA - OKMULGEE 138KV CKT 1	Replace switch 12798 @ Diana	12/01/05	11/01/07
AEPW	EAST CENTRAL HENRYETTA - WELEETKA 138KV CKT 1	EAST CENTRAL HENRYETTA - WELEETKA 138KV CKT 1	Replace Weleetka Wavetrap	12/01/05	11/01/07
AEPW	EASTON REC - KNOX LEE 138KV CKT 1	EASTON REC - KNOX LEE 138KV CKT 1	Reset CT @ Knox Lee	06/01/15	06/01/15
AEPW	FIXICO TAP - MAUD 138KV CKT 1	FIXICO TAP - MAUD 138KV AEPW	Reconductor 11.83 miles of 3/0 shielded Copperweld with 795 ACSR.	06/01/15	06/01/15
AEPW	FLOURNOY - OAK PAN-HARR REC 138KV CKT 1	FLOURNOY - OAK PAN-HARR REC 138KV CKT 1	Reconductor 10.42 miles 666 ACSR to 1272 ACSR	06/01/15	06/01/15
AEPW	LONE STAR SOUTH - PITTSBURG 138KV CKT 1	LONE STAR SOUTH - PITTSBURG 138KV CKT 1	Replace wavetraps at both ends. Reset CTs @ Lone Star South. Replace switches & reset relays @ Pittsburg	06/01/10	06/01/10
AEPW	LONGWOOD - OAK PAN-HARR REC 138KV CKT 1	LONGWOOD - OAK PAN-HARR REC 138KV CKT 1	Reconductor 1.8 miles of 666 ACSR with 1272 ACSR	06/01/10	06/01/10
AEPW	ROCK HILL - TATUM 138KV CKT 1	ROCK HILL - TATUM 138KV CKT 1	Replace Tatum switch 10655. Replace Rock Hill switches, breaker 11800, and jumpers.	06/01/15	06/01/15
EMDE	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV CKT 1	OZARKS - SUB 434 - OZARK SOUTHEAST 69KV CKT 1	Reconductor 69 line from 59609 to 59442 with 795 ACSR	06/01/07	06/01/09
EMDE	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV CKT 1	SUB 330 - OZARK NORTHWEST - SUB 434 - OZARK SOUTHEAST 69KV CKT 1	Reconductor line from 59570 to 59609 with 556 ACSR	06/01/07	06/01/09
KACP	BUCYRUS - STILWELL 161KV CKT 1	BUCYRUS - STILWELL 161KV CKT 1	Rebuild Bucyrus line terminal at Stilwell so transmission line rating can be increased to conductor limits. Replace Stilwell wavetrap	06/01/10	06/01/10
MIPU	ANACONDA - FREEMAN 69KV CKT 1	ANACONDA - FREEMAN 69KV CKT 1	Conductor	06/01/07	04/01/08
MIPU	ANACONDA - HARRISONVILLE WEST 69KV CKT 1	ANACONDA - HARRISONVILLE WEST 69KV CKT 1	Conductor	06/01/07	04/01/08
MIPU	ORRICK - RICHMOND 161KV CKT 1	ORRICK - RICHMOND 161KV CKT 1	Upgrade to 795 26/7 ACSR	06/01/15	06/01/15
MIPU	ORRICK - SIBLEY 161KV CKT 1	ORRICK - SIBLEY 161KV CKT 1	Upgrade to 795 26/7 ACSR	06/01/15	06/01/15
OKGE	FIXICO TAP - MAUD 138KV CKT 1	FIXICO TAP - MAUD 138KV OKGE	Upgrade CT Ratio to 800A	06/01/15	06/01/15
SUNC	BIRD CITY 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	BREWSTER 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	CHASE 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	CITY OF GOODLAND 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	CITY OF ST.FRANCIS 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	ELLIS 69KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	GOODLAND 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	GOODLAND TAP 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	GOVE 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	GRINNELL 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	KANARADO 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	LAWN RIDGE 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	MINGO 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	NATIONAL SUNFLOWER INDUSTRY TAP 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	NSI 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	RULETON 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	SHARON SPRINGS 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	ST.FRANCIS 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SUNC	ST.FRANCIS TAP 115KV	Mingo and Rhoades DVAR	Install DVAR at Mingo and Rhoades	06/01/06	10/01/07
SWPS	CURRY COUNTY INTERCHANGE - ROOSEVELT COUNTY INTERCHANGE 115KV CKT 2	CURRY COUNTY INTERCHANGE - ROOSEVELT COUNTY INTERCHANGE 115KV CKT 2	Upgrade Roosevelt to Curry 115 kV circuit w/795 ACSR	06/01/10	06/01/10
SWPS	DOSS3 115KV	DOSS3 115KV	Install 1 - 14.4 MVar capacitor bank at Dos:	12/01/10	12/01/10
SWPS	MOORE COUNTY INTERCHANGE 230/115KV TRANSFORMER CKT 1	MOORE COUNTY INTERCHANGE 230/115KV TRANSFORMER CKT 1	Add 2nd 230 kV circuit and 2nd 230/115 kV transformer at Moore. 230 kV construction using 795 ACSR.	06/01/10	06/01/10
SWPS	ROOSEVELT COUNTY INTERCHANGE 230/115KV TRANSFORMER CKT 1	ROOSEVELT COUNTY INTERCHANGE 230/115KV TRANSFORMER CKT 1	Add 2nd transformer 230/115 kV 252 MVA	06/01/10	06/01/10
SWPS	SNANDR3 115KV	SNANDR3 115KV	Install 1 - 14.4 MVar capacitor bank San Andres:	12/01/10	12/01/10
WFEC	FLETCHER - MARLOW JCT 69KV CKT 1	FLETCHER - MARLOW JCT 69KV CKT 1	Reconductor 7.2 miles from 336 to 795 ACSR	06/01/15	06/01/15
WPEK	MEDICINE LODGE 115KV	Harper Capacitor	20MVAR at Harper 138KV	06/01/06	11/01/06
WPEK	MEDICINE LODGE 138KV	Harper Capacitor	20MVAR at Harper 138KV	06/01/06	11/01/06
WPEK	MILAN 138KV	Harper Capacitor	20MVAR at Harper 138KV	06/01/06	11/01/06
WPEK	MILAN TAP 138KV	Harper Capacitor	20MVAR at Harper 138KV	06/01/06	11/01/06
WR	AUBURN ROAD (AUBRN77X) 230/115/13.8KV TRANSFORMER CKT 1	AUBURN ROAD (AUBRN77X) 230/115/13.8KV TRANSFORMER CKT 1	Add second Auburn 230-115 kV transformer	06/01/11	06/01/11
WR	BUTLER 138/69KV TRANSFORMER CKT 1	BUTLER 138/69KV TRANSFORMER CKT 1	Replace Butler transformer	06/01/10	06/01/10
WR	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV CKT 1	CIRCLEVILLE - HOYT HTI SWITCHING JUNCTION 115KV CKT 1	Rebuild 15.50 mile Circleville-Hoyt HTI Junction 115 kV line	10/01/05	06/01/08
WR	CIRCLEVILLE - KING HILL N.M. COOP 115KV CKT 1	CIRCLEVILLE - KING HILL N.M. COOP 115KV CKT 1	Rebuild 15.15 mile line with 1192.5 kcmil ACSR	10/01/05	06/01/08
WR	CIRCLE - HUTCHINSON ENERGY CENTER 115KV CKT 1	HEC-HEC GT-Circle 115KV	Rebuild and convert HEC-HEC GT-Circle loop to 115 kV	06/01/07	06/01/07
WR	HUTCHINSON ENERGY CENTER - HUTCHINSON GAS TURBINE STATION 69KV CKT 1	HEC-HEC GT-Circle 115KV	Rebuild and convert HEC-HEC GT-Circle loop to 115 kV	06/01/07	06/01/07
WR	54TH & MERIDEN - HOYT 115KV CKT 1	JEC - Swissvale 345KV	Construct JEC-Swissvale 345 kV line	06/01/11	06/01/11
WR	AUBURN ROAD - JEFFREY ENERGY CENTER 230KV CKT 1	JEC - Swissvale 345KV	Construct JEC-Swissvale 345 kV line	06/01/11	06/01/11
WR	EAST MANHATTAN (EMANH3X) 230/115/18.0KV TRANSFORMER CKT 1	JEC - Swissvale 345KV	Construct JEC-Swissvale 345 kV line	06/01/11	06/01/11
WR	GOODYEAR JUNCTION - NORTHLAND 115KV CKT 1	JEC - Swissvale 345KV	Construct JEC-Swissvale 345 kV line	06/01/11	06/01/11
WR	HOYT - JEFFREY ENERGY CENTER 345KV CKT 1	JEC - Swissvale 345KV	Construct JEC-Swissvale 345 kV line	06/01/11	06/01/11

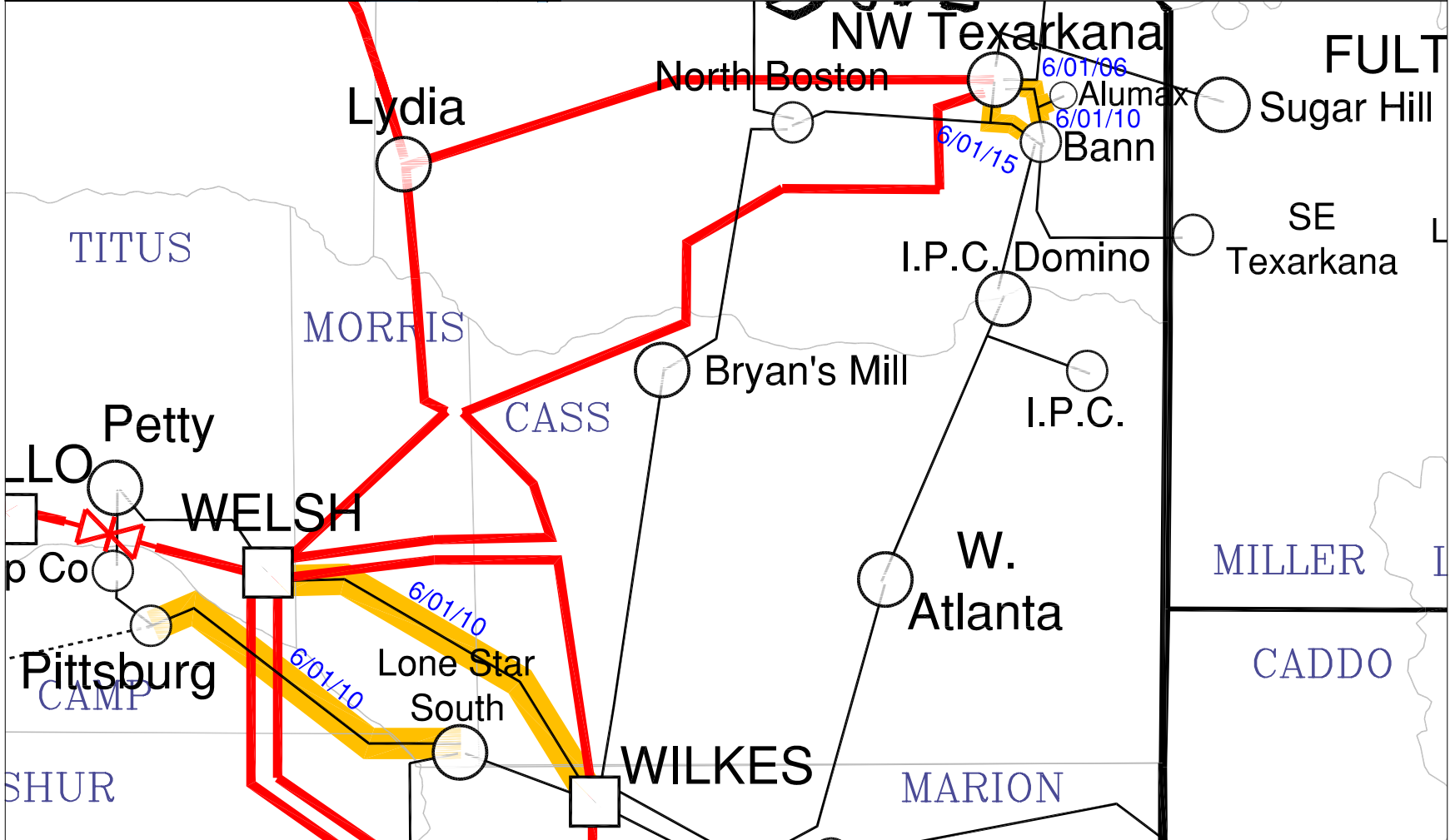
Constraints Identified for Aggregate Study

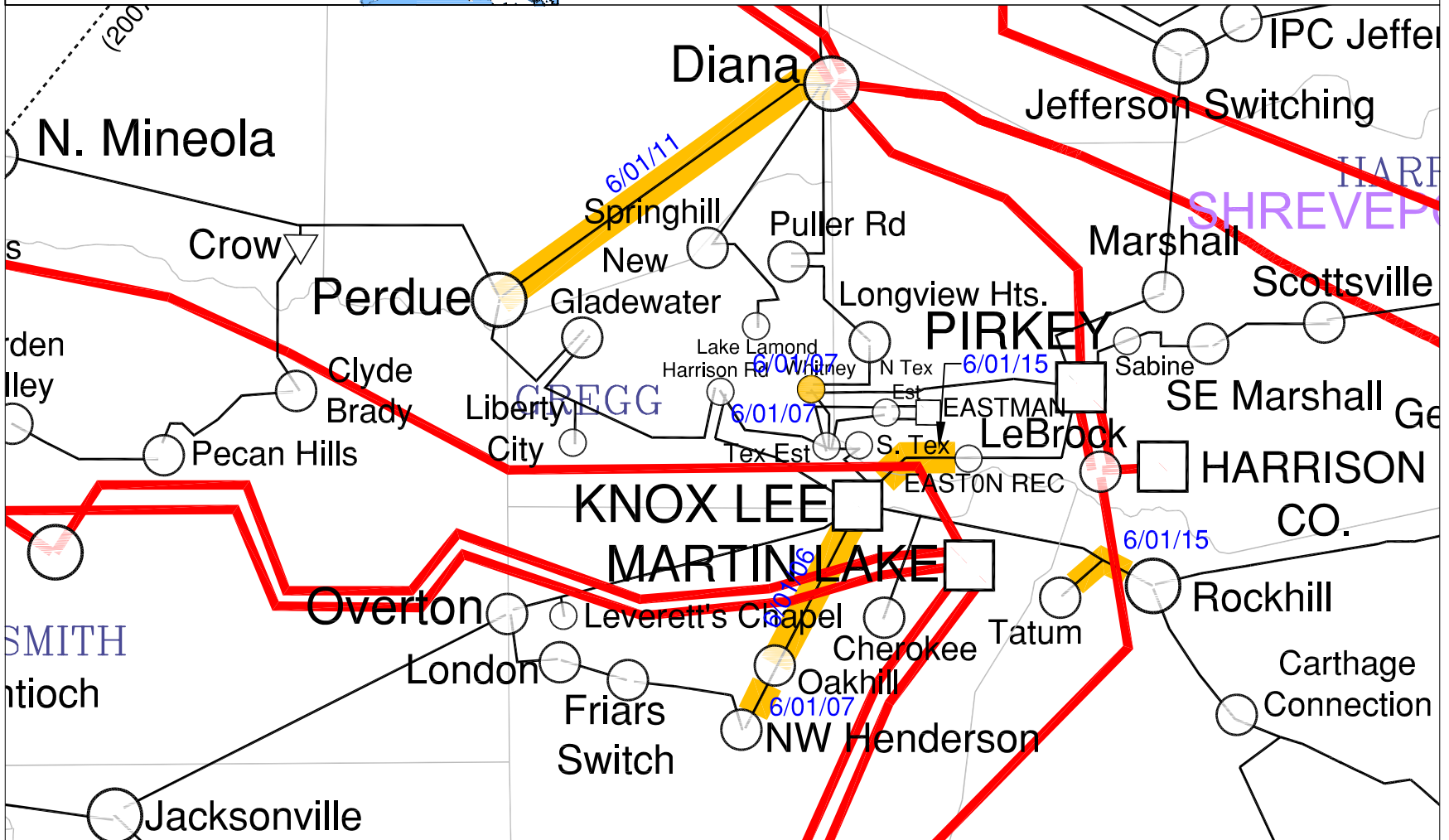
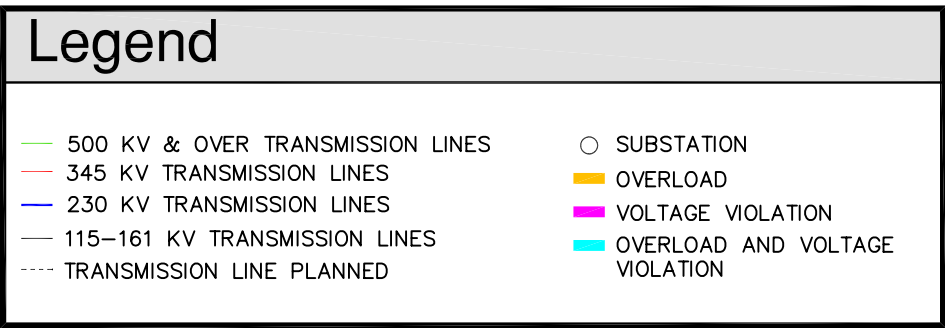




Legend

— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	▬ OVERLOAD
— 230 KV TRANSMISSION LINES	▬ VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	▬ OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	

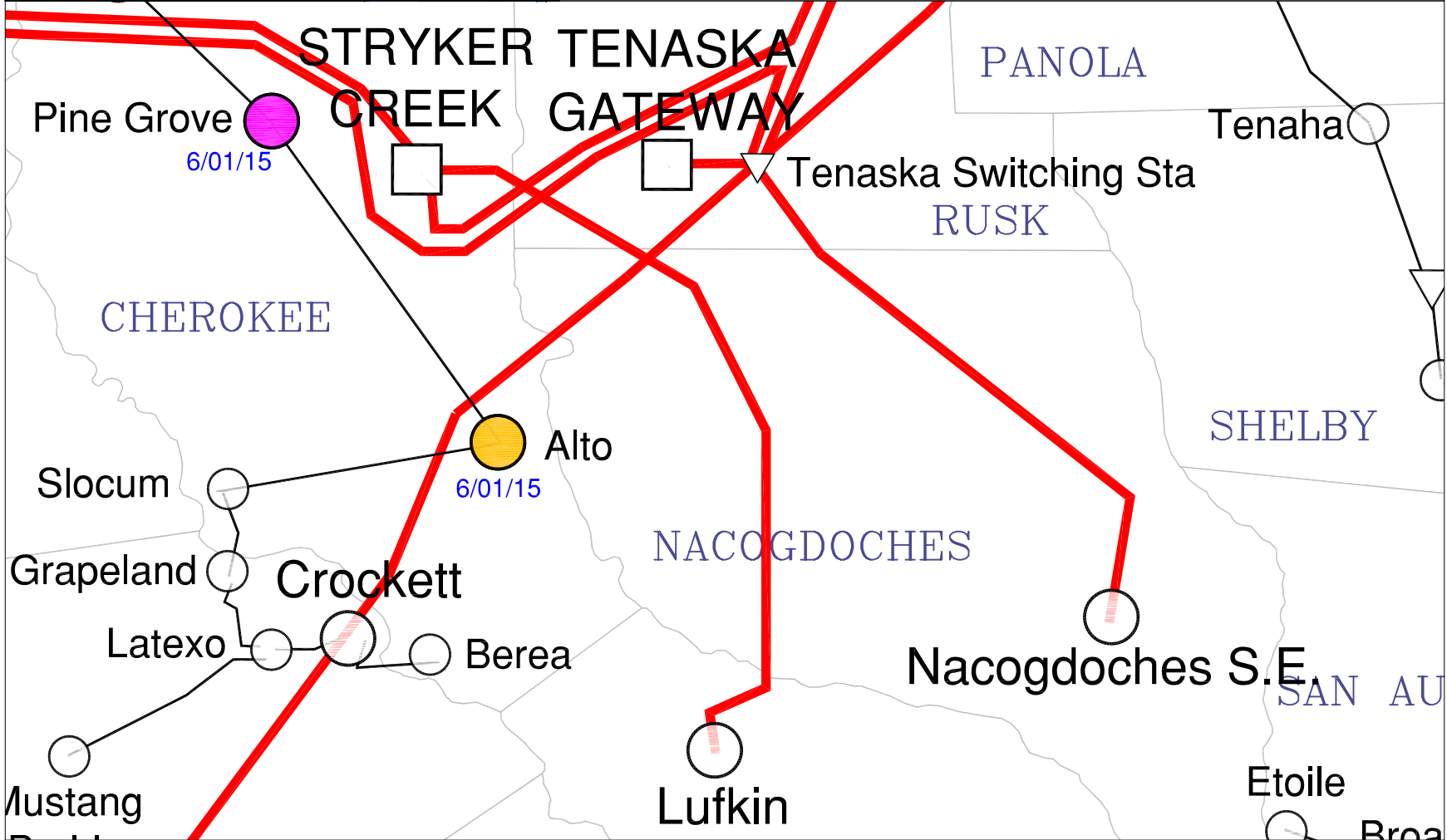






Legend

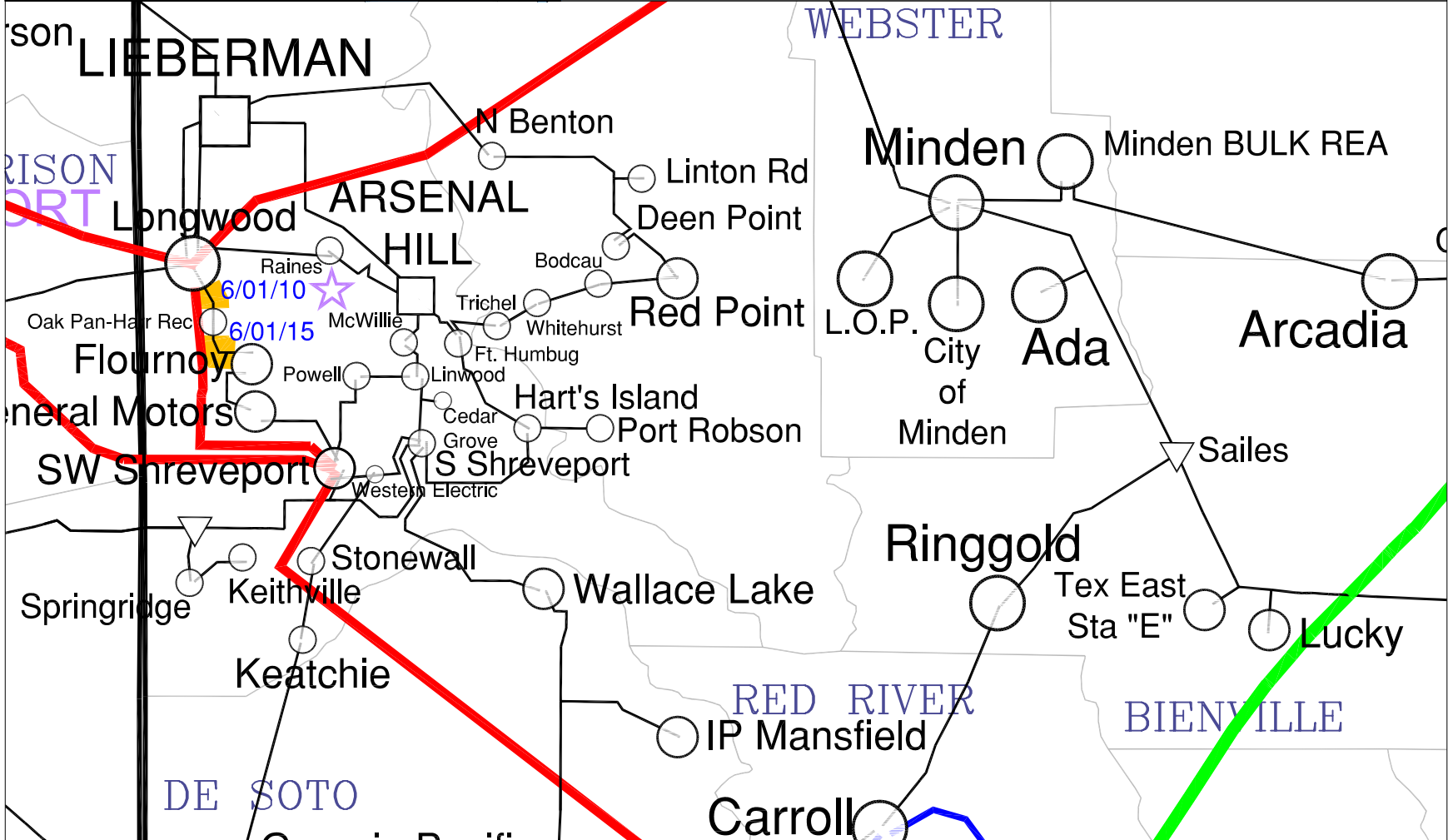
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	■ OVERLOAD
— 230 KV TRANSMISSION LINES	■ VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	■ OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	





Legend

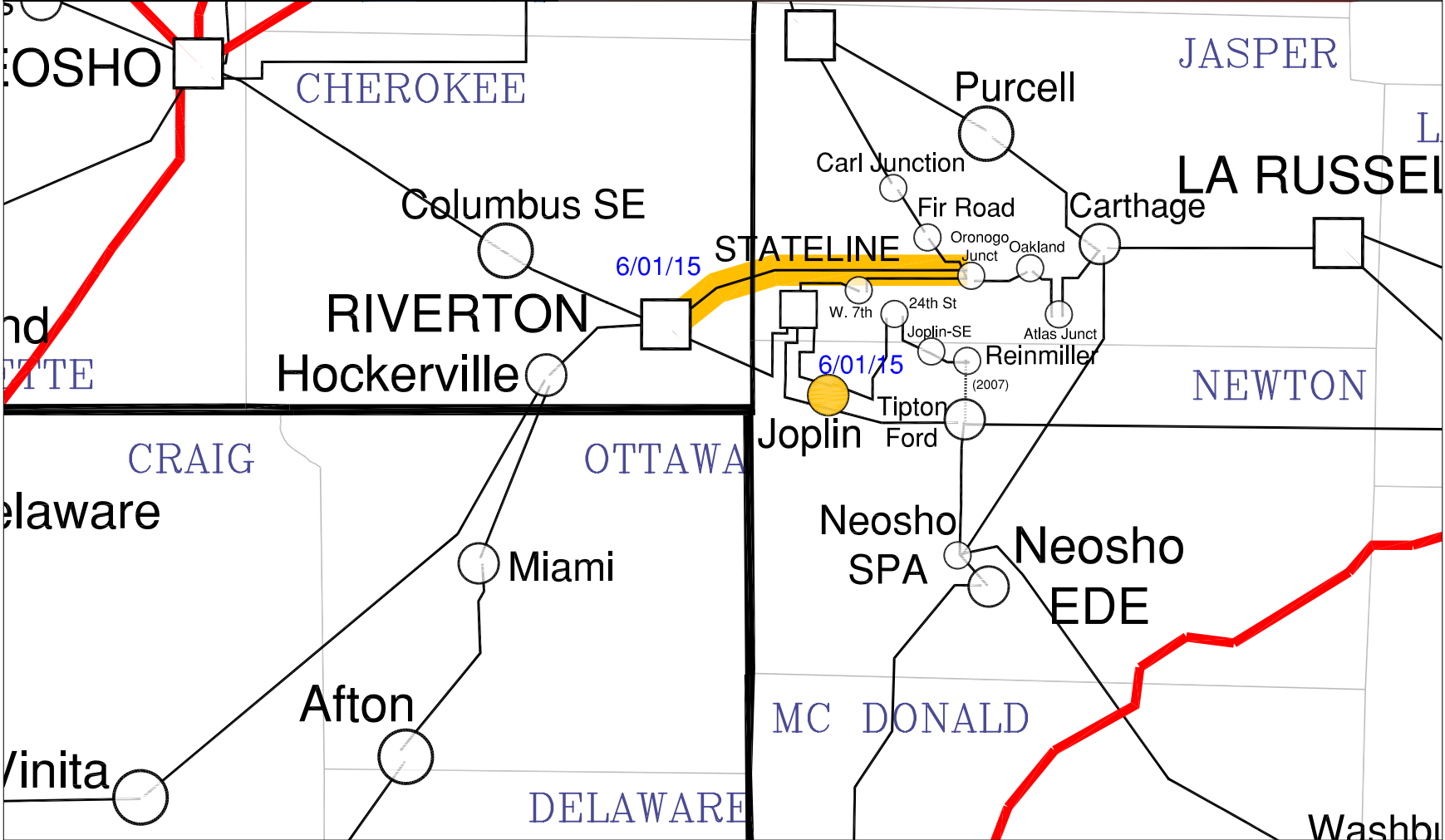
500 KV & OVER TRANSMISSION LINES	SUBSTATION
345 KV TRANSMISSION LINES	OVERLOAD
230 KV TRANSMISSION LINES	VOLTAGE VIOLATION
115-161 KV TRANSMISSION LINES	OVERLOAD AND VOLTAGE VIOLATION
TRANSMISSION LINE PLANNED	





Legend

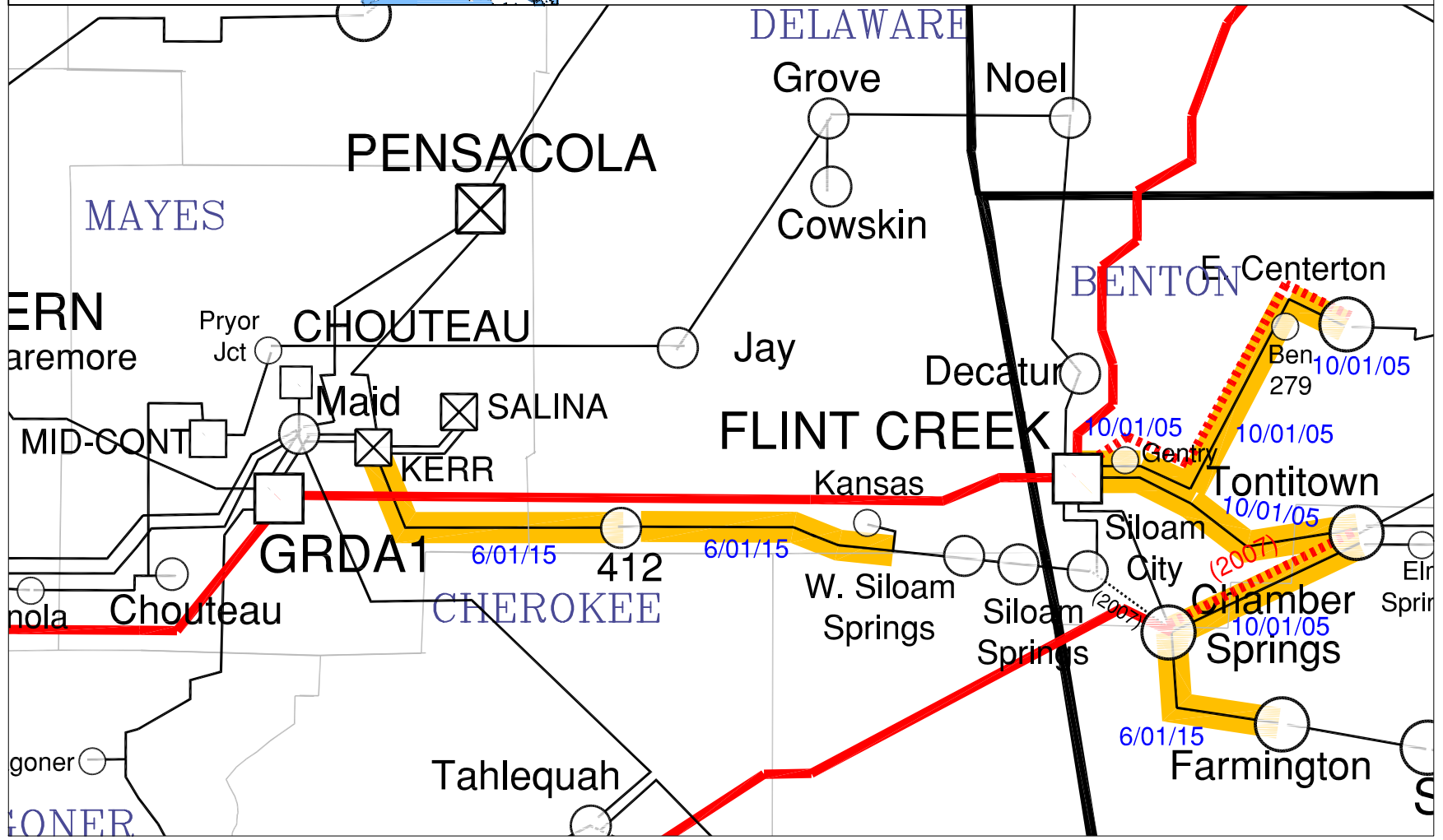
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	— OVERLOAD
— 230 KV TRANSMISSION LINES	— VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	— OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	





Legend

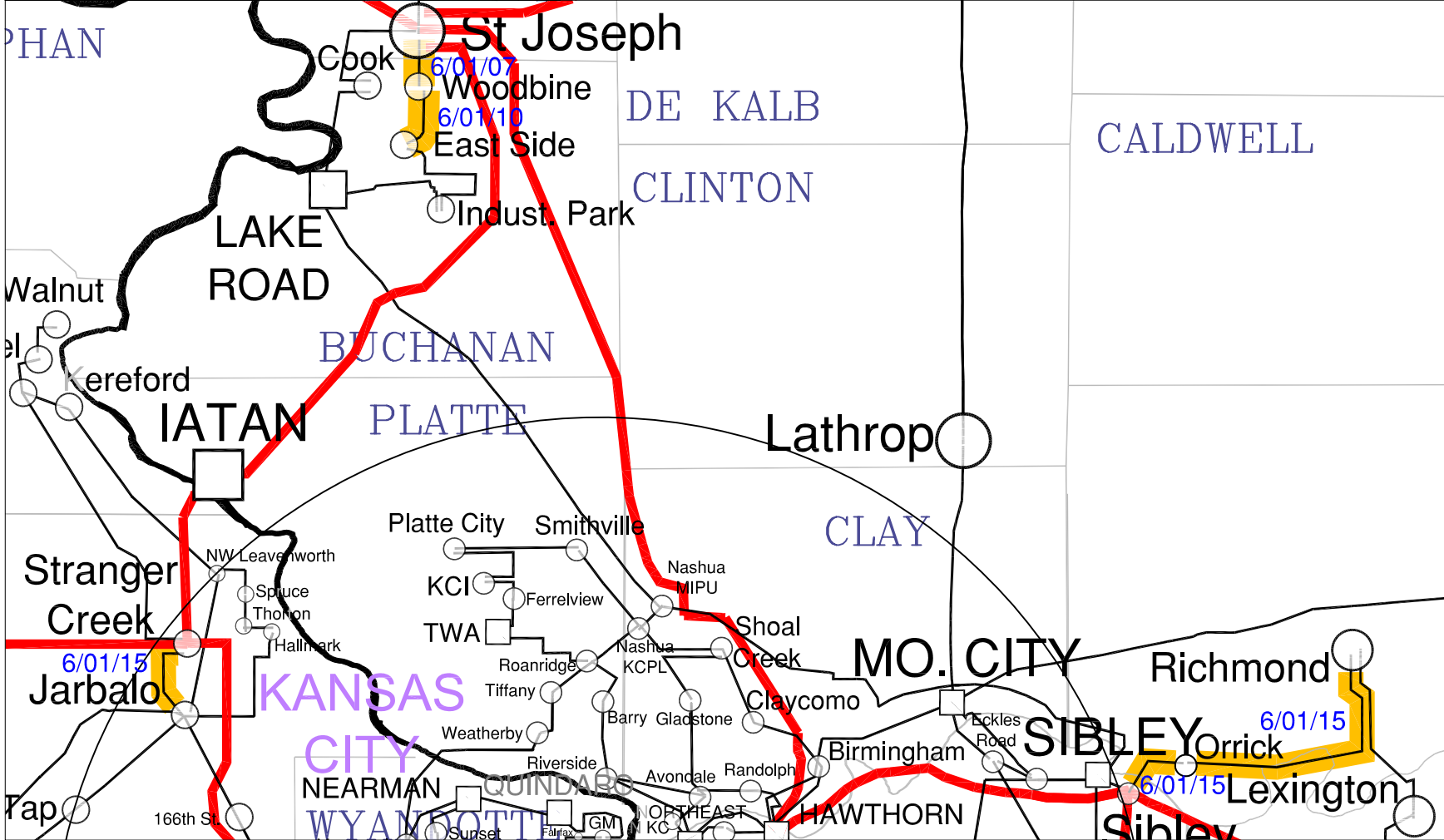
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	 OVERLOAD
— 230 KV TRANSMISSION LINES	 VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	 OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	





Legend

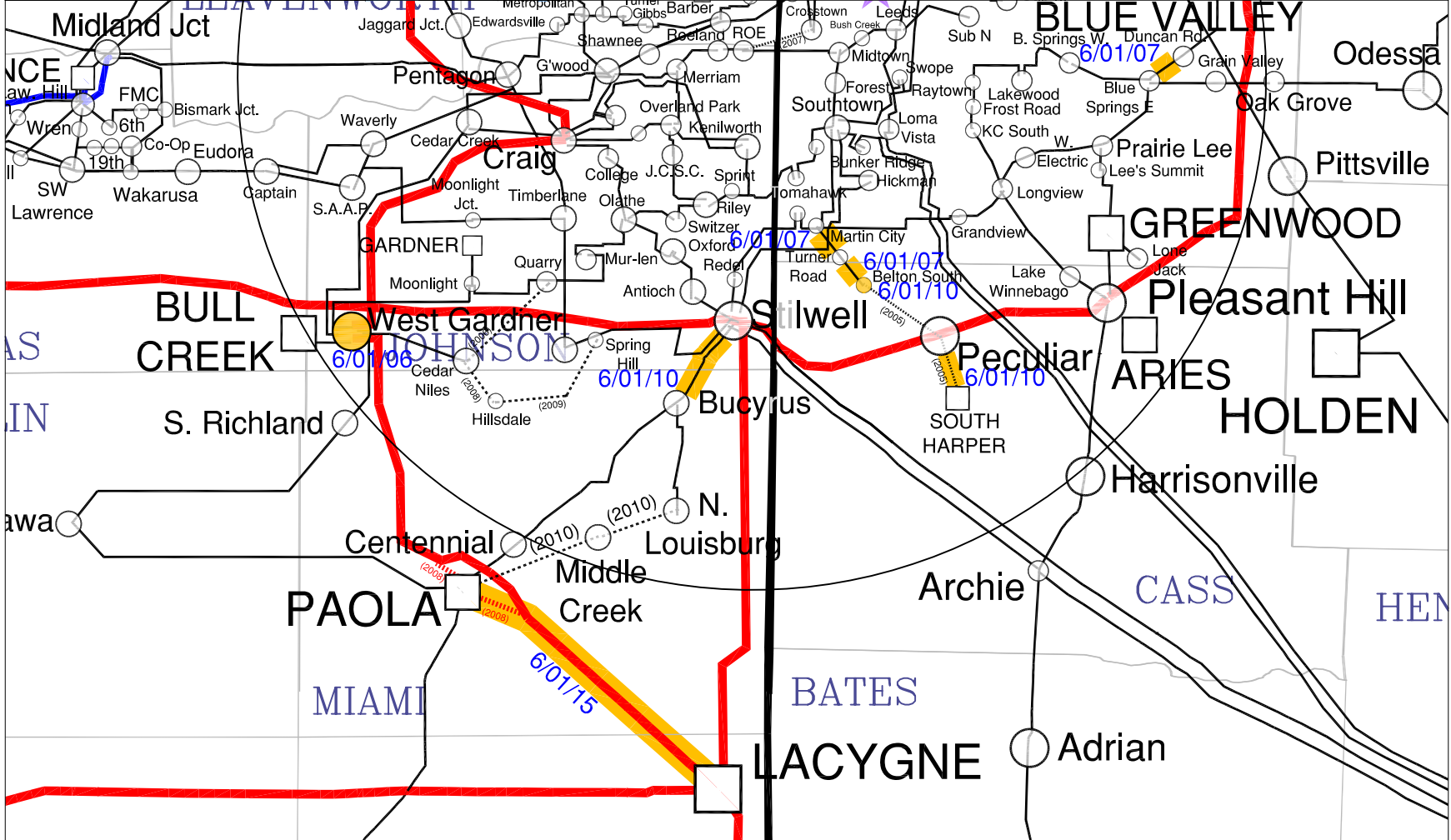
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES --- TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION OVERLOAD VOLTAGE VIOLATION OVERLOAD AND VOLTAGE VIOLATION
--	---





Legend

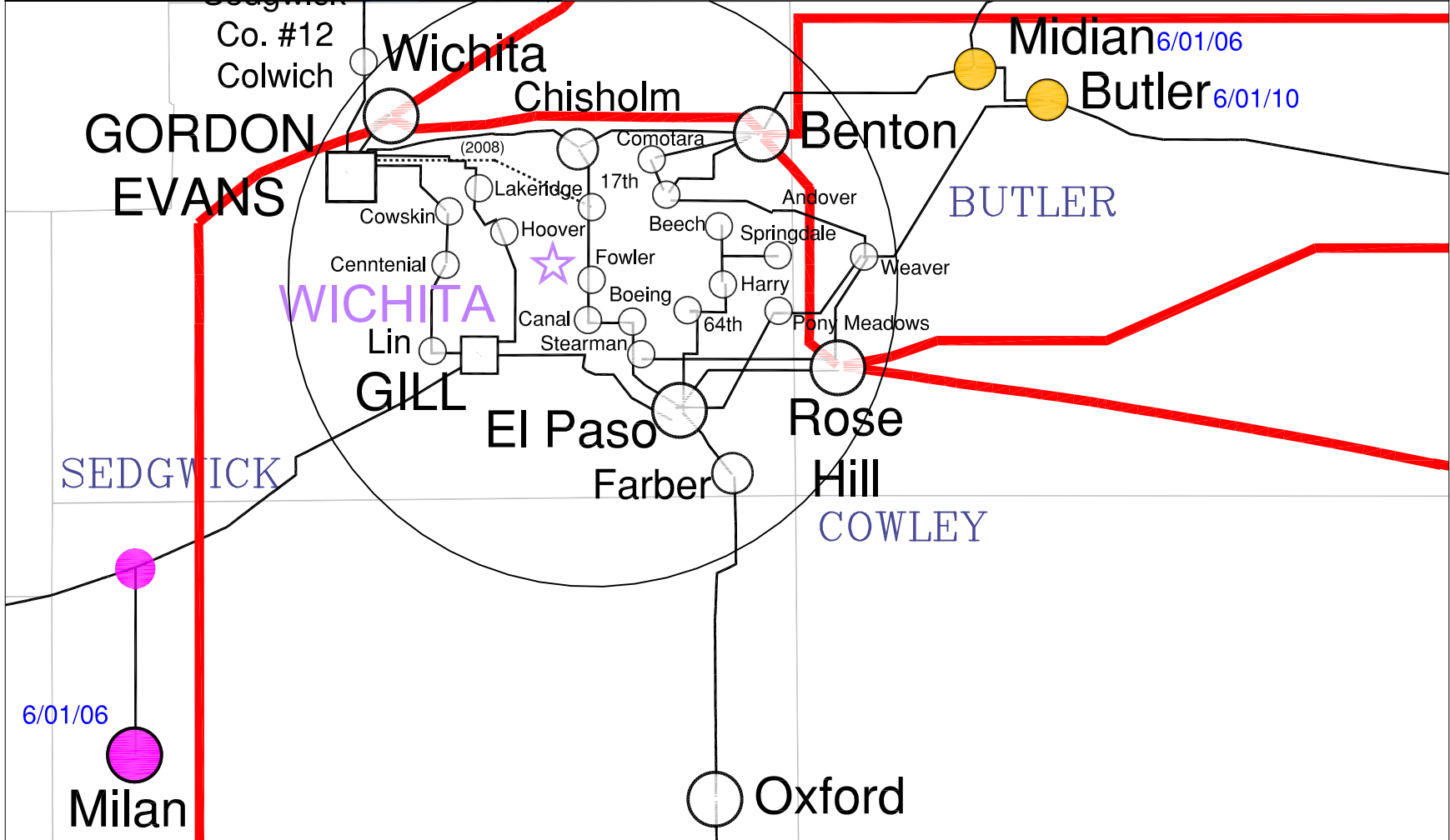
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES - - - TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION OVERLOAD VOLTAGE VIOLATION OVERLOAD AND VOLTAGE VIOLATION
--	--





Legend

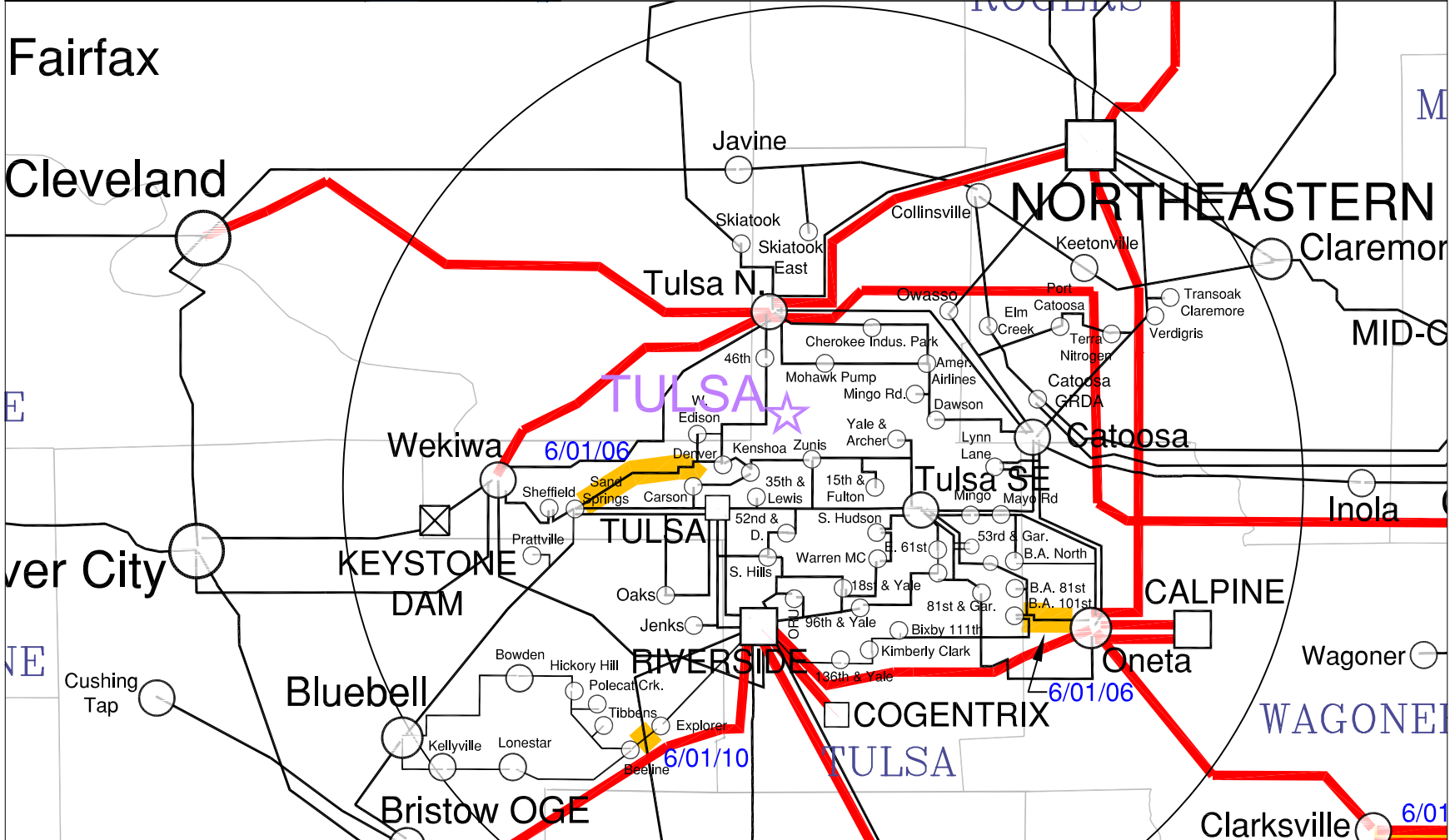
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	● OVERLOAD
— 230 KV TRANSMISSION LINES	● VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	● OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	





Legend

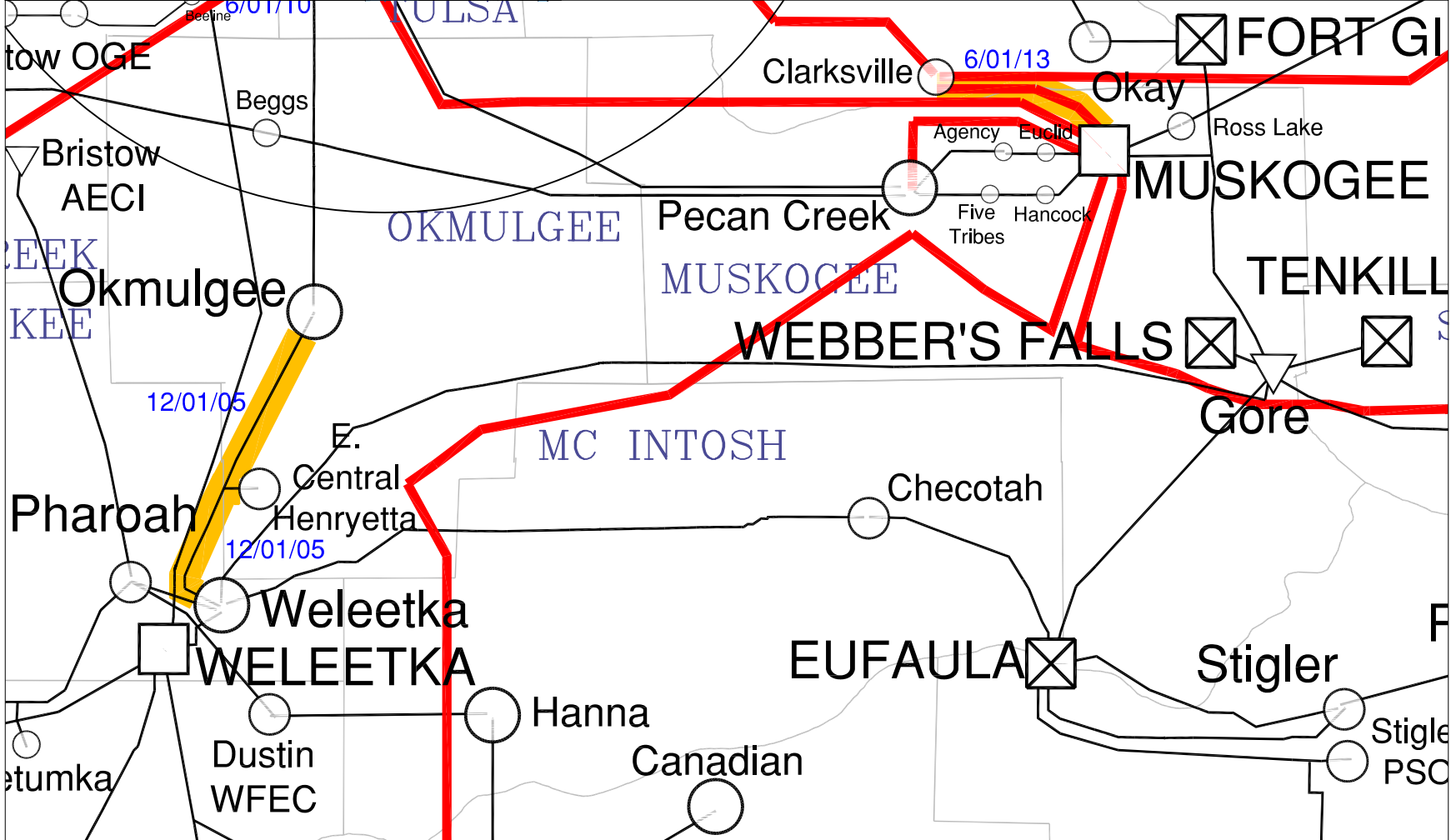
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	■ OVERLOAD
— 230 KV TRANSMISSION LINES	■ VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	■ OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	

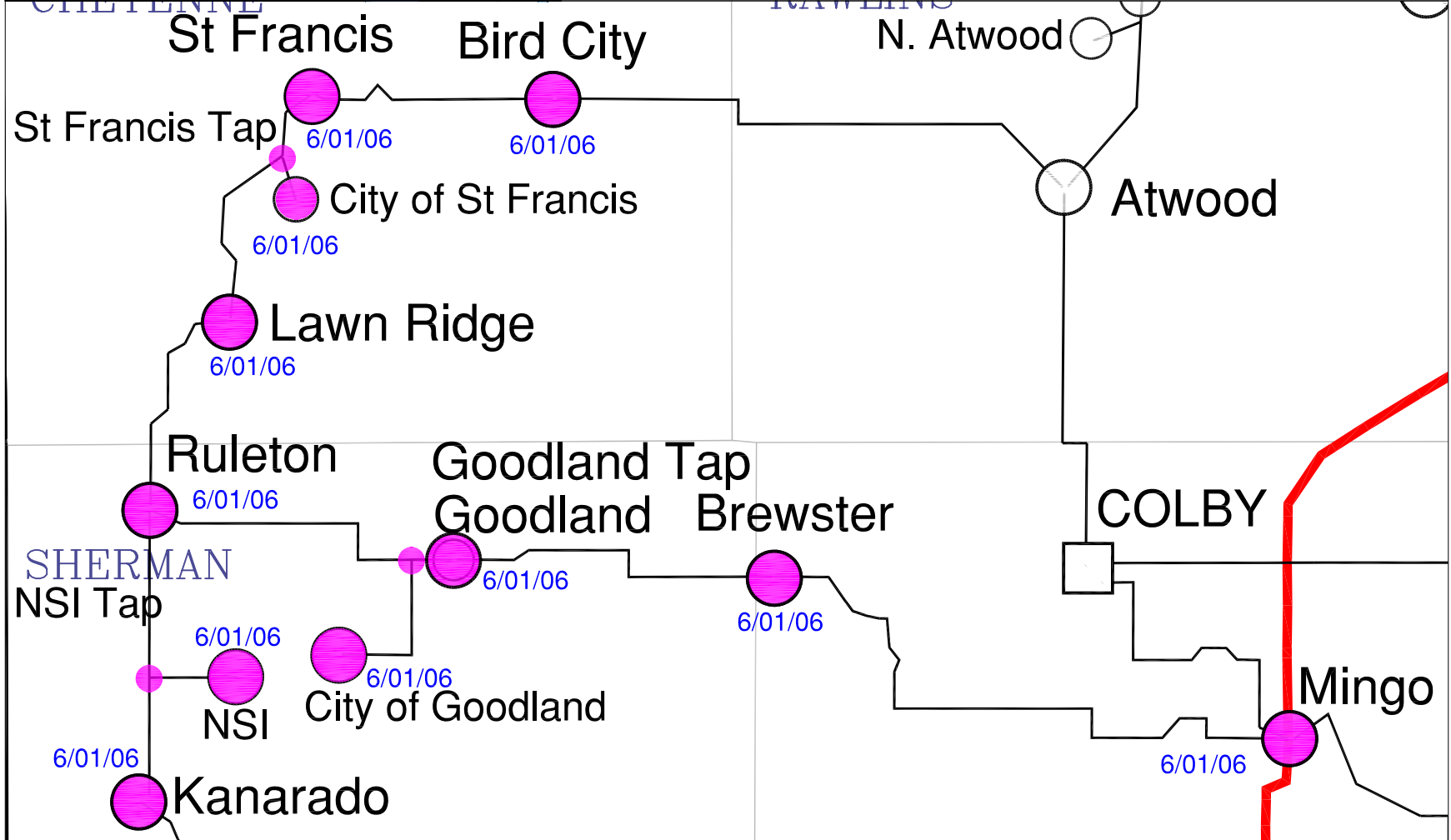
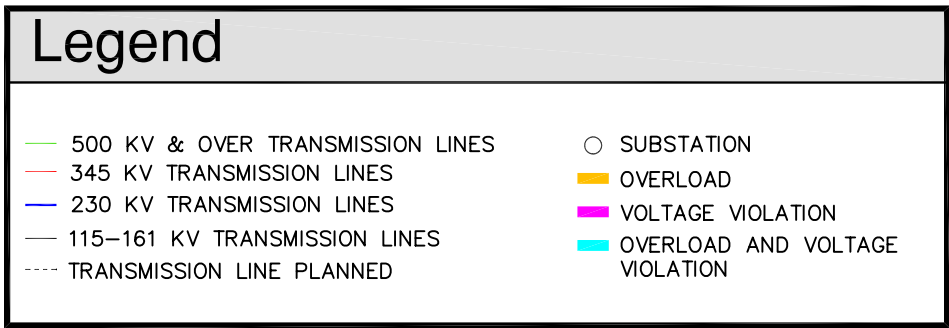




Legend

— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	■ OVERLOAD
— 230 KV TRANSMISSION LINES	■ VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	■ OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	

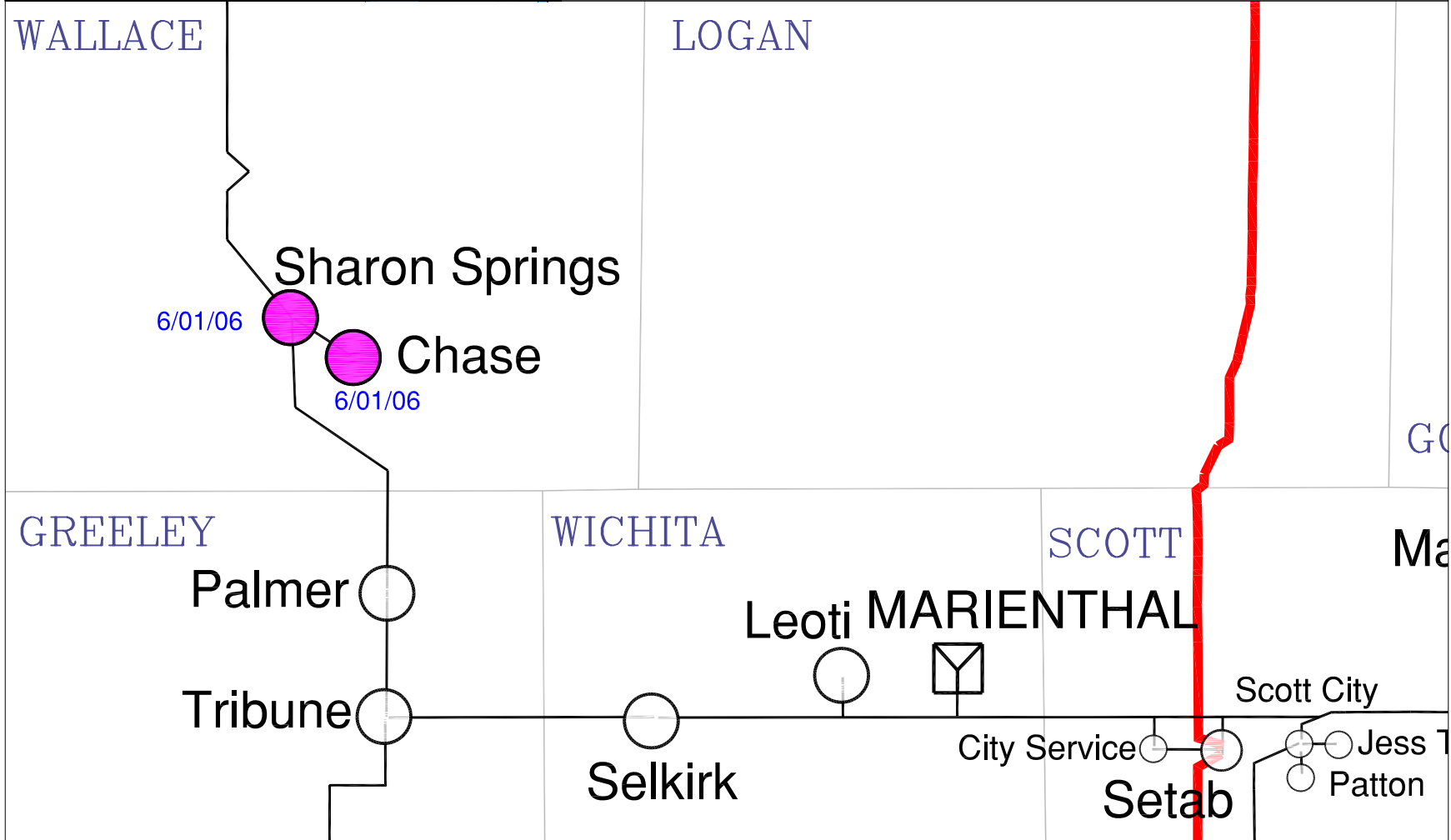















Legend

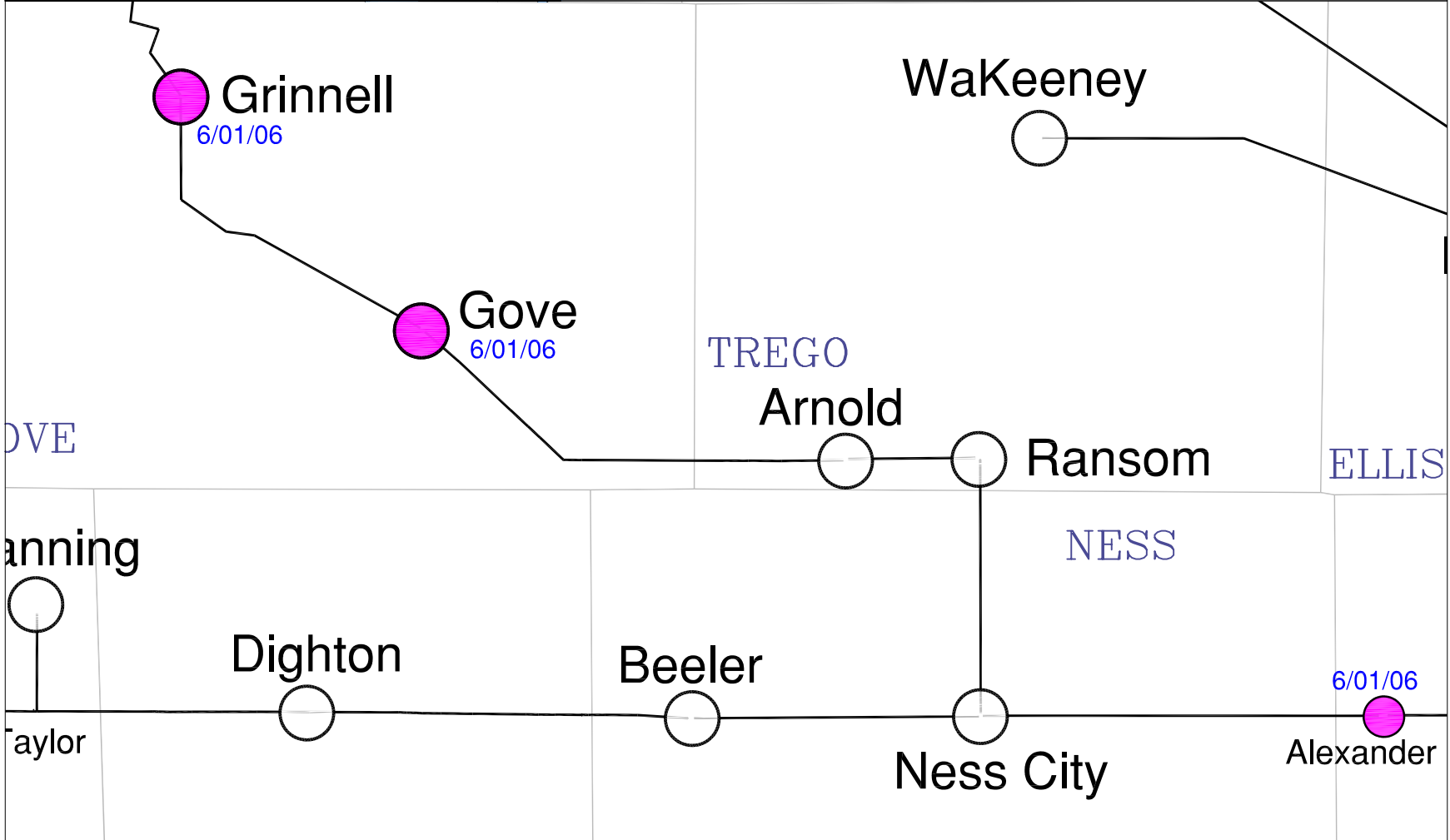
500 KV & OVER TRANSMISSION LINES	SUBSTATION
345 KV TRANSMISSION LINES	OVERLOAD
230 KV TRANSMISSION LINES	VOLTAGE VIOLATION
115-161 KV TRANSMISSION LINES	OVERLOAD AND VOLTAGE VIOLATION
TRANSMISSION LINE PLANNED	





Legend

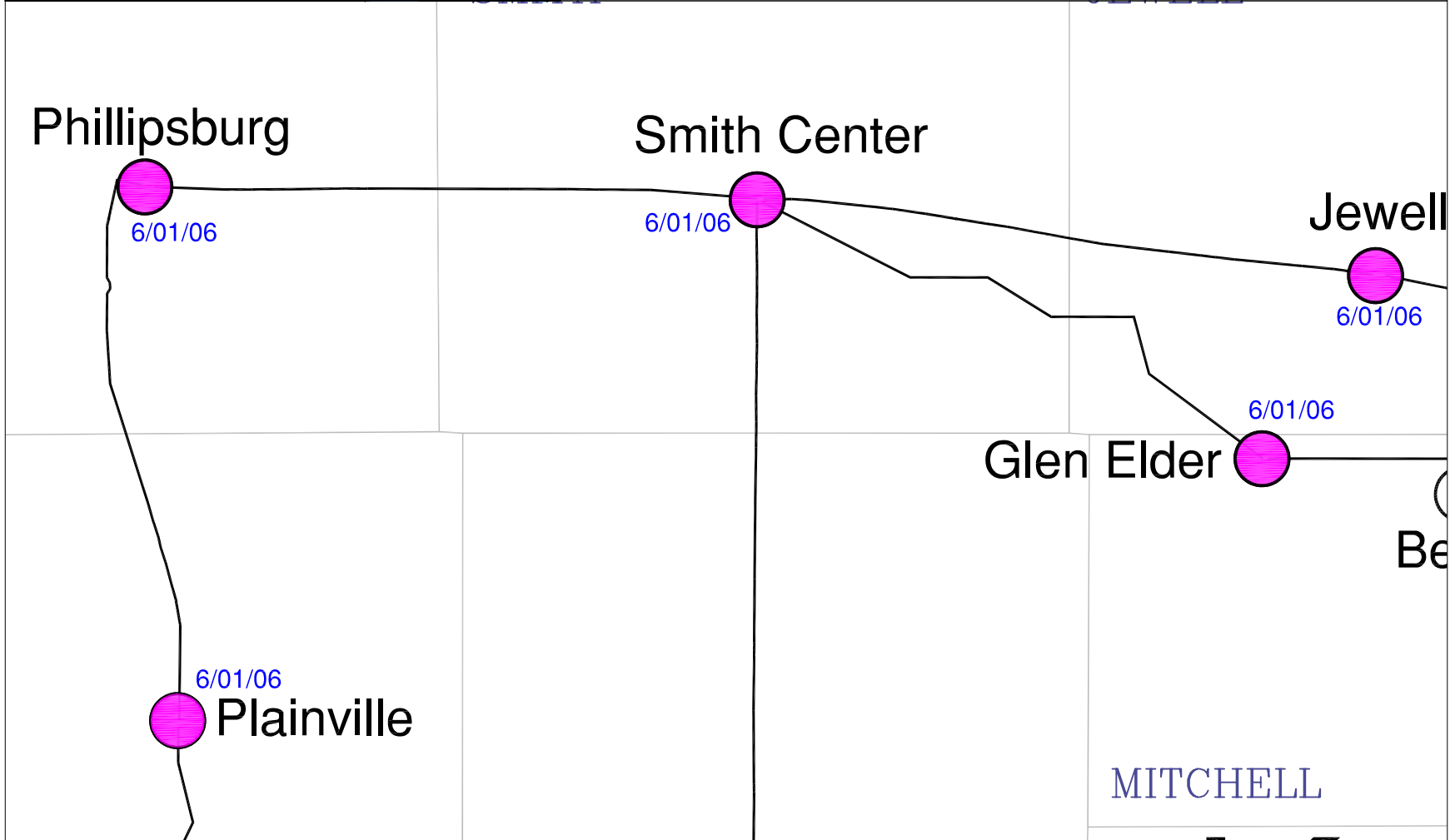
 500 KV & OVER TRANSMISSION LINES	 SUBSTATION
 345 KV TRANSMISSION LINES	 OVERLOAD
 230 KV TRANSMISSION LINES	 VOLTAGE VIOLATION
 115-161 KV TRANSMISSION LINES	 OVERLOAD AND VOLTAGE VIOLATION
 TRANSMISSION LINE PLANNED	





Legend

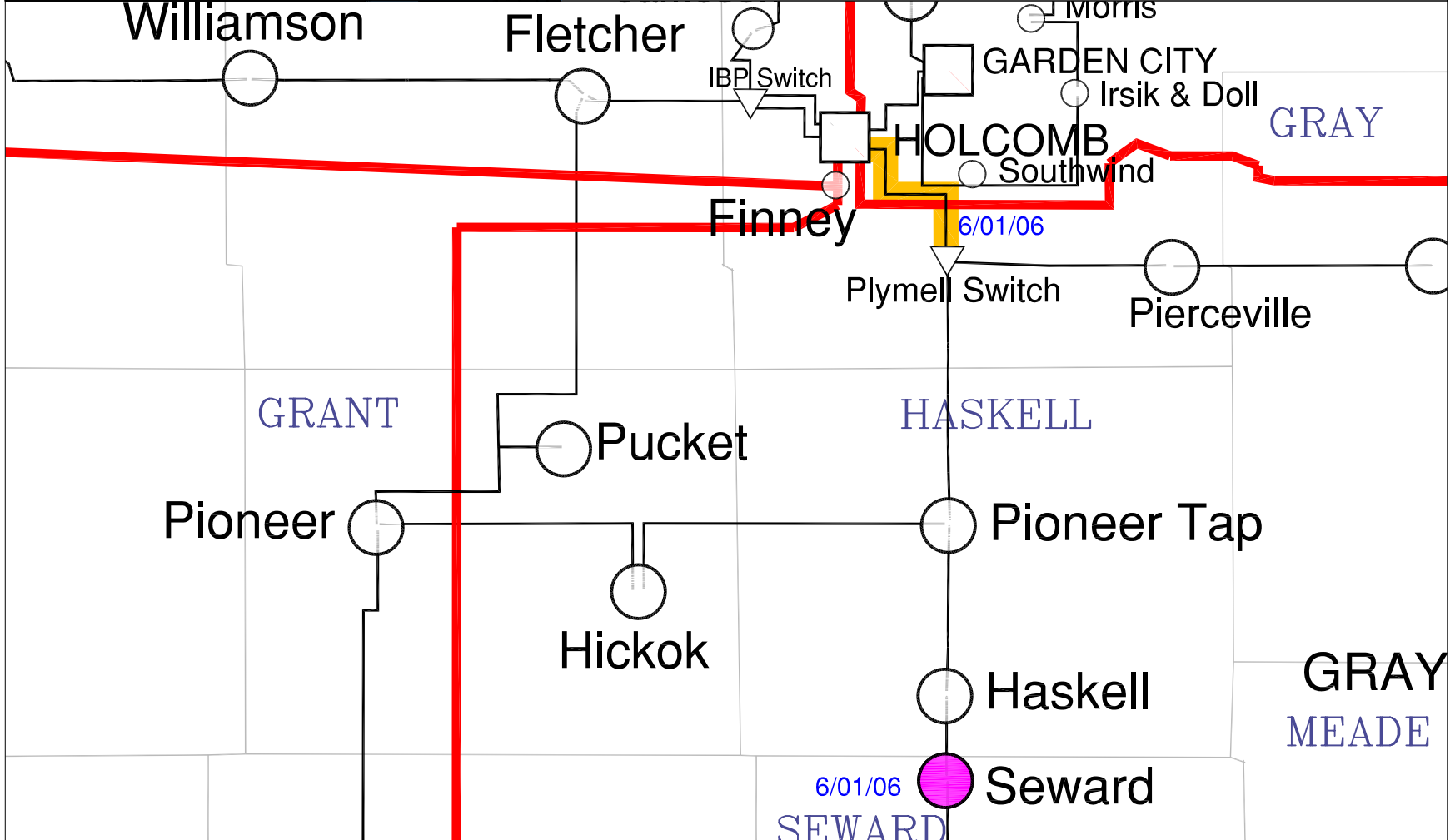
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	■ OVERLOAD
— 230 KV TRANSMISSION LINES	■ VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	■ OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	





Legend

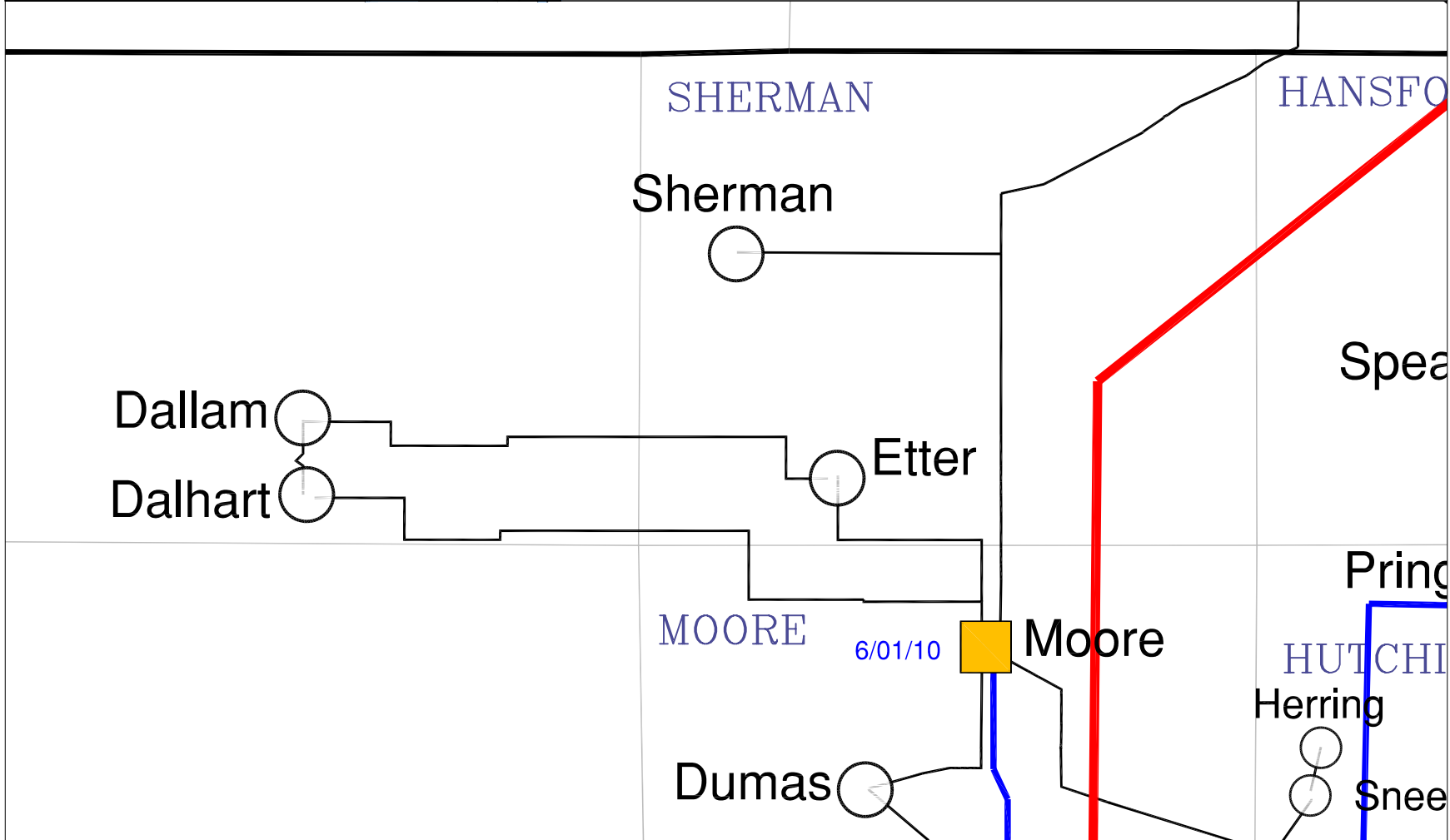
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES - - - TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION OVERLOAD VOLTAGE VIOLATION OVERLOAD AND VOLTAGE VIOLATION
--	---





Legend

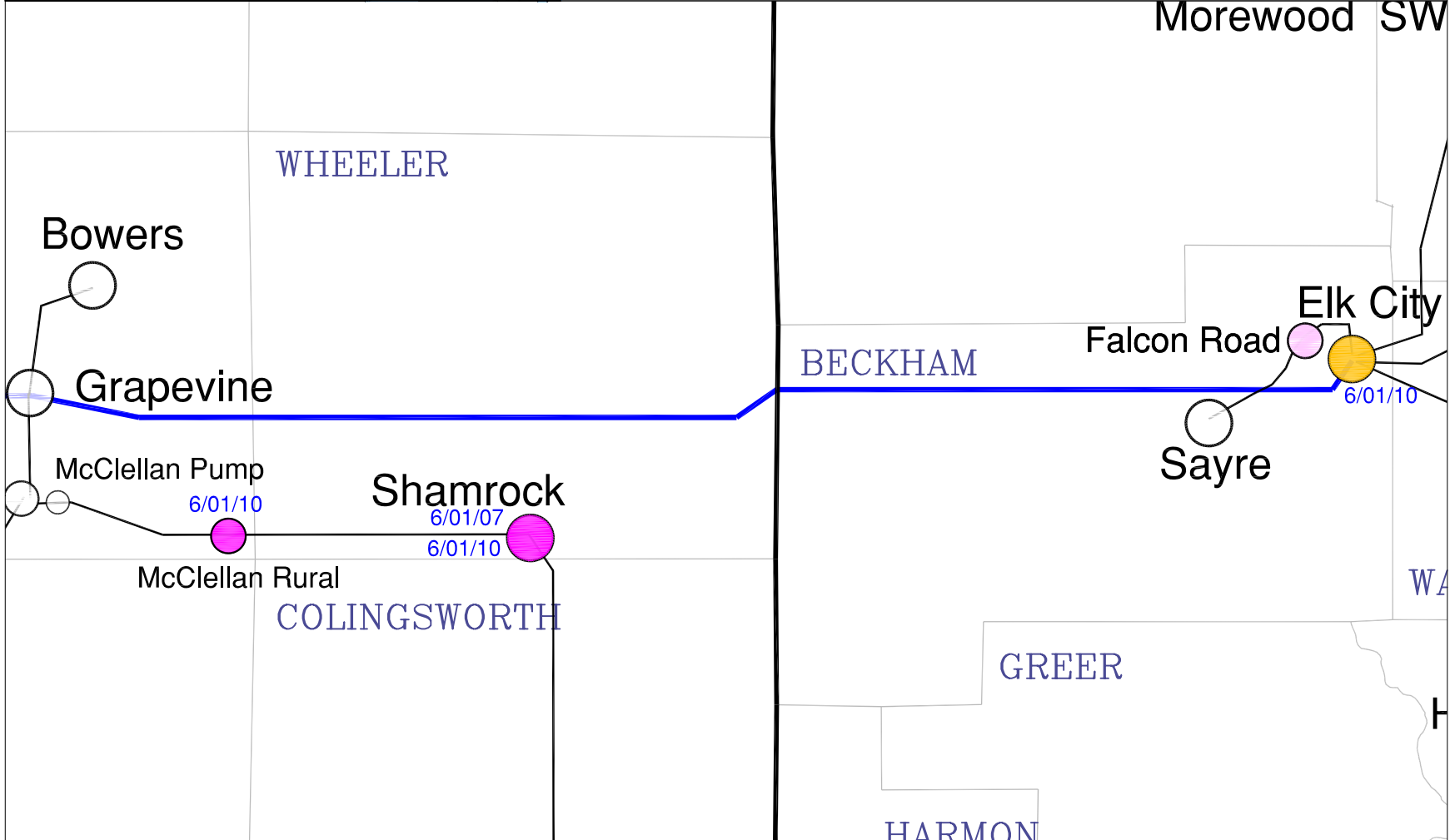
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	■ OVERLOAD
— 230 KV TRANSMISSION LINES	■ VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	■ OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	





Legend

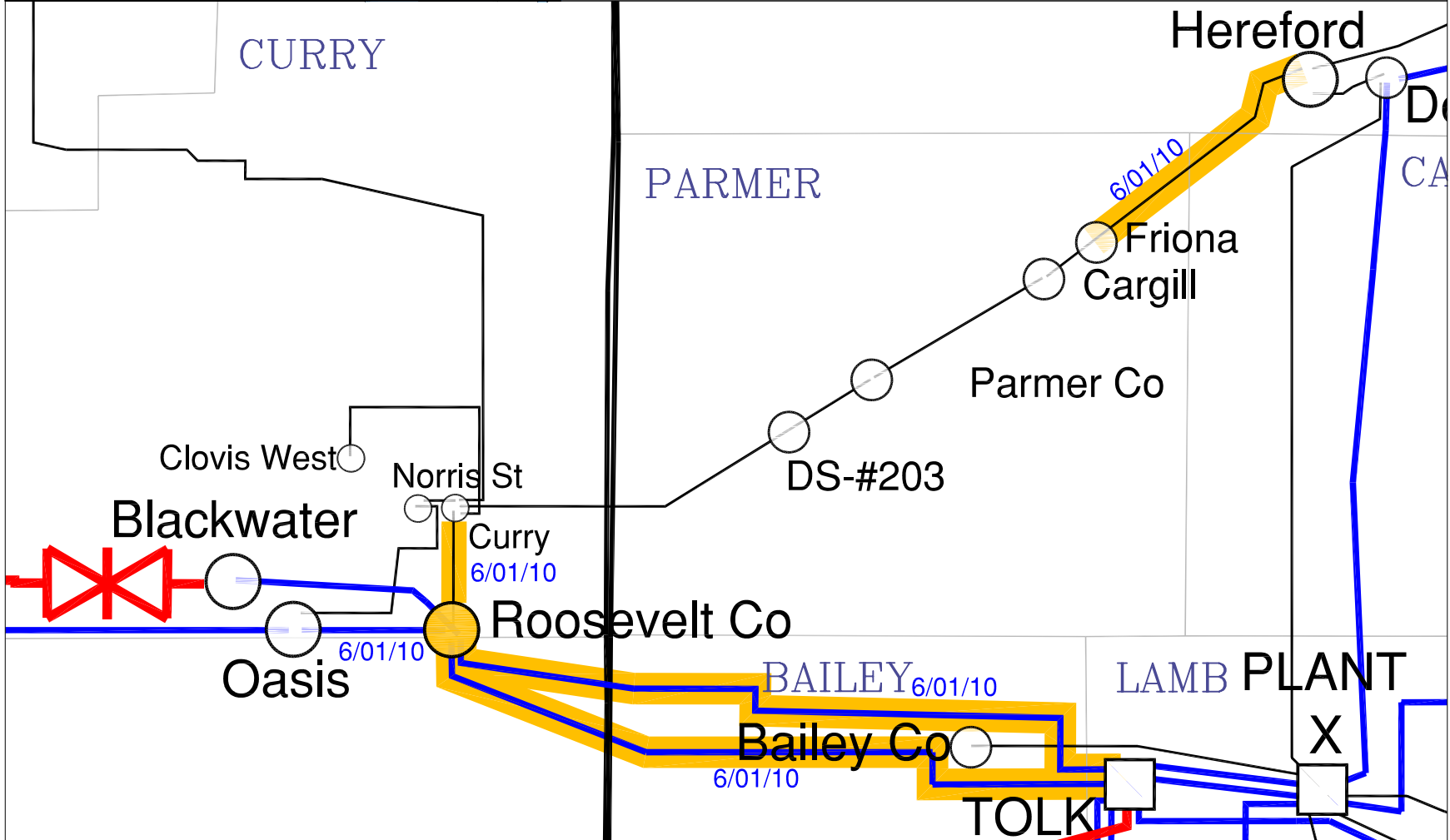
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	■ OVERLOAD
— 230 KV TRANSMISSION LINES	■ VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	■ OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	





Legend

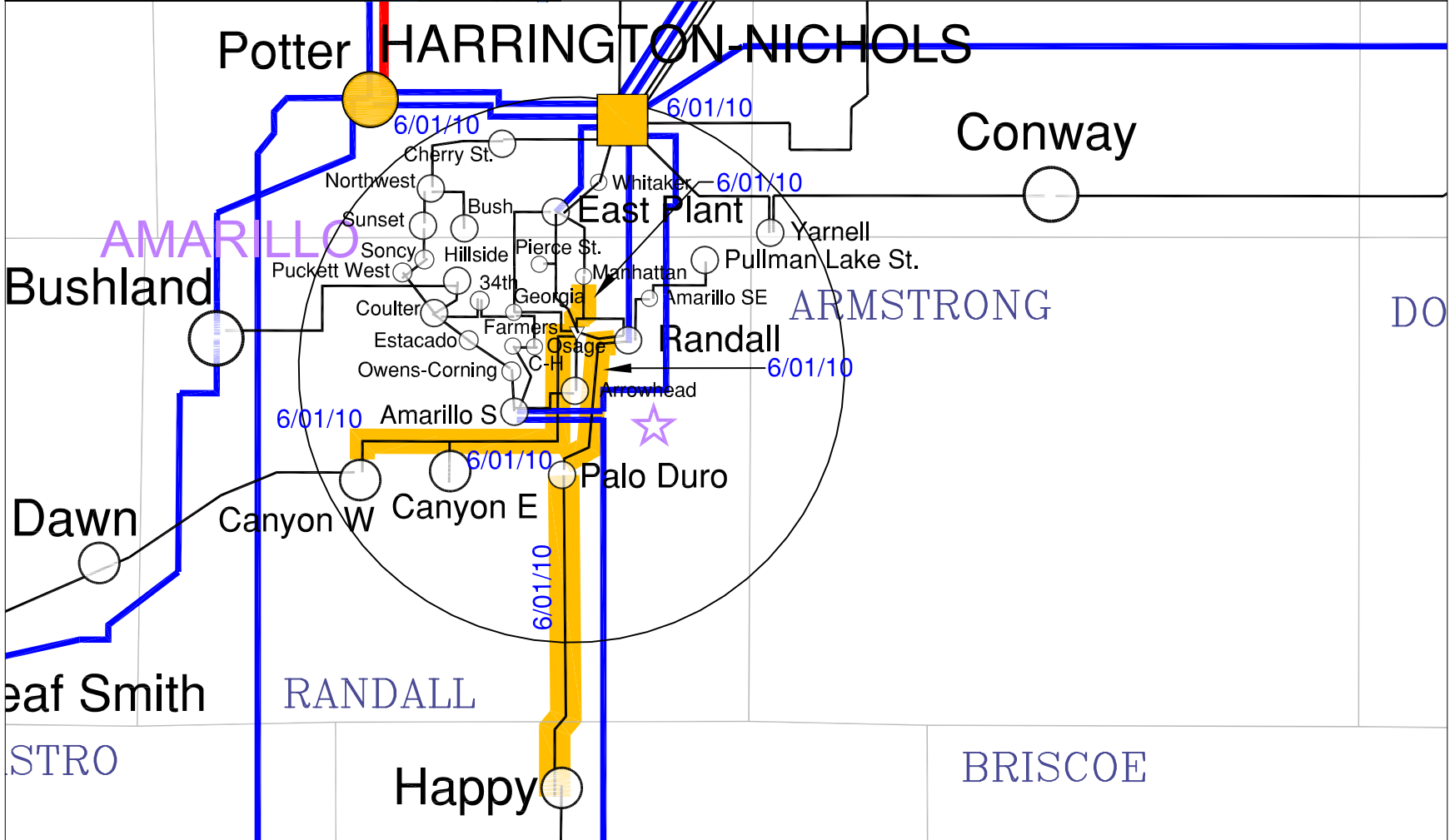
— 500 KV & OVER TRANSMISSION LINES	 SUBSTATION
— 345 KV TRANSMISSION LINES	 OVERLOAD
— 230 KV TRANSMISSION LINES	 VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	 OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	





Legend

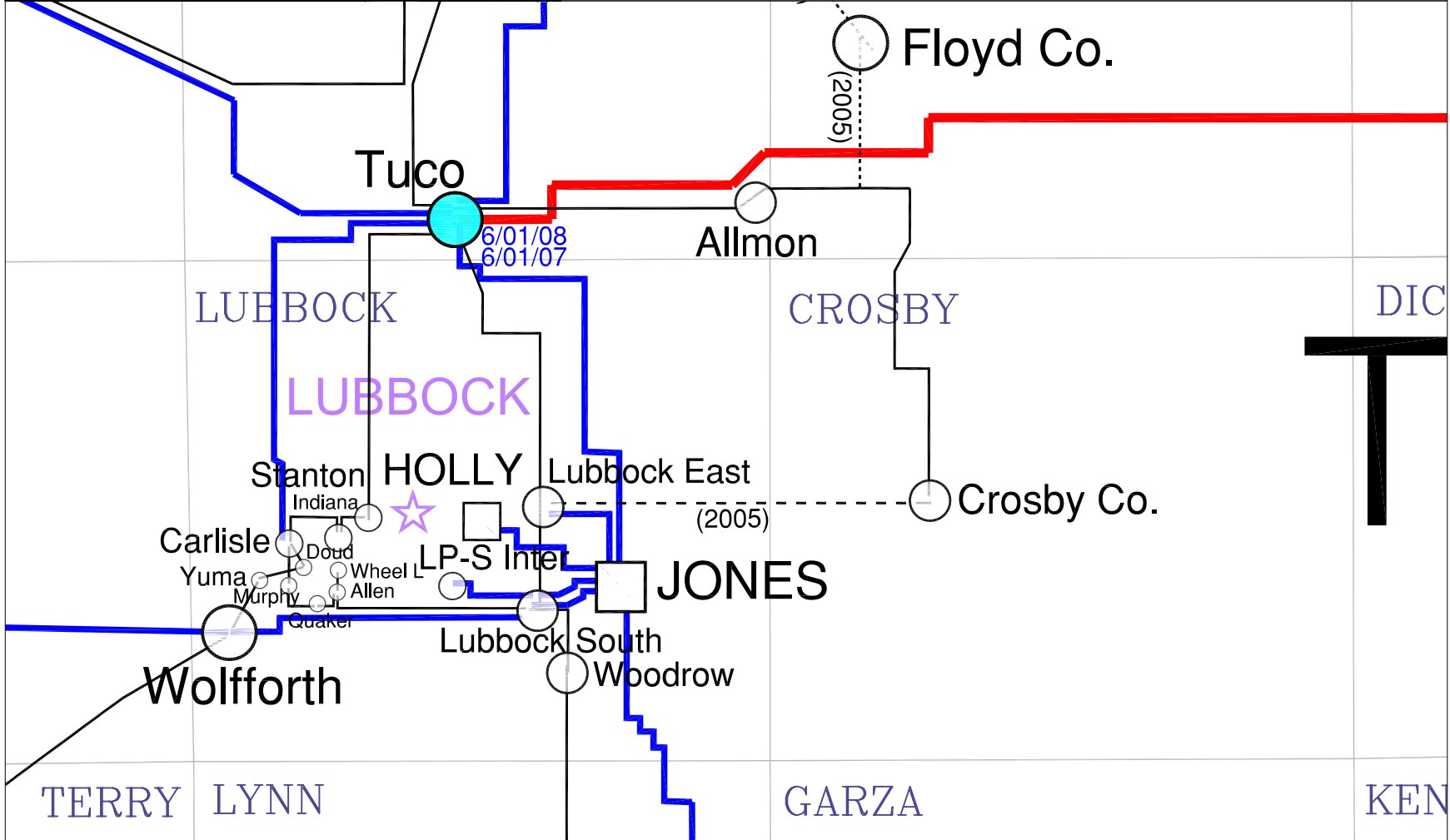
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	 OVERLOAD
— 230 KV TRANSMISSION LINES	 VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	 OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	

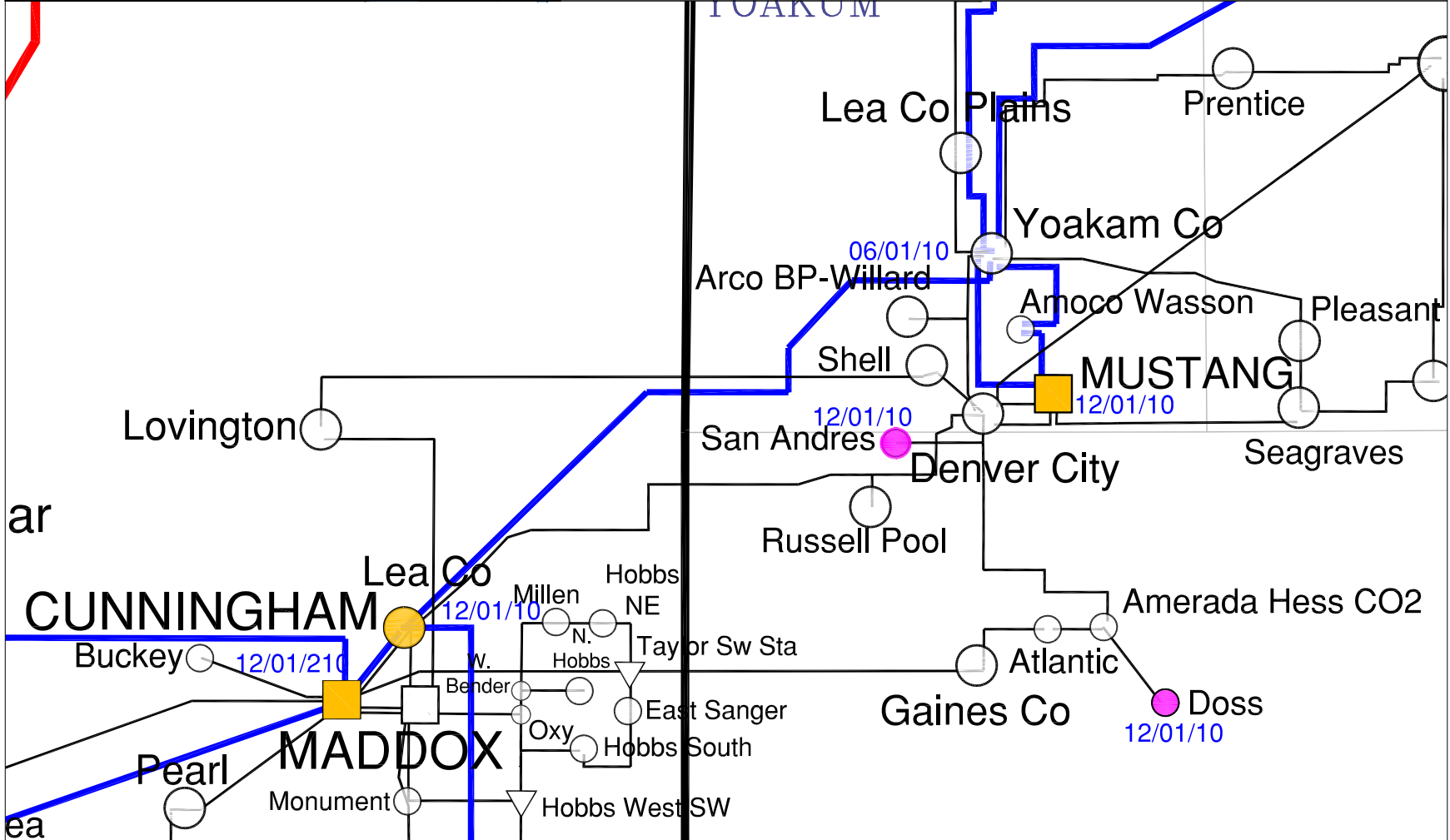
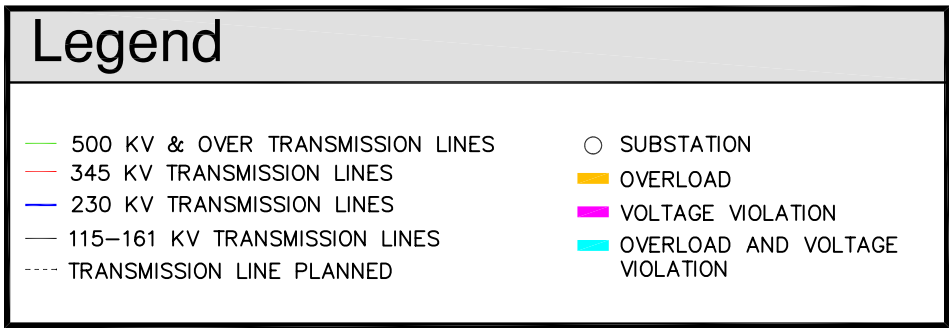




Legend

— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	■ OVERLOAD
— 230 KV TRANSMISSION LINES	■ VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	■ OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	

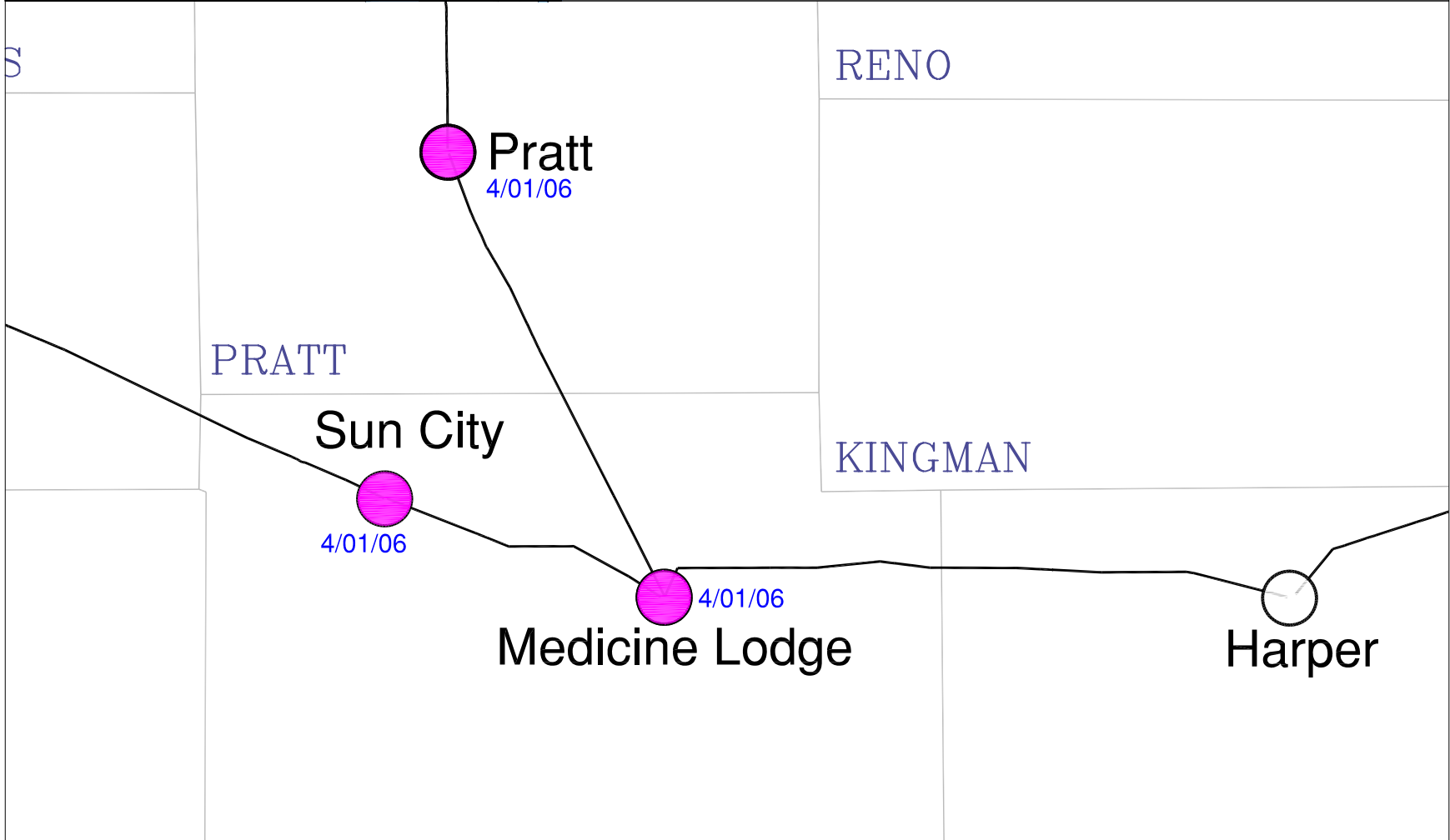






Legend

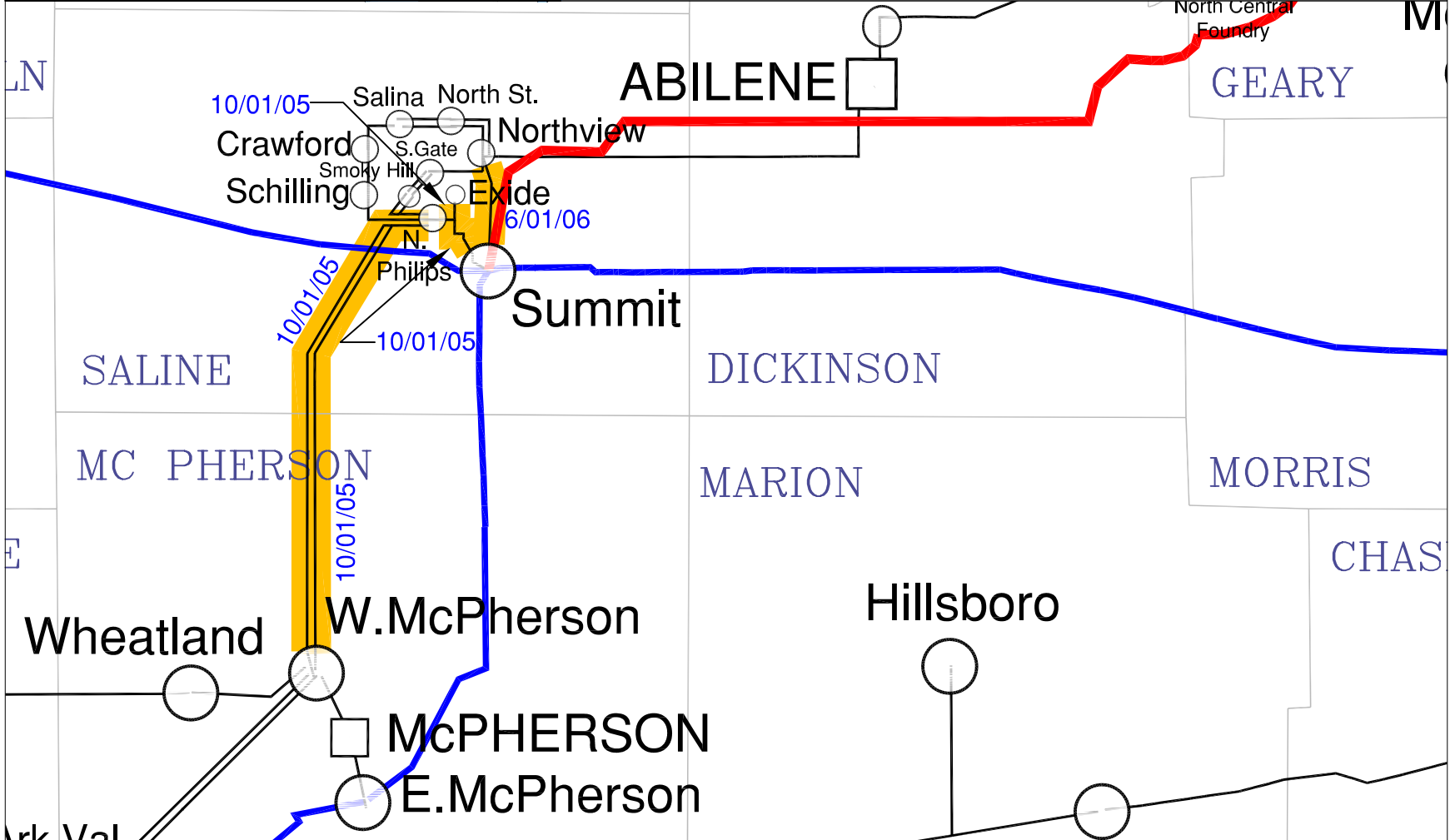
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	■ OVERLOAD
— 230 KV TRANSMISSION LINES	■ VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	■ OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	





Legend

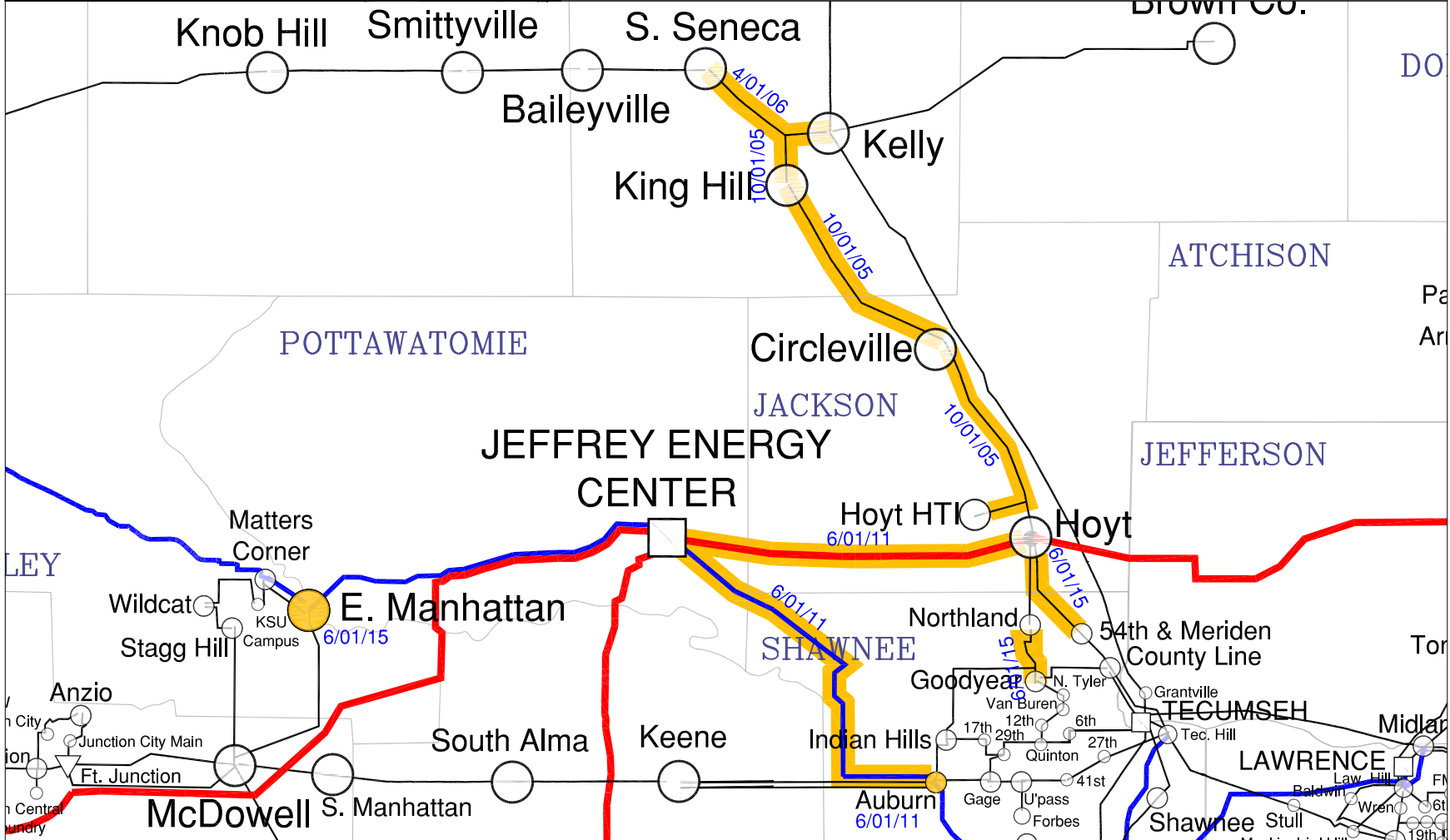
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES - - - TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION OVERLOAD VOLTAGE VIOLATION OVERLOAD AND VOLTAGE VIOLATION
--	--





Legend

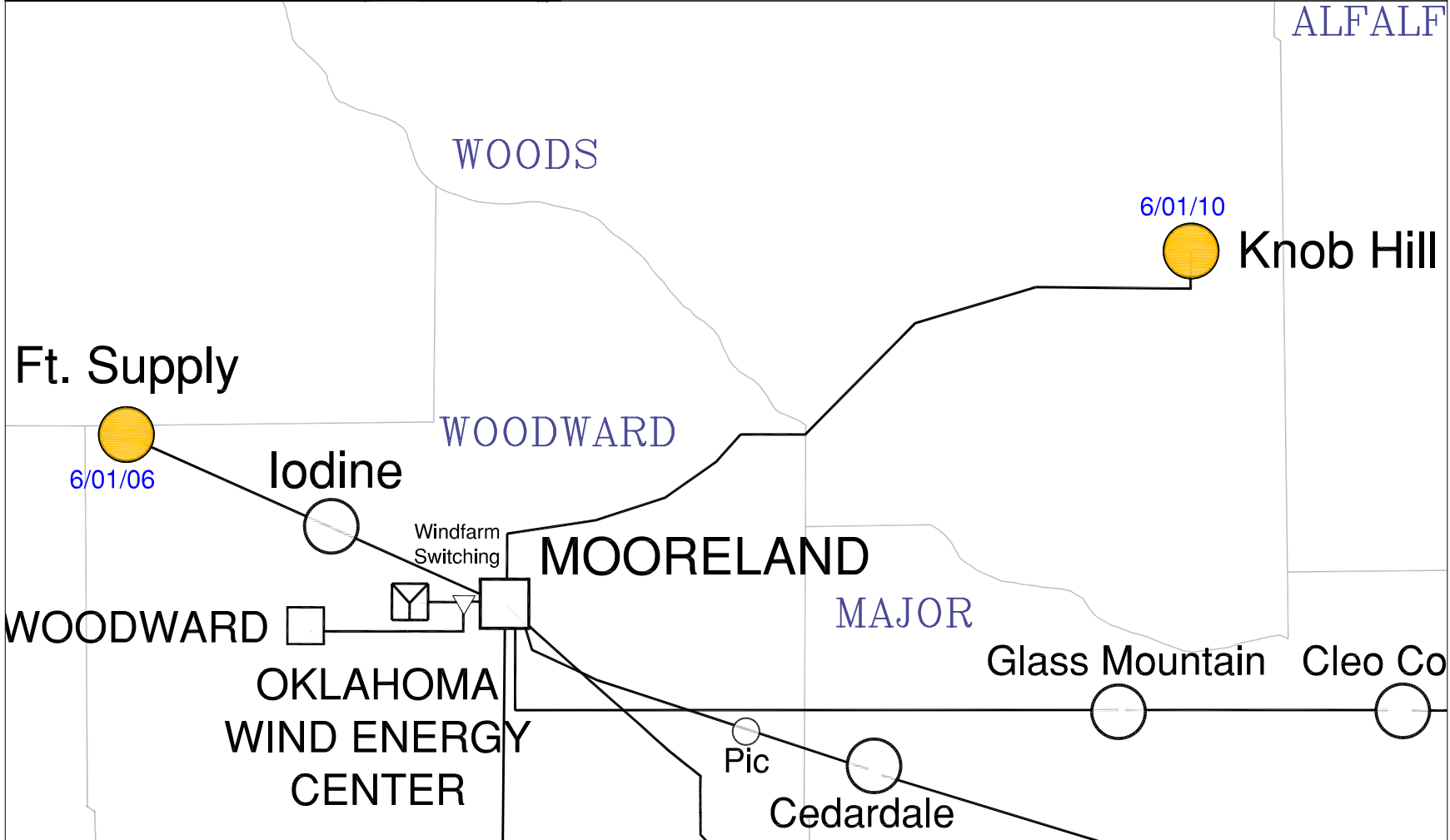
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES - - - TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION OVERLOAD VOLTAGE VIOLATION OVERLOAD AND VOLTAGE VIOLATION
--	---

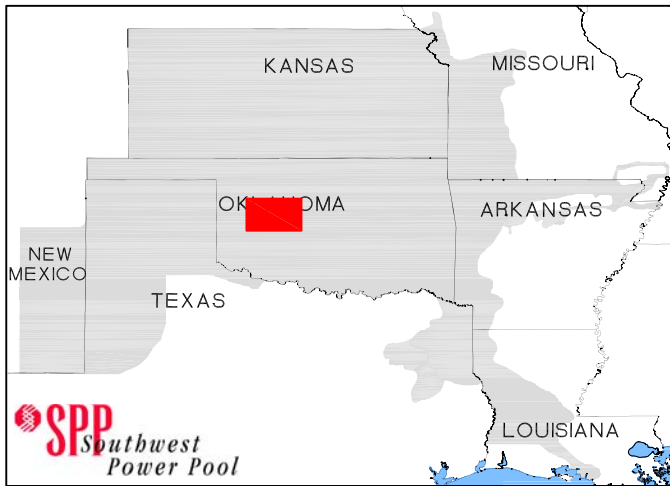




Legend

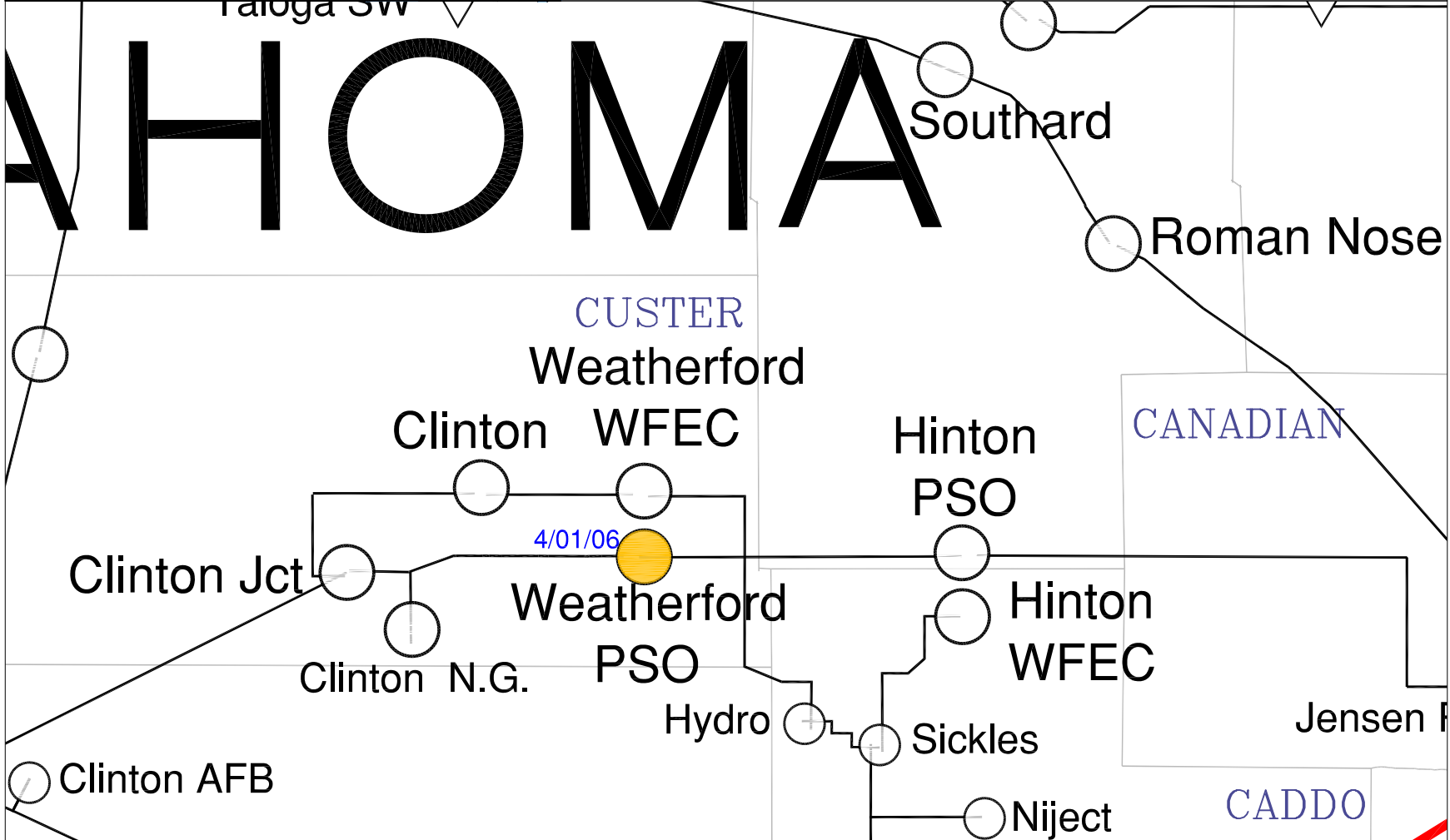
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	■ OVERLOAD
— 230 KV TRANSMISSION LINES	■ VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	■ OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	





Legend

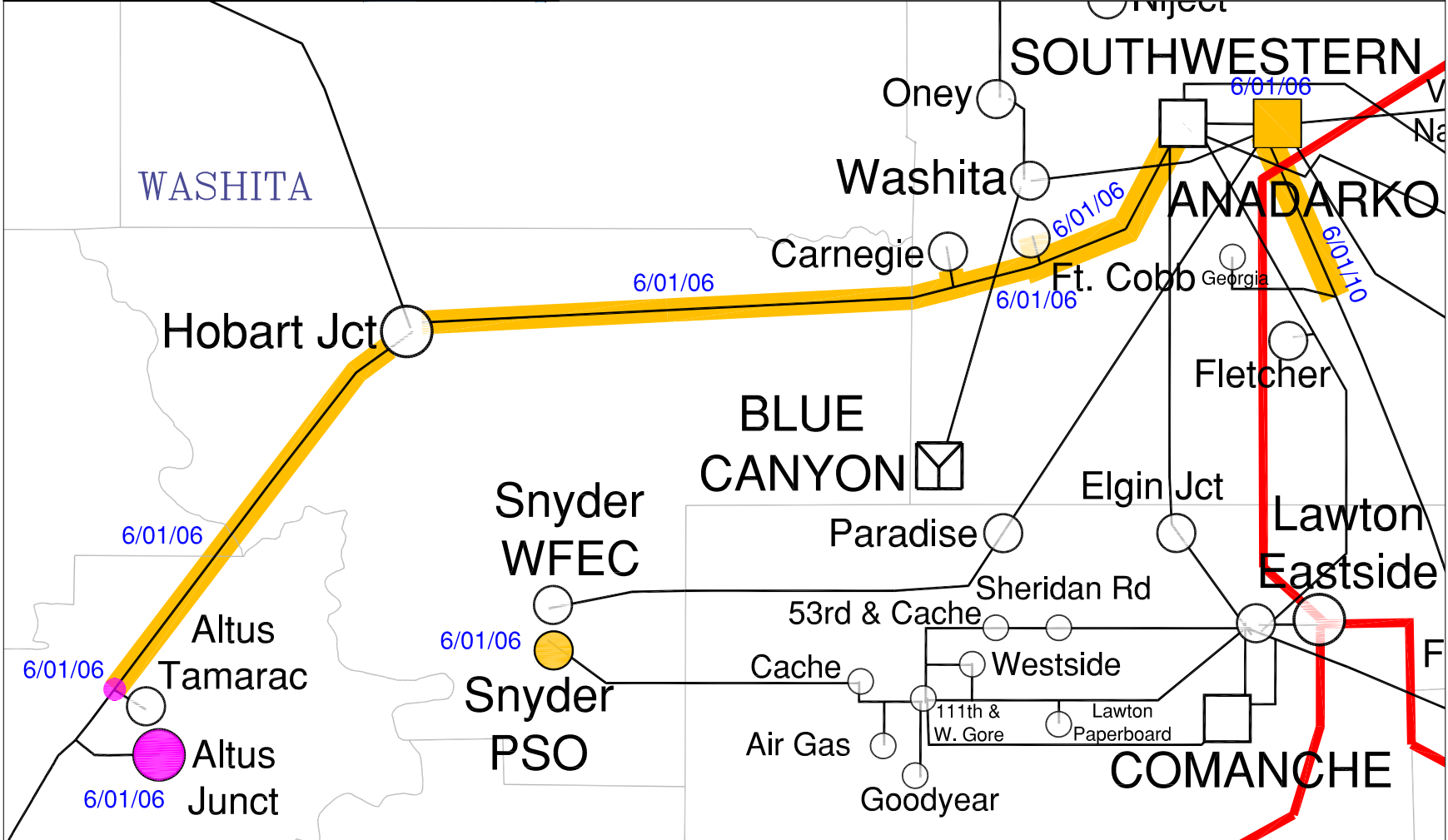
500 KV & OVER TRANSMISSION LINES	SUBSTATION
345 KV TRANSMISSION LINES	OVERLOAD
230 KV TRANSMISSION LINES	VOLTAGE VIOLATION
115-161 KV TRANSMISSION LINES	OVERLOAD AND VOLTAGE VIOLATION
TRANSMISSION LINE PLANNED	





Legend

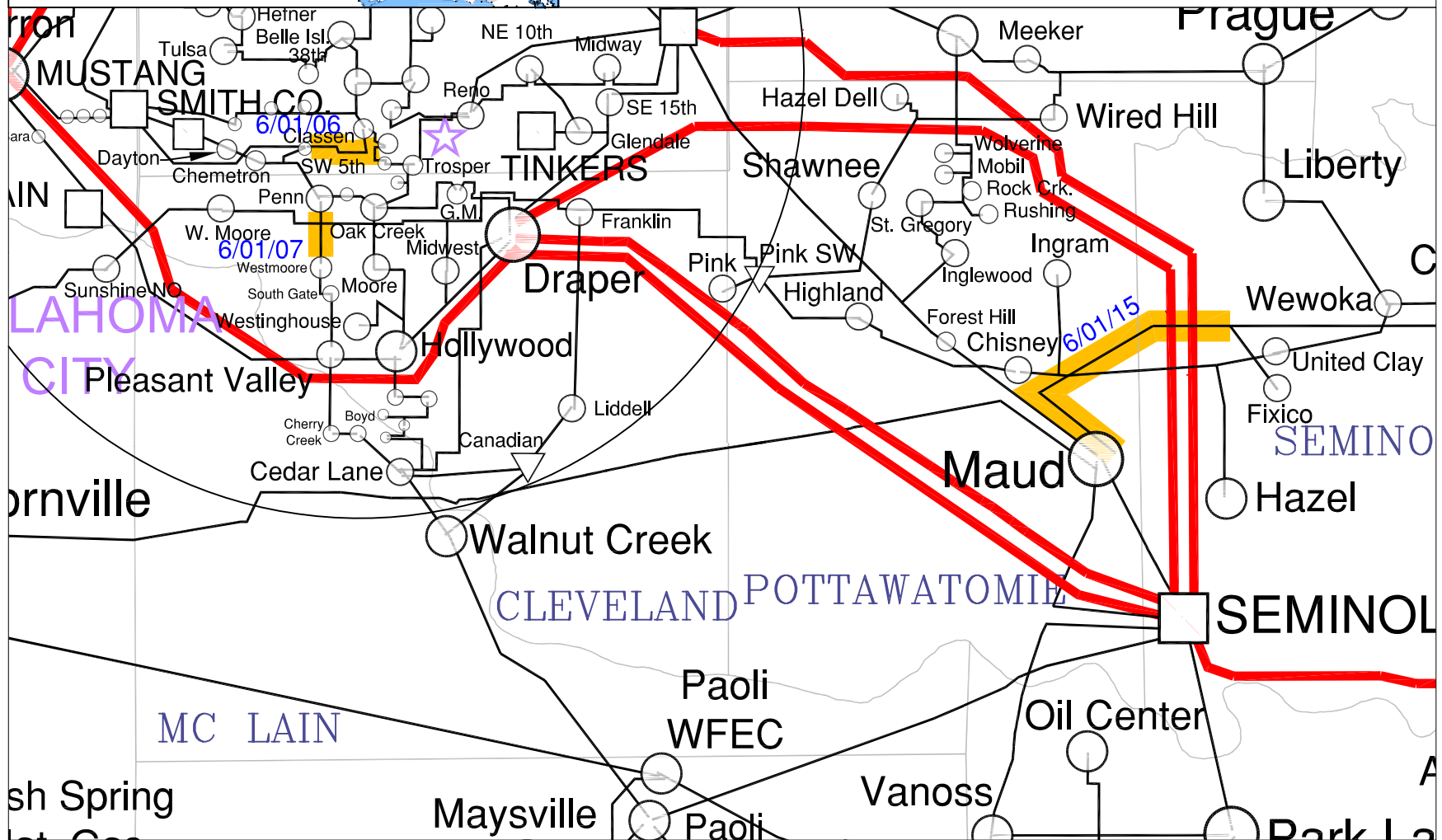
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	 OVERLOAD
— 230 KV TRANSMISSION LINES	 VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	 OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	





Legend

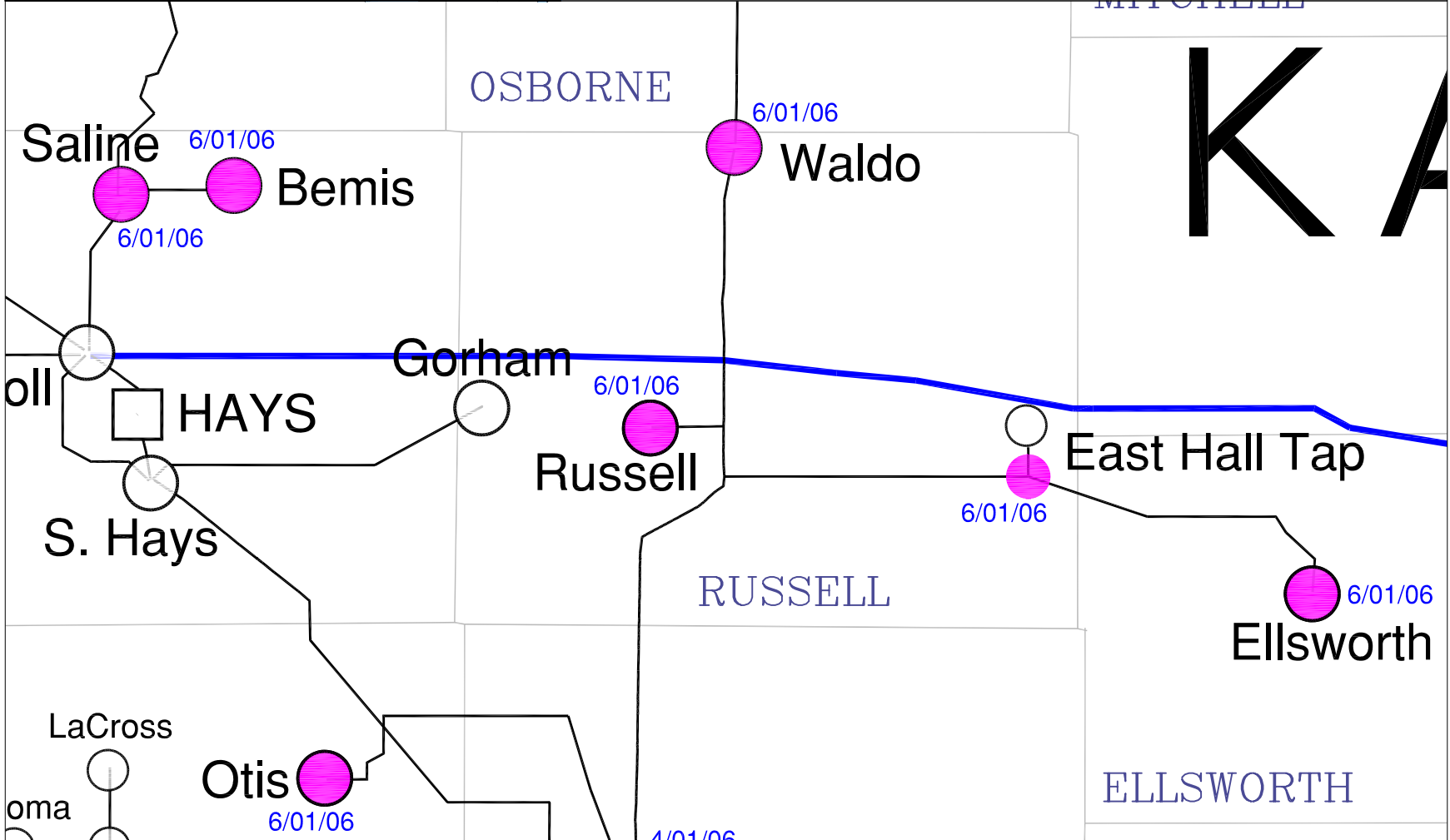
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	▬ OVERLOAD
— 230 KV TRANSMISSION LINES	▬ VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	▬ OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	





Legend

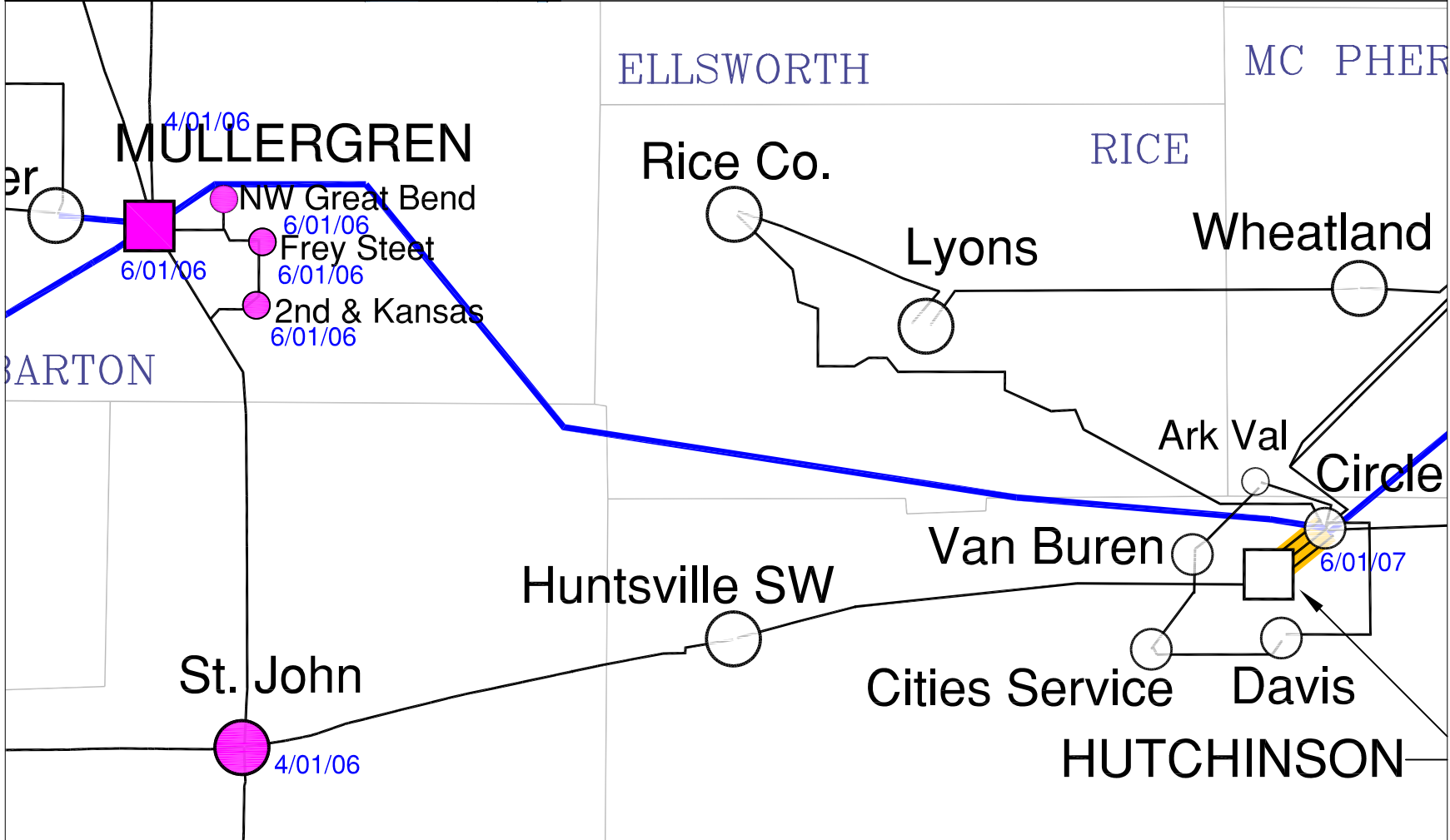
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES - - - TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION OVERLOAD VOLTAGE VIOLATION OVERLOAD AND VOLTAGE VIOLATION
--	---





Legend

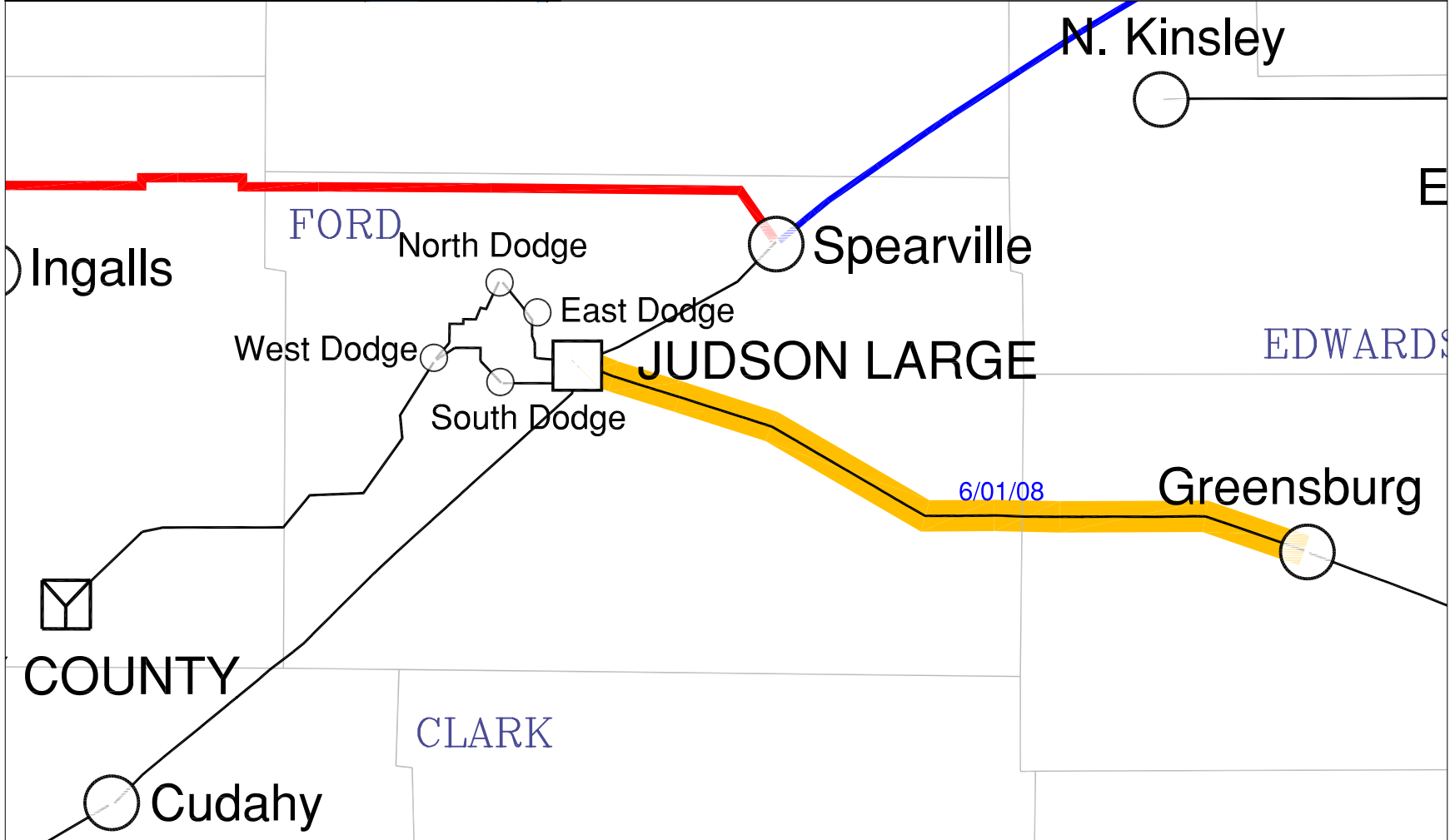
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	■ OVERLOAD
— 230 KV TRANSMISSION LINES	■ VOLTAGE VIOLATION
— 115–161 KV TRANSMISSION LINES	■ OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	

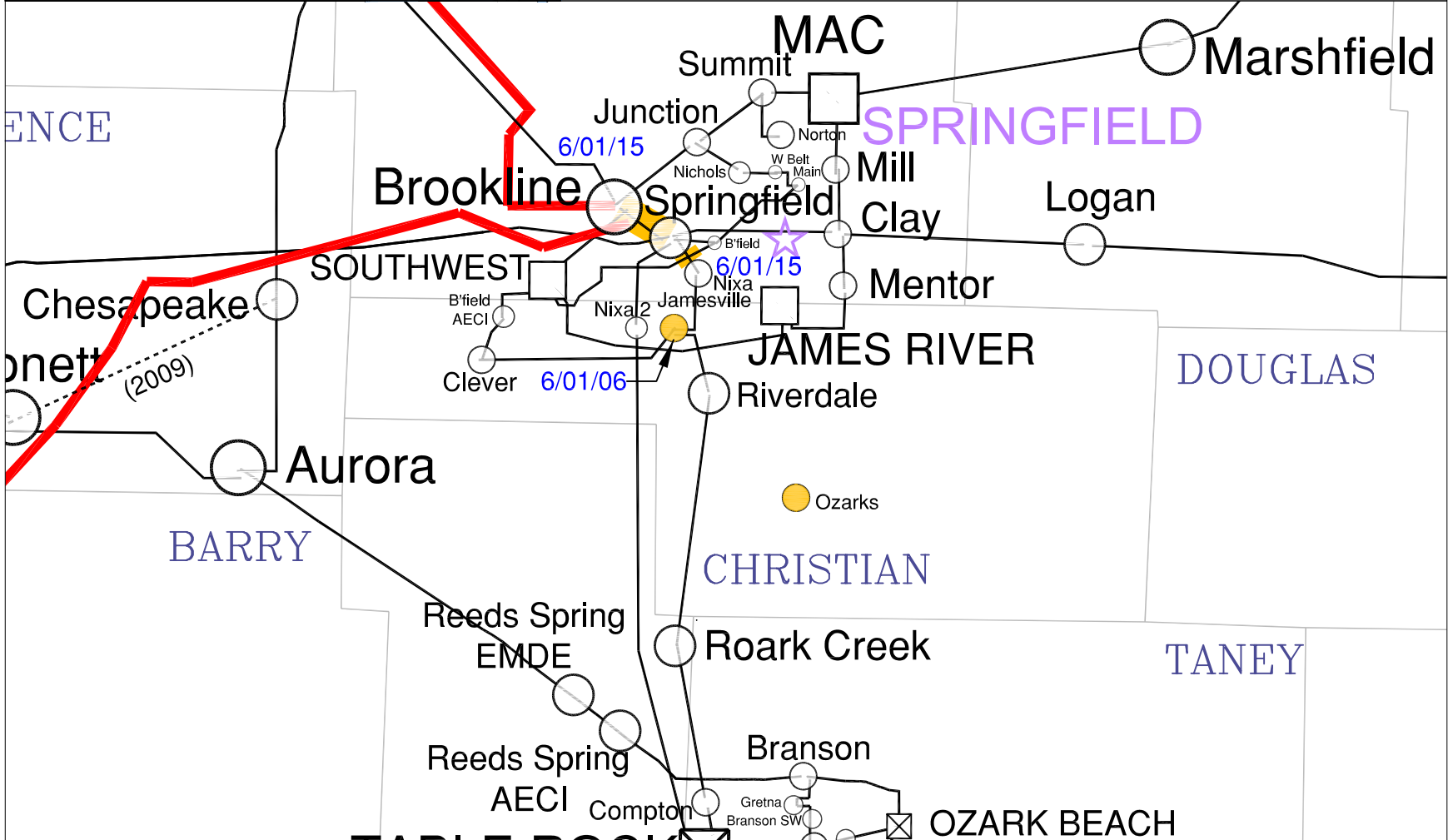
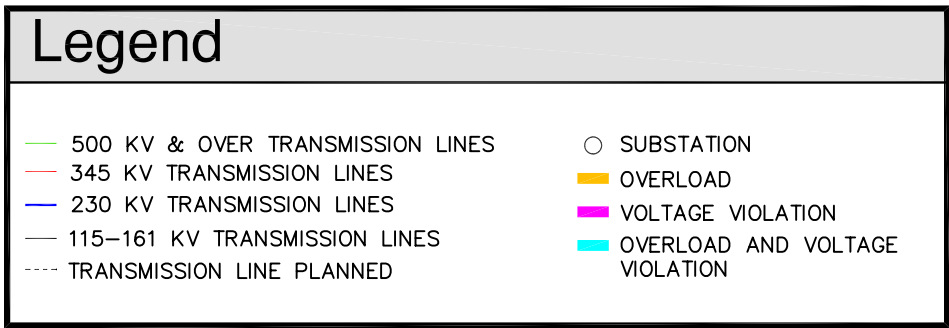




Legend

— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	 OVERLOAD
— 230 KV TRANSMISSION LINES	 VOLTAGE VIOLATION
— 115-161 KV TRANSMISSION LINES	 OVERLOAD AND VOLTAGE VIOLATION
- - - TRANSMISSION LINE PLANNED	

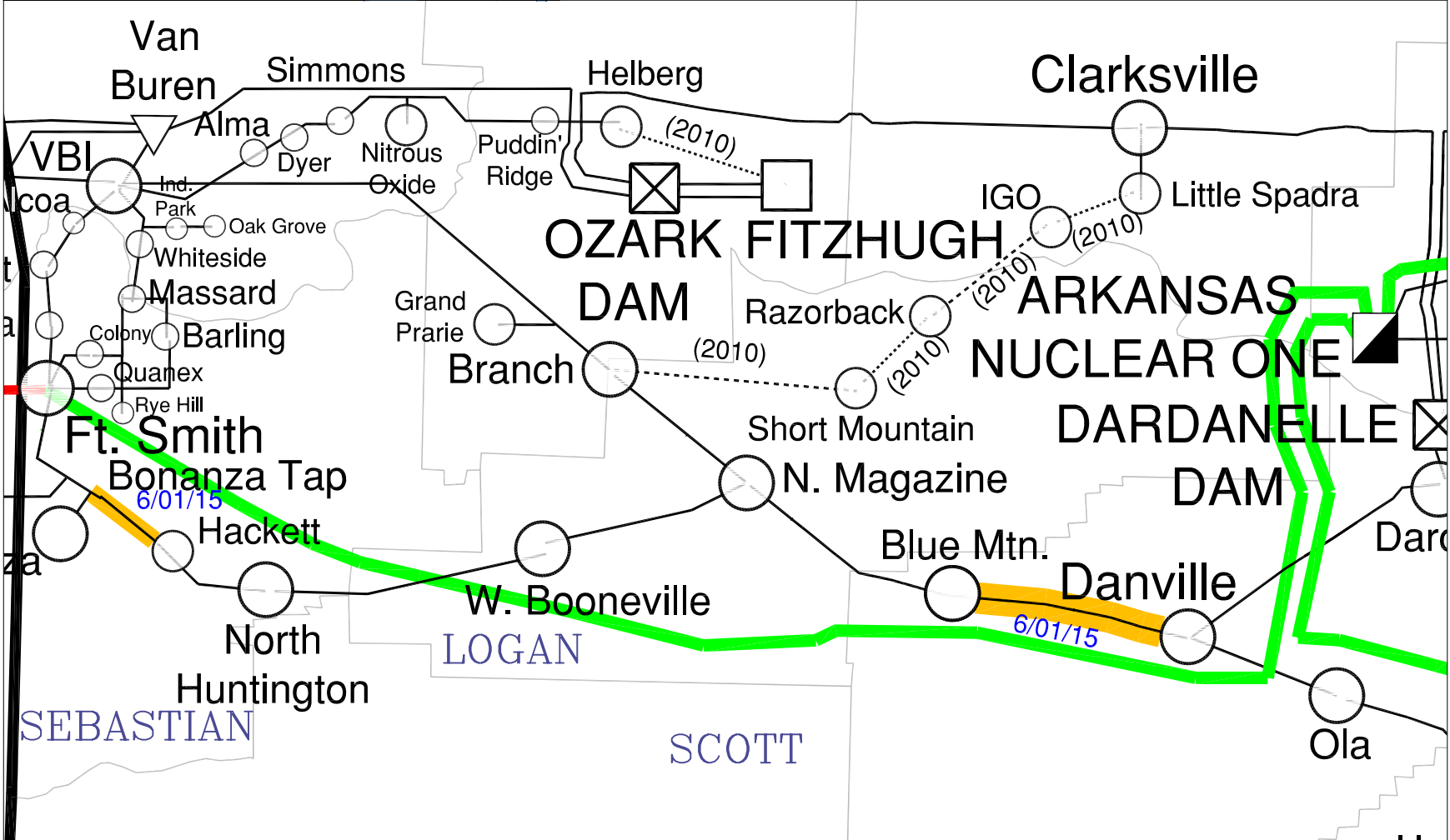






Legend

<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES - - - TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION OVERLOAD VOLTAGE VIOLATION OVERLOAD AND VOLTAGE VIOLATION
--	---

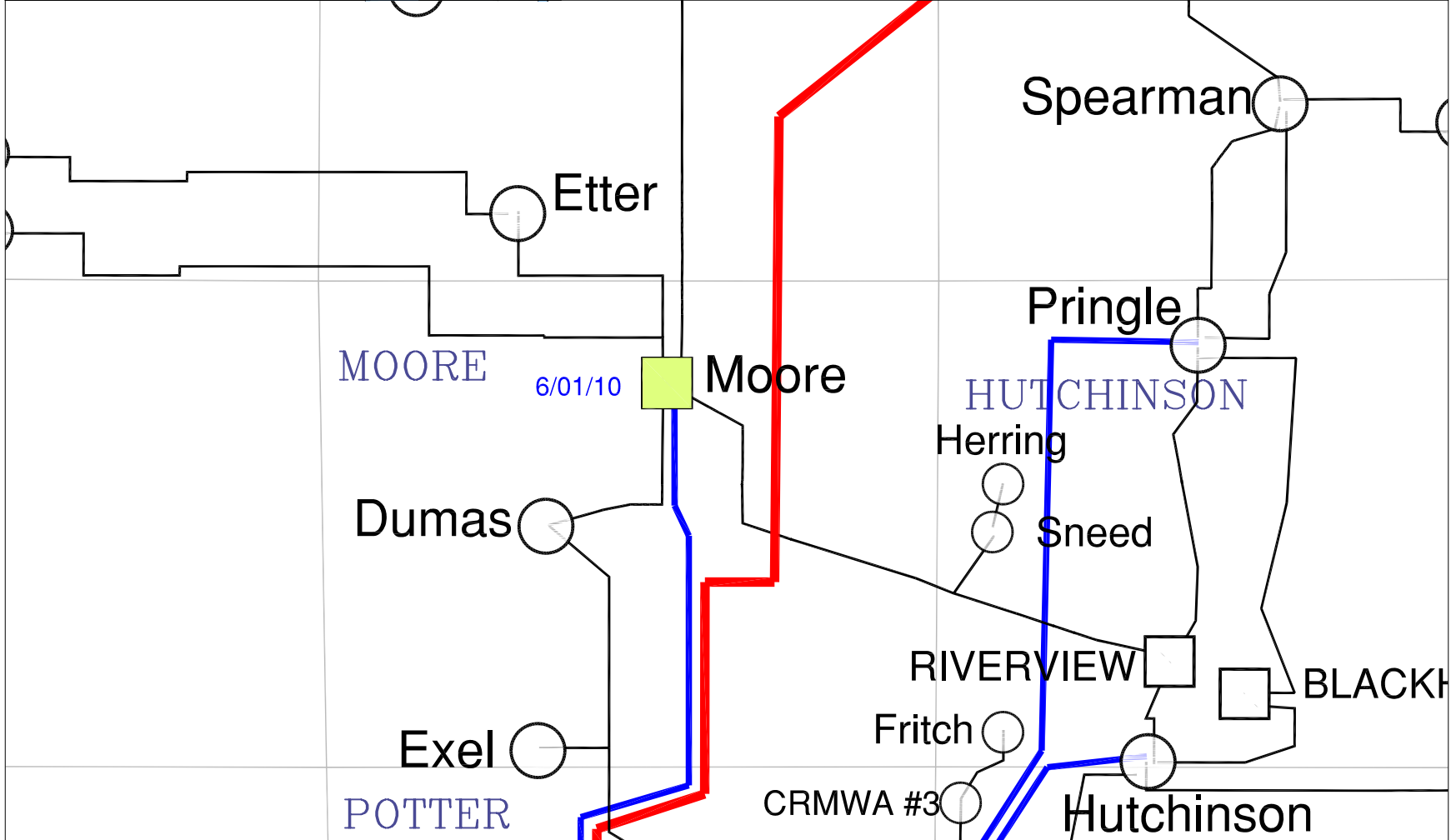


Facility Upgrades



Legend

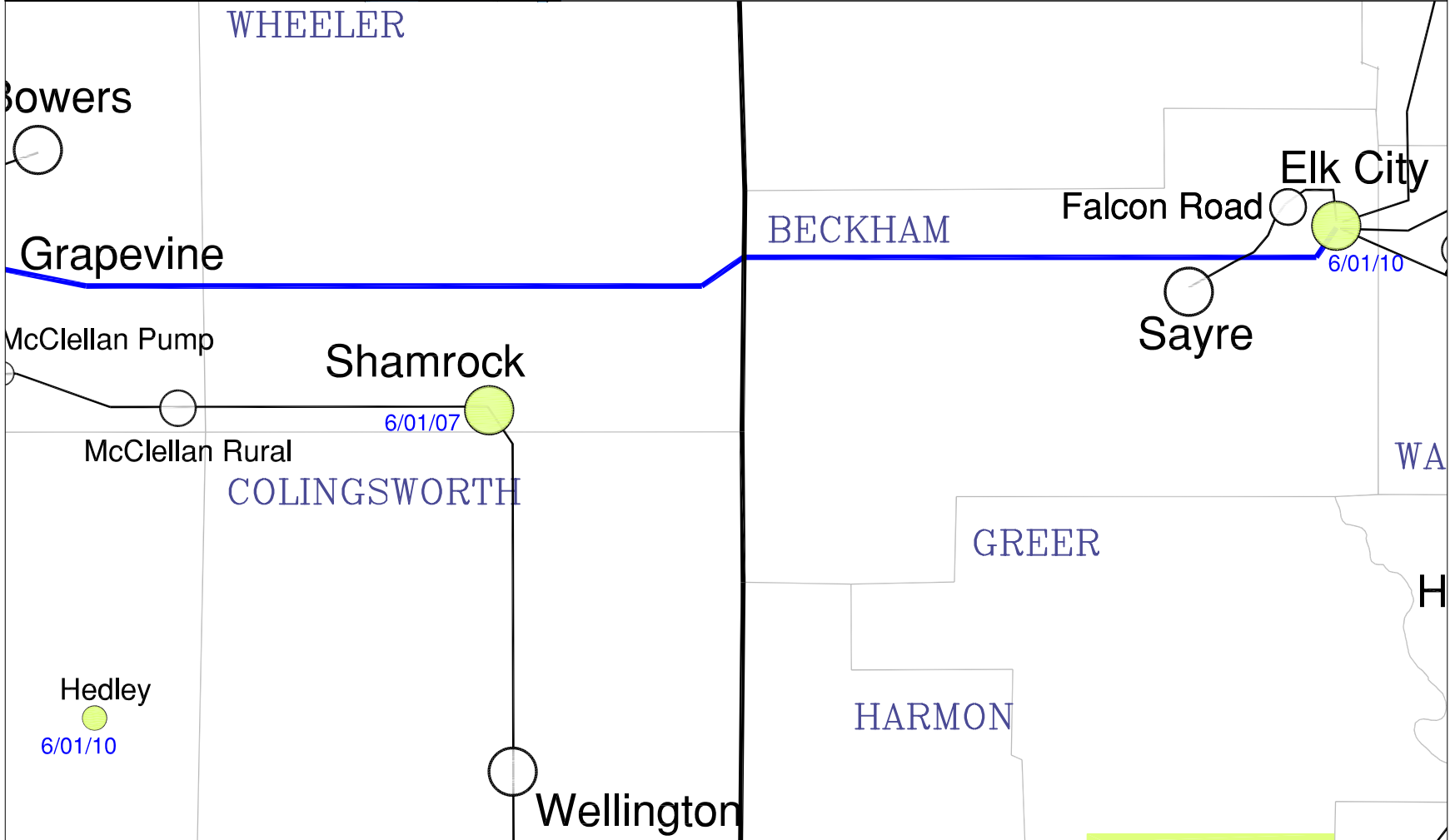
- 500 KV & OVER TRANSMISSION LINES
- 345 KV TRANSMISSION LINES
- 230 KV TRANSMISSION LINES
- 115–161 KV TRANSMISSION LINES
- - - TRANSMISSION LINE PLANNED
- SUBSTATION
- UPGRADE





Legend

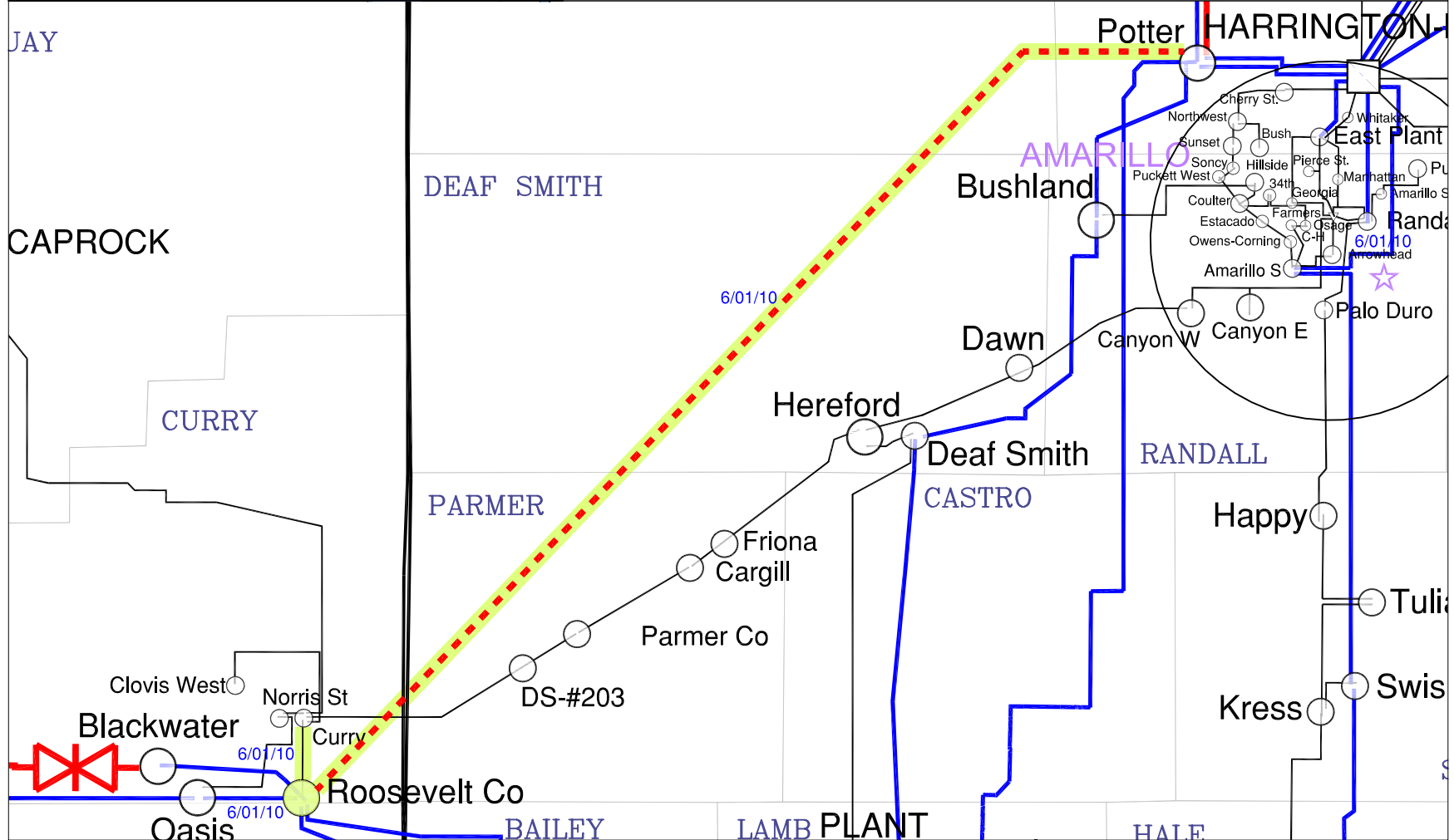
— 500 KV & OVER TRANSMISSION LINES	 SUBSTATION
— 345 KV TRANSMISSION LINES	 UPGRADE
— 230 KV TRANSMISSION LINES	
— 115–161 KV TRANSMISSION LINES	
- - - TRANSMISSION LINE PLANNED	





Legend

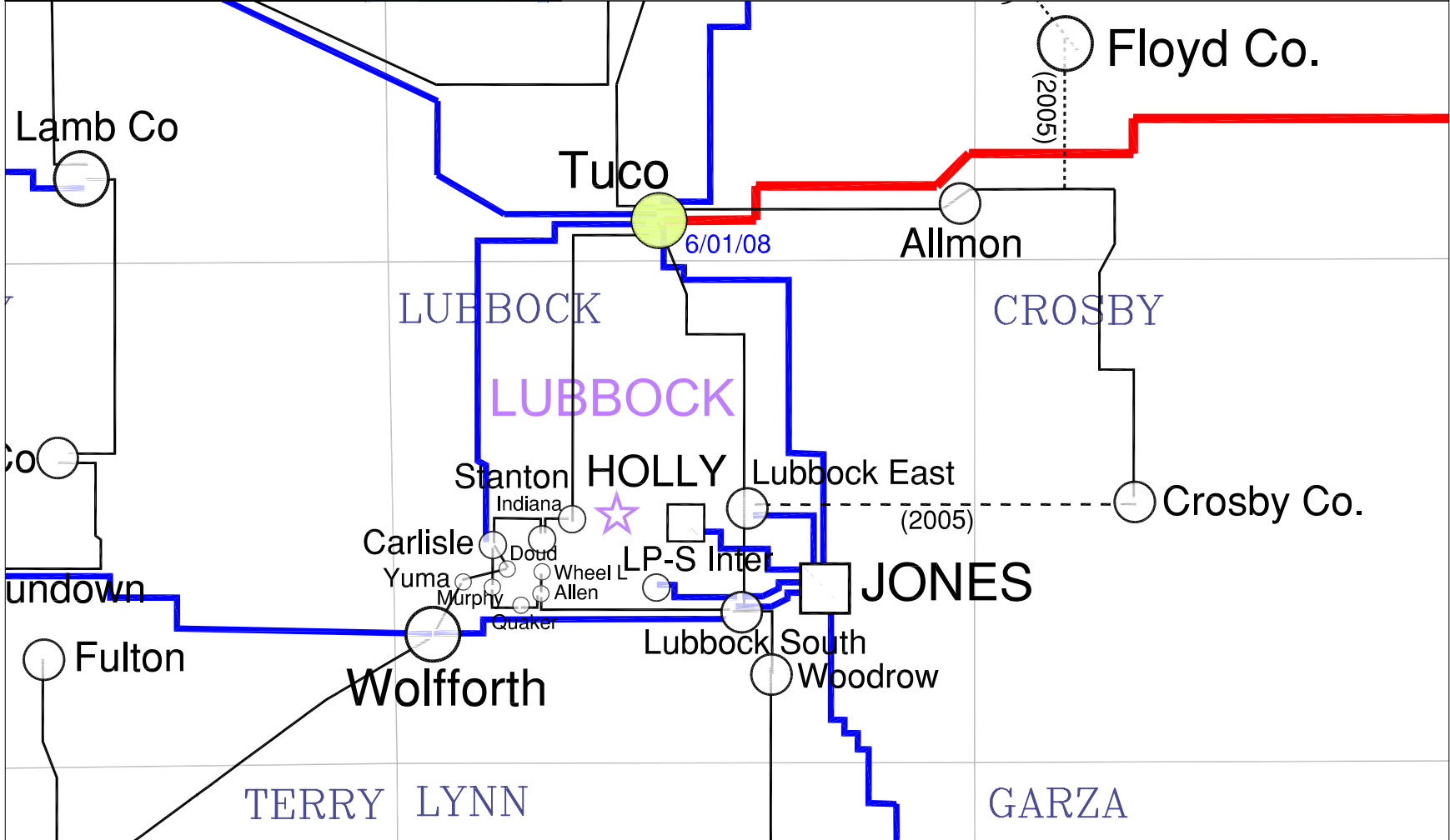
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES - - - TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION UPGRADE
--	---





Legend

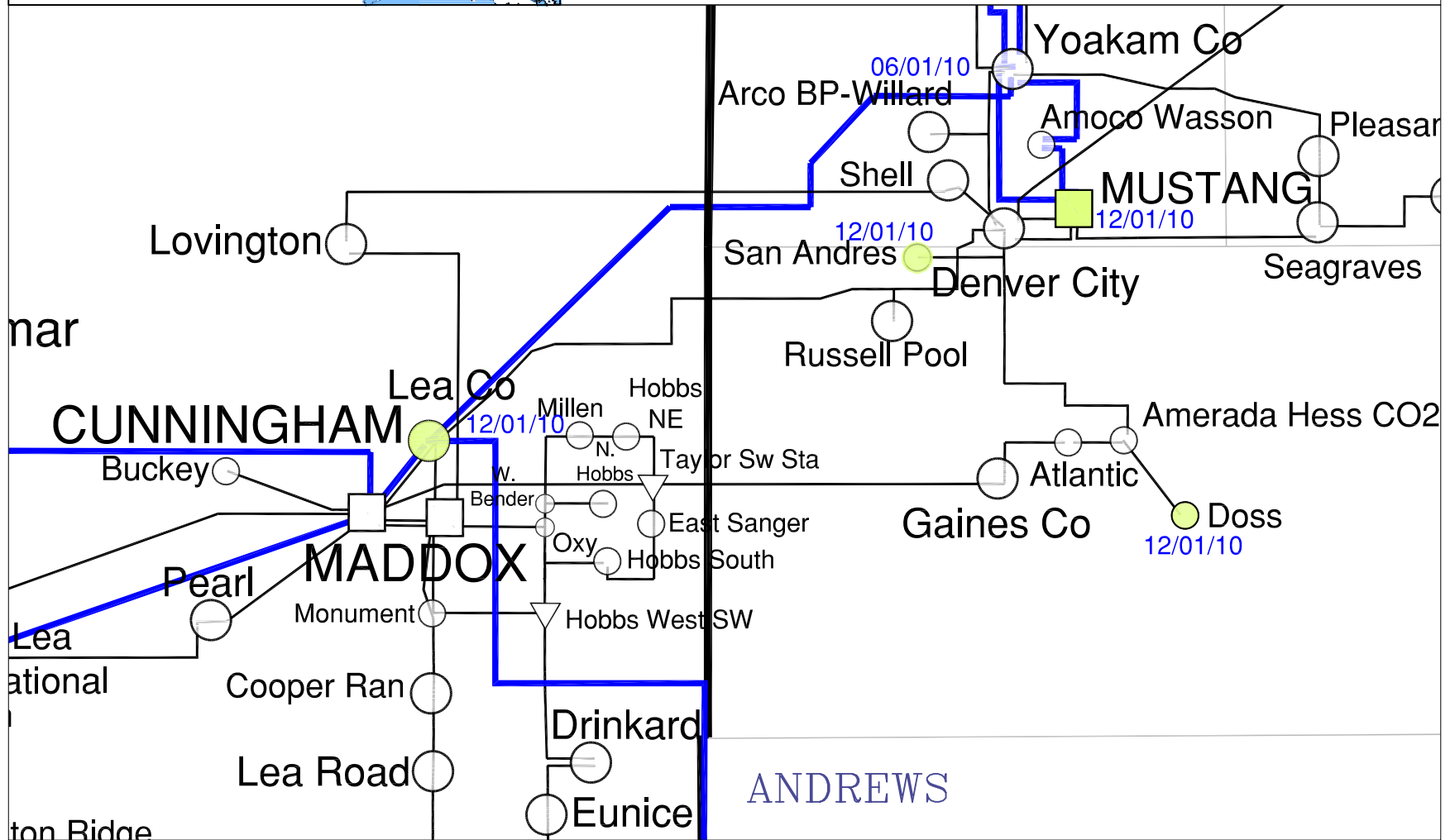
- 500 KV & OVER TRANSMISSION LINES
- 345 KV TRANSMISSION LINES
- 230 KV TRANSMISSION LINES
- 115–161 KV TRANSMISSION LINES
- - - TRANSMISSION LINE PLANNED
- SUBSTATION
- UPGRADE





Legend

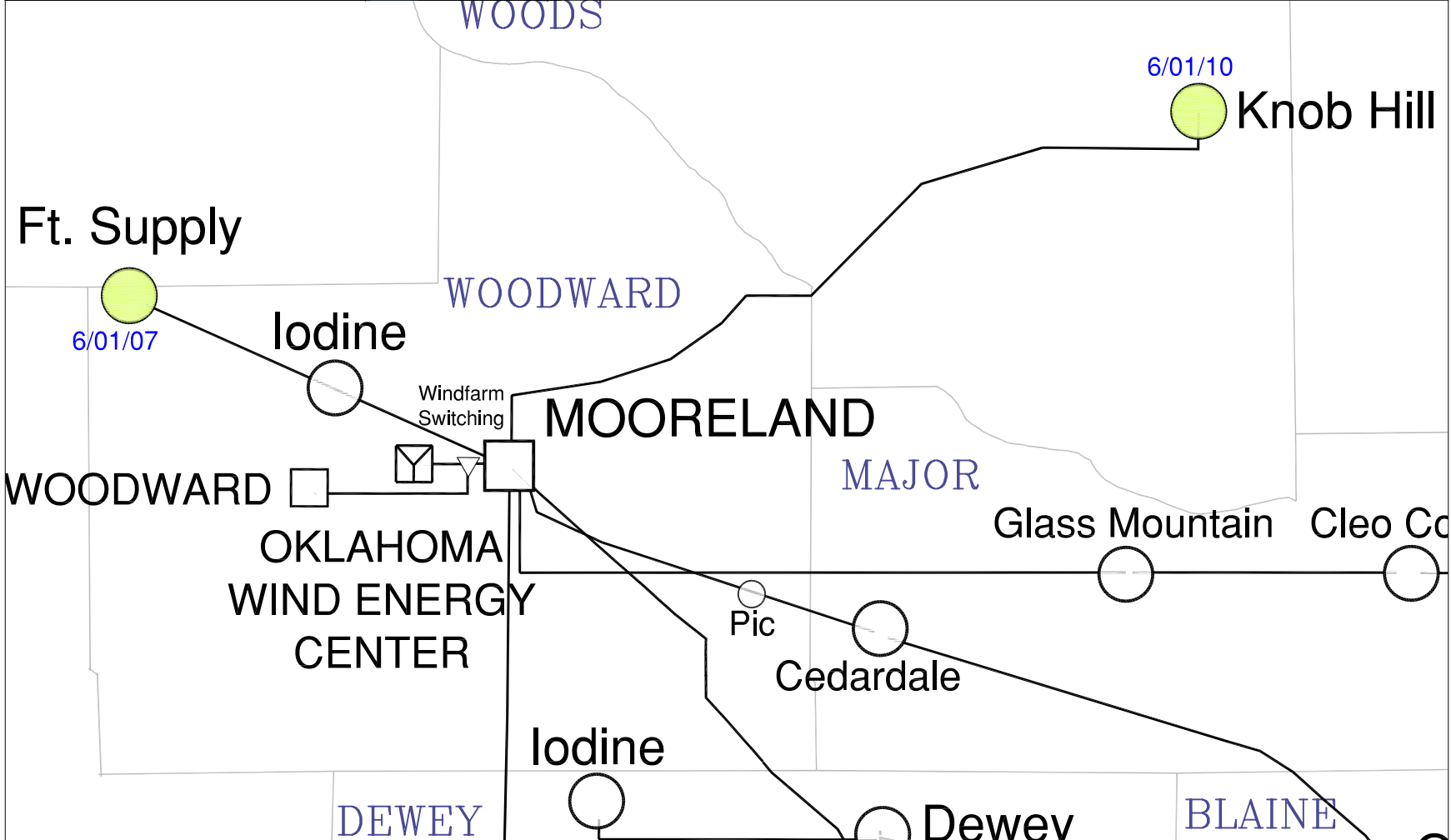
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	■ UPGRADE
— 230 KV TRANSMISSION LINES	
— 115–161 KV TRANSMISSION LINES	
- - - TRANSMISSION LINE PLANNED	





Legend

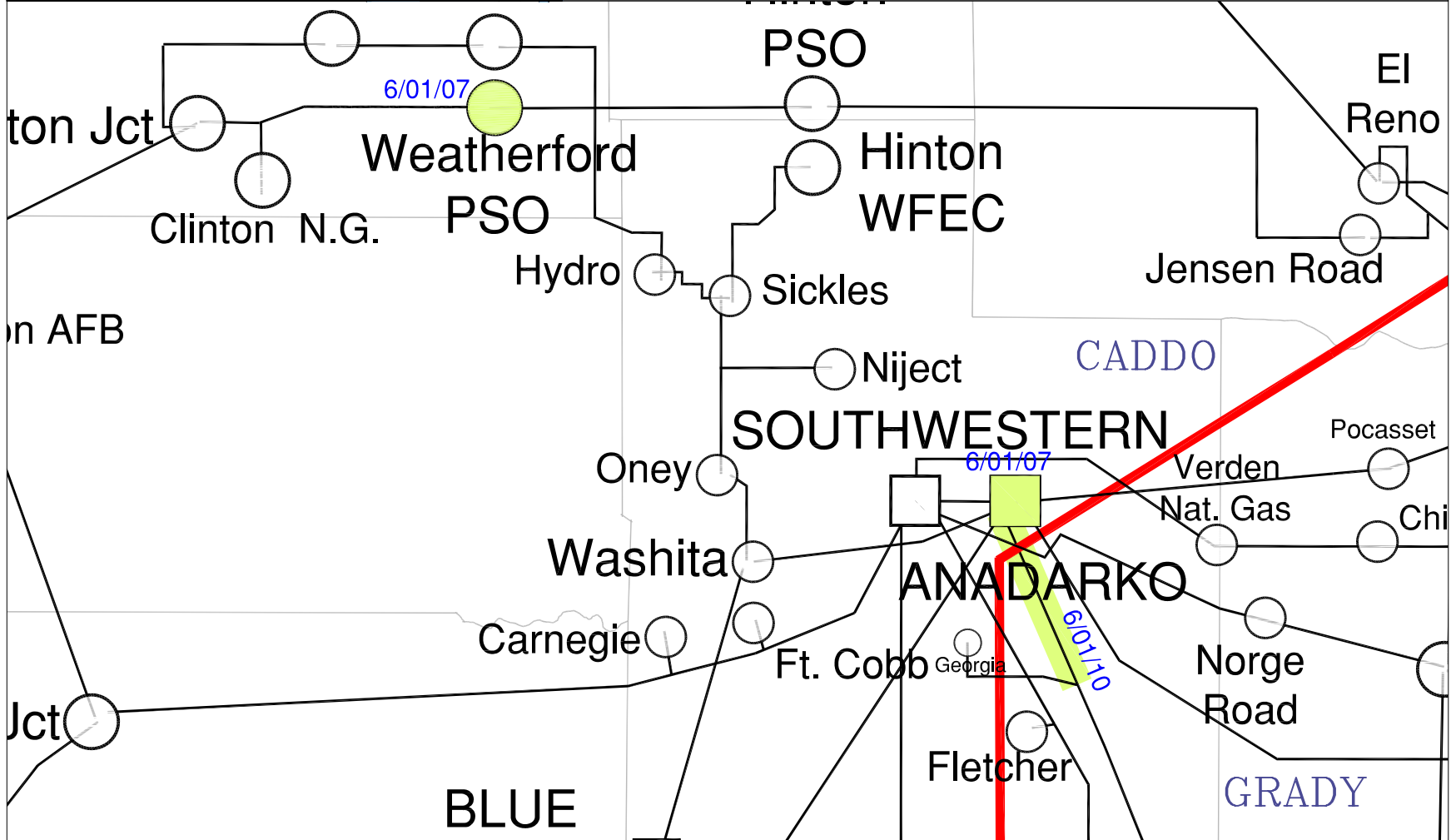
- 500 KV & OVER TRANSMISSION LINES
- 345 KV TRANSMISSION LINES
- 230 KV TRANSMISSION LINES
- 115–161 KV TRANSMISSION LINES
- - - TRANSMISSION LINE PLANNED
- SUBSTATION
- UPGRADE





Legend

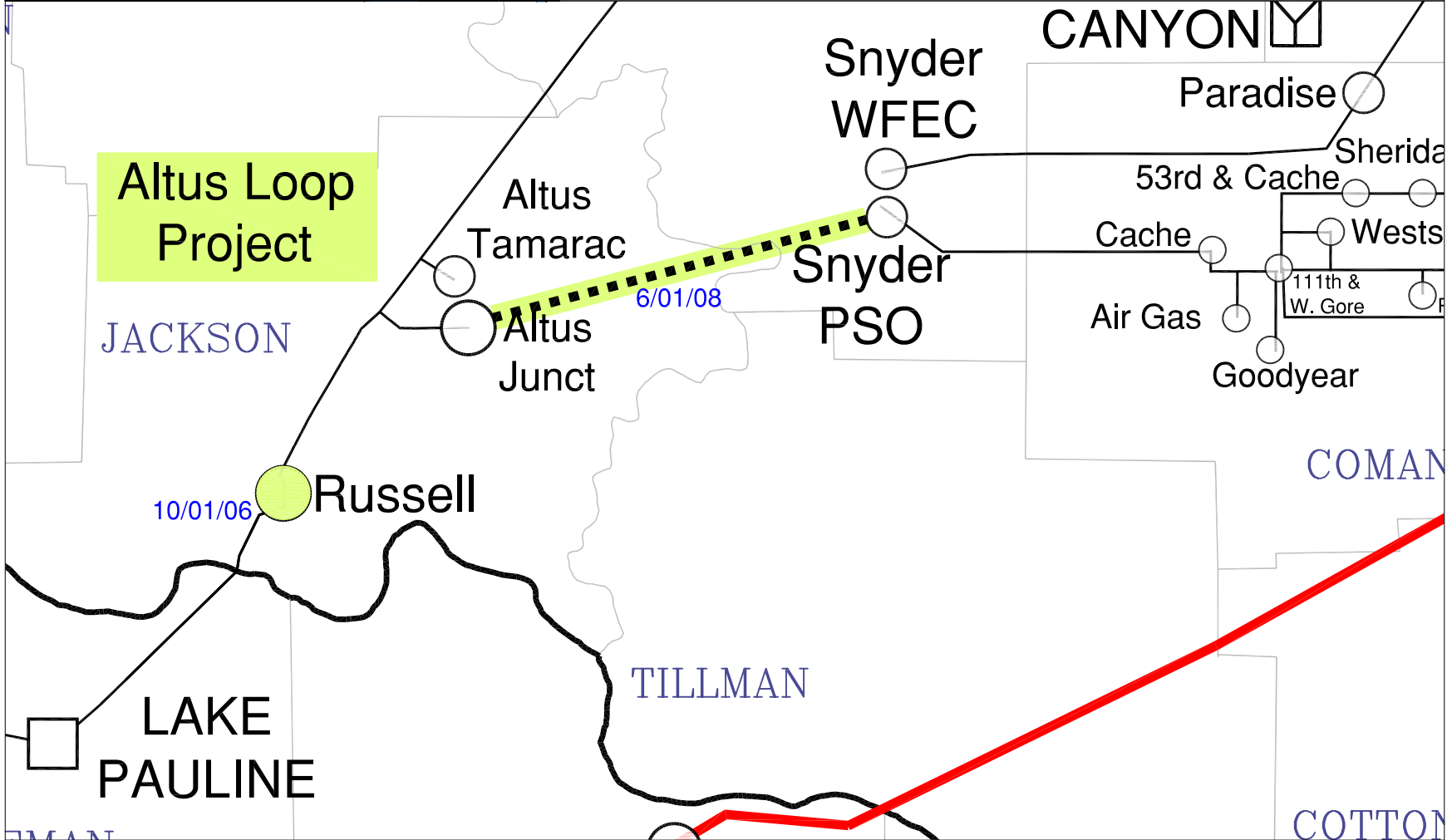
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES 115–161 KV TRANSMISSION LINES TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION UPGRADE
---	--





Legend

- 500 KV & OVER TRANSMISSION LINES
- 345 KV TRANSMISSION LINES
- 230 KV TRANSMISSION LINES
- 115–161 KV TRANSMISSION LINES
- - - TRANSMISSION LINE PLANNED
- SUBSTATION
- UPGRADE

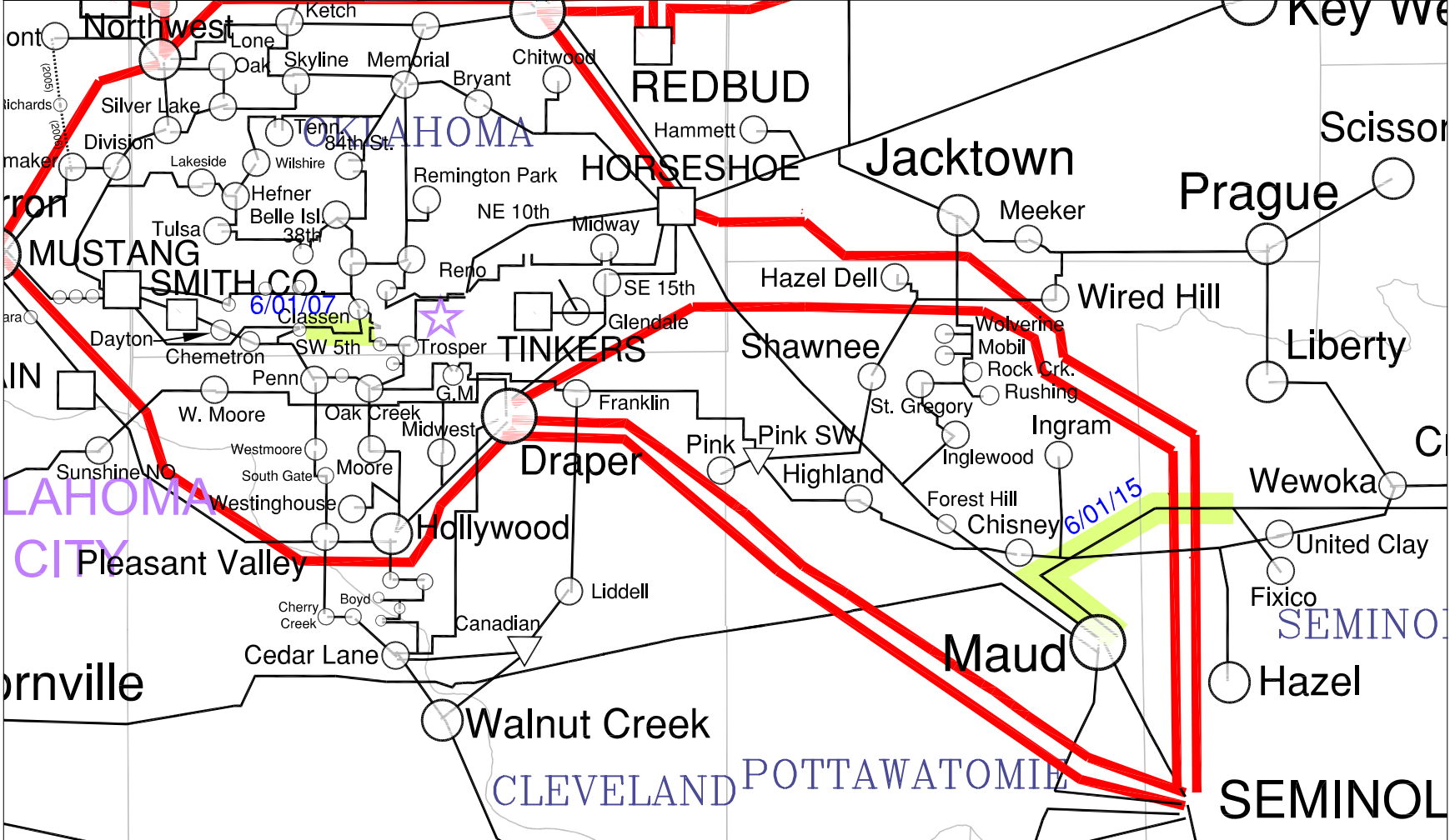




SPP
Southwest
Power Pool

Legend

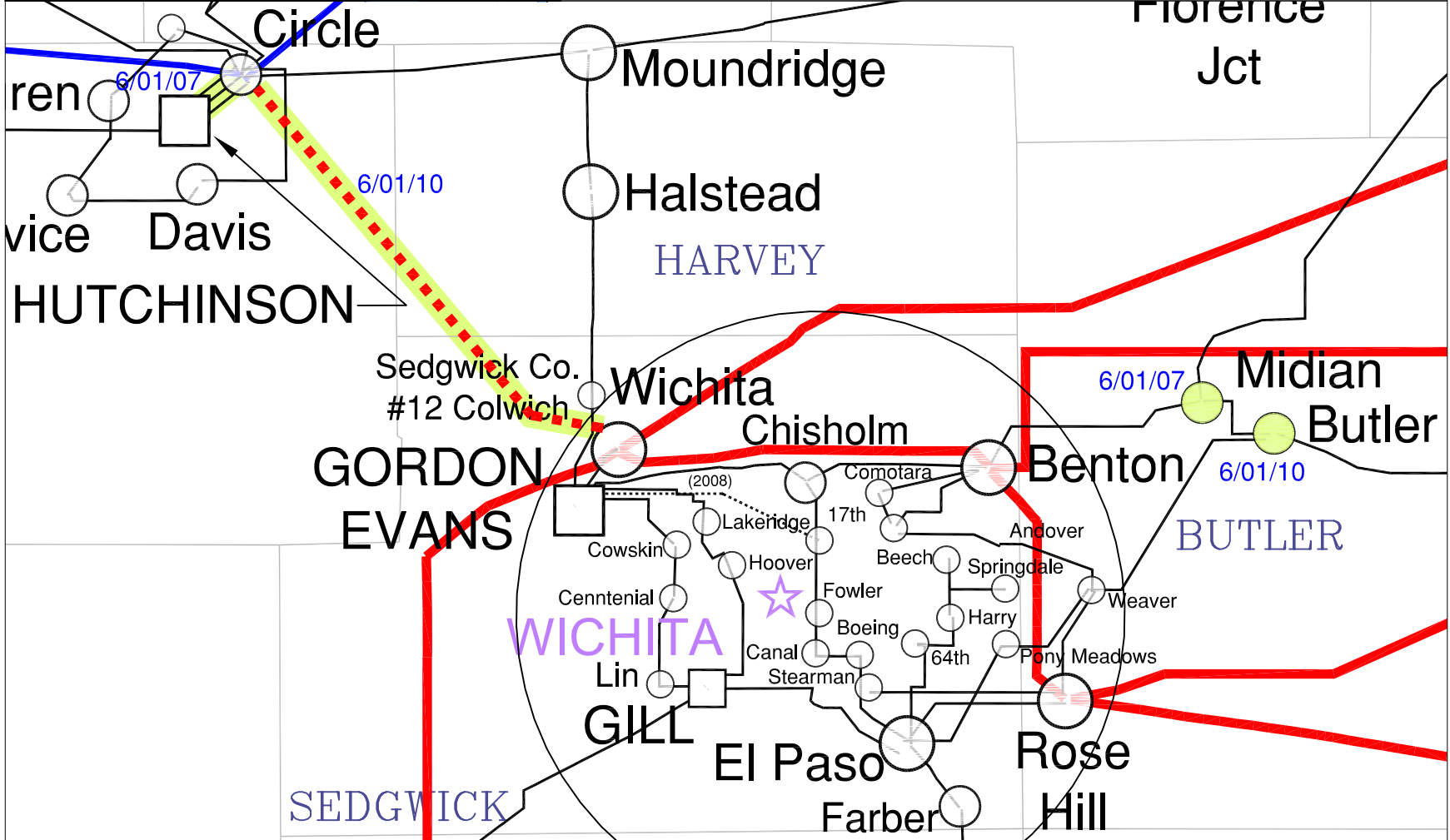
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES --- TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION UPGRADE
--	---





Legend

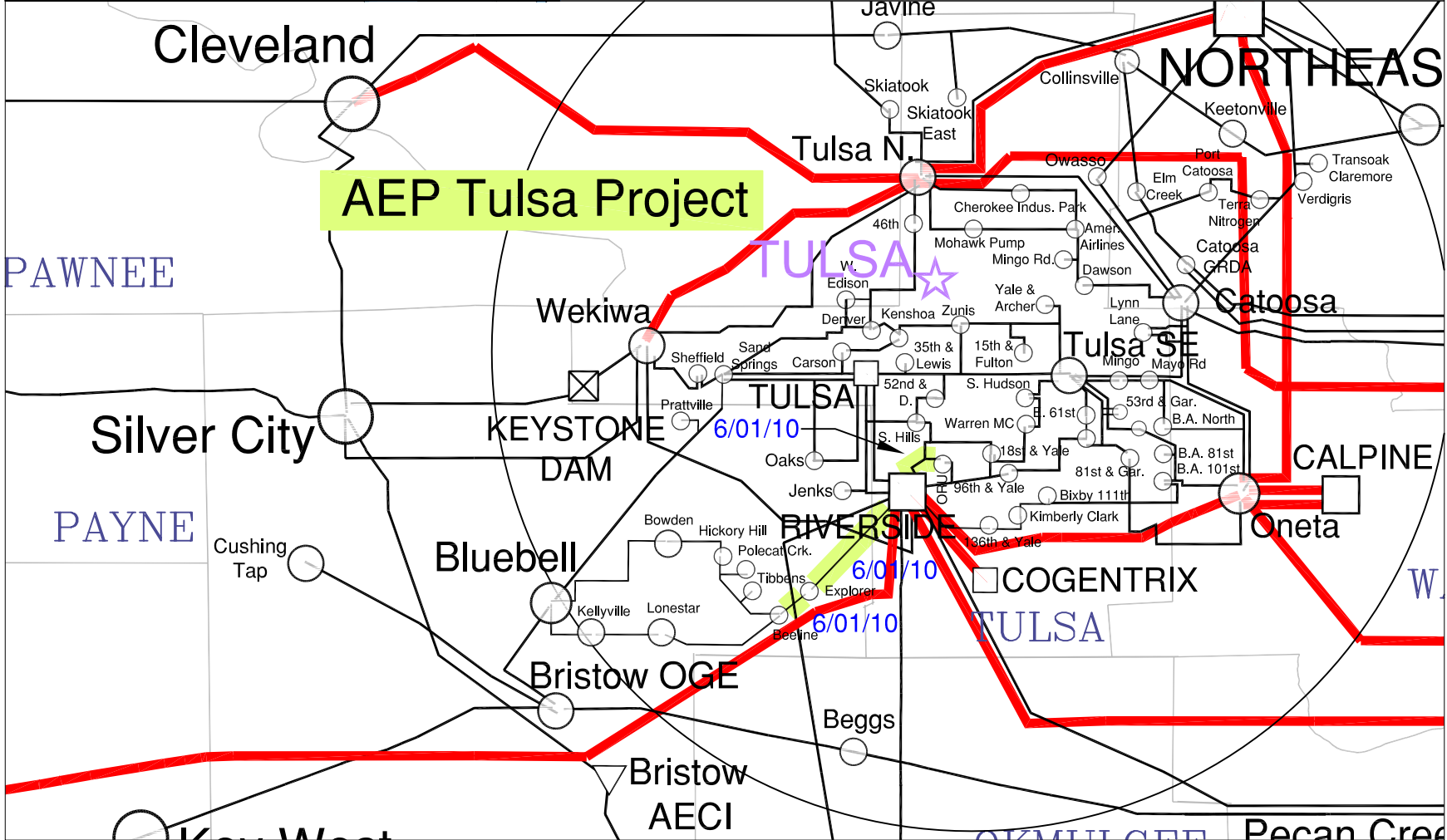
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES - - - TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION UPGRADE
--	---












Legend

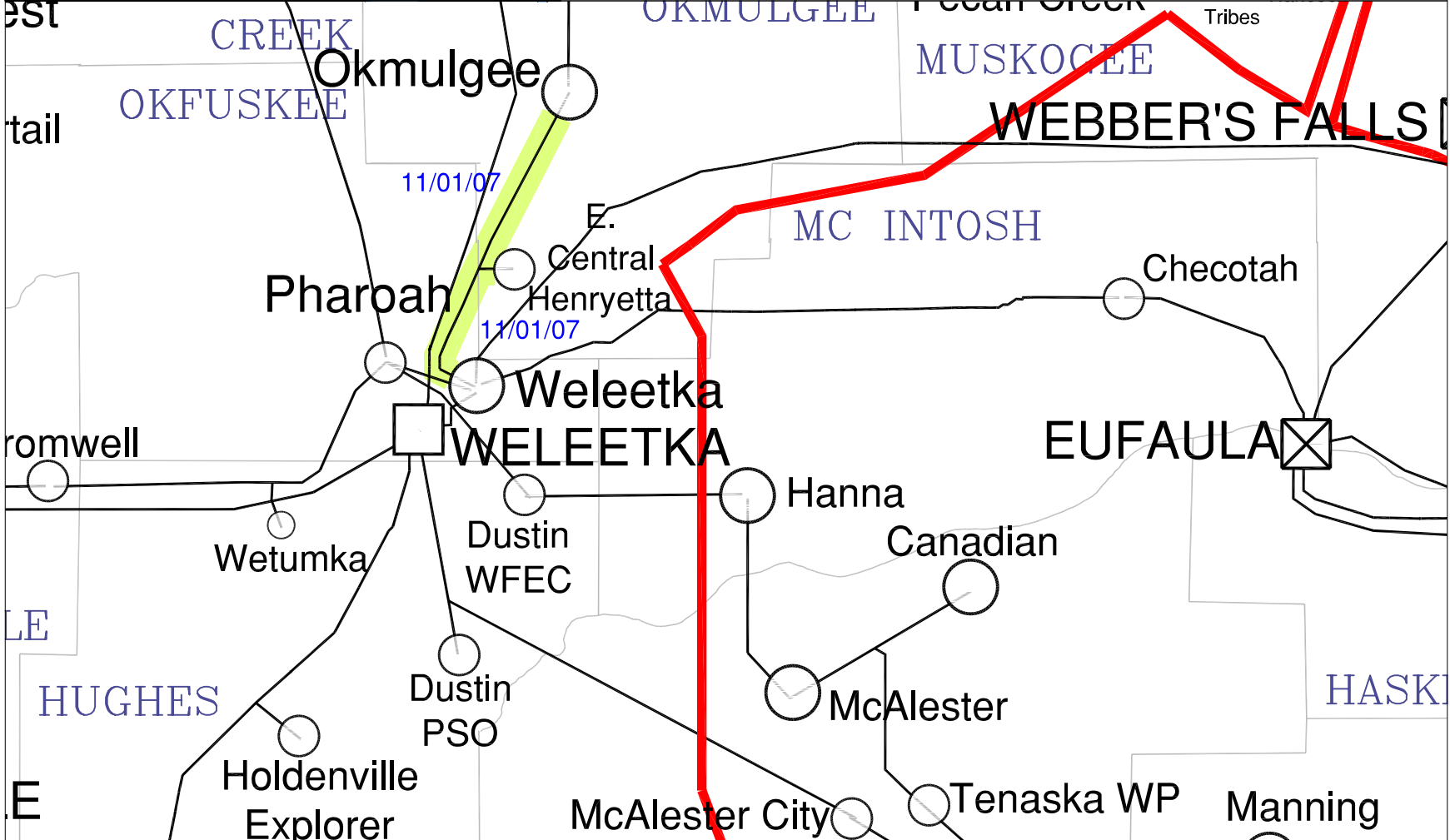
— 500 KV & OVER TRANSMISSION LINES	 SUBSTATION
— 345 KV TRANSMISSION LINES	 UPGRADE
— 230 KV TRANSMISSION LINES	
— 115–161 KV TRANSMISSION LINES	
--- TRANSMISSION LINE PLANNED	

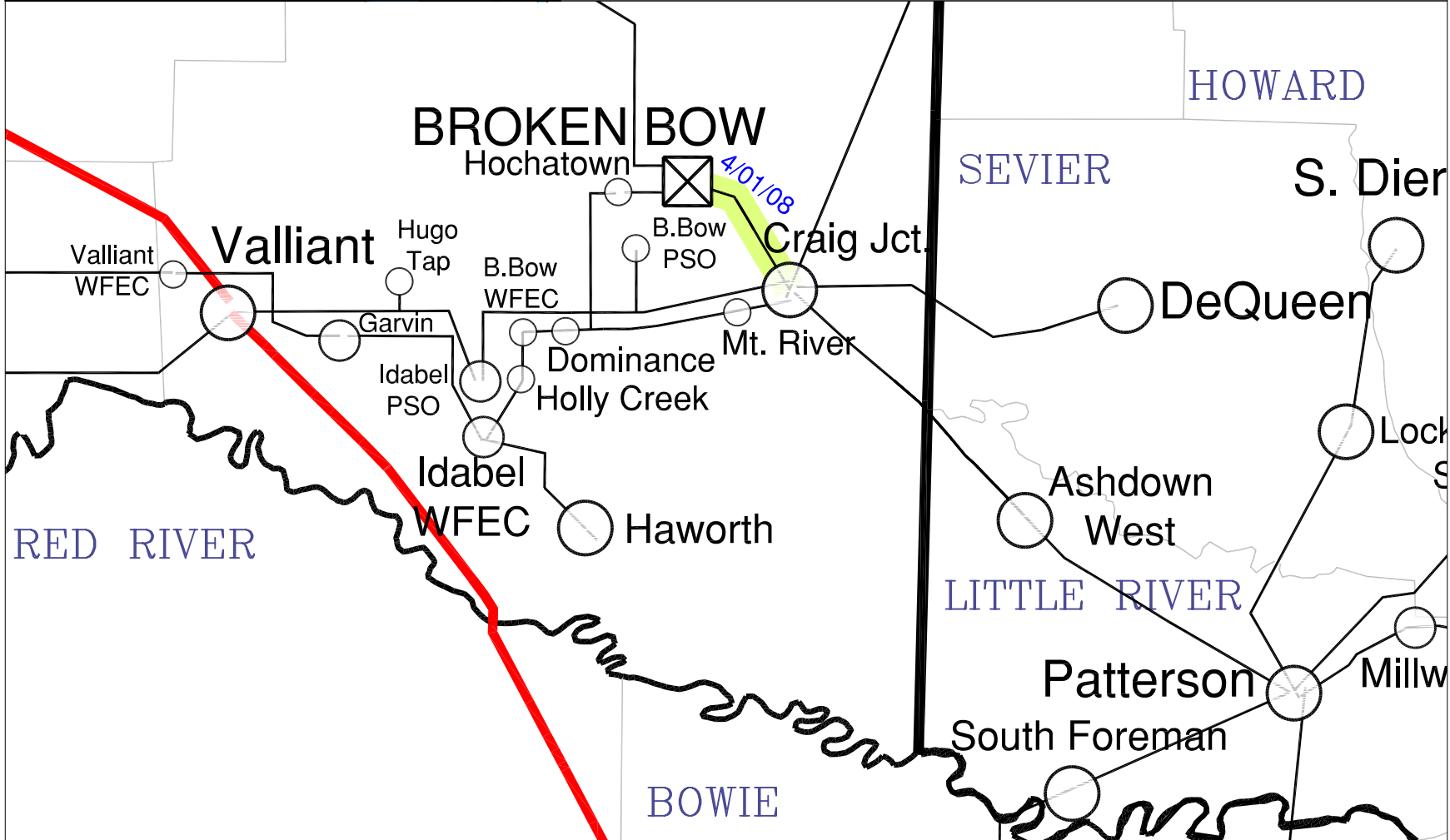
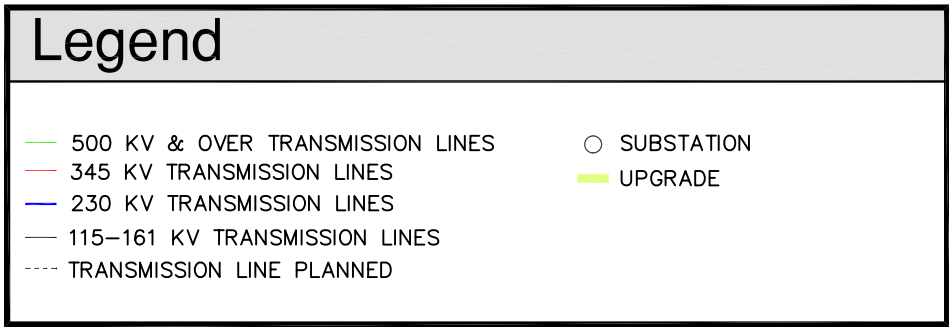


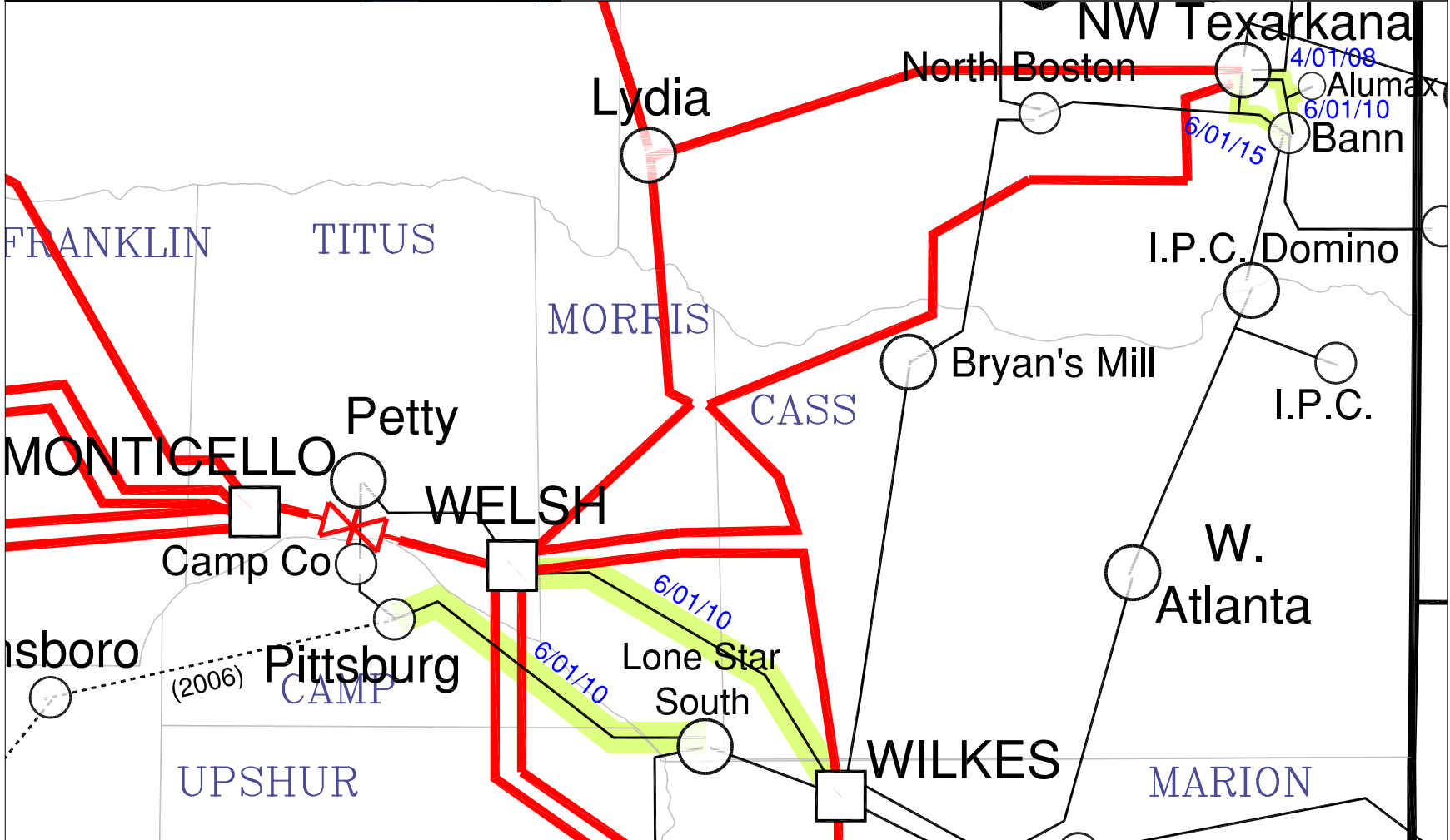
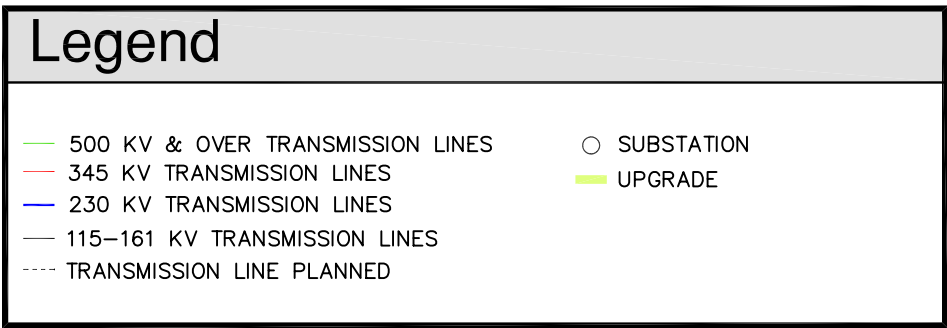


Legend

 500 KV & OVER TRANSMISSION LINES	 SUBSTATION
 345 KV TRANSMISSION LINES	 UPGRADE
 230 KV TRANSMISSION LINES	
 115-161 KV TRANSMISSION LINES	
 TRANSMISSION LINE PLANNED	



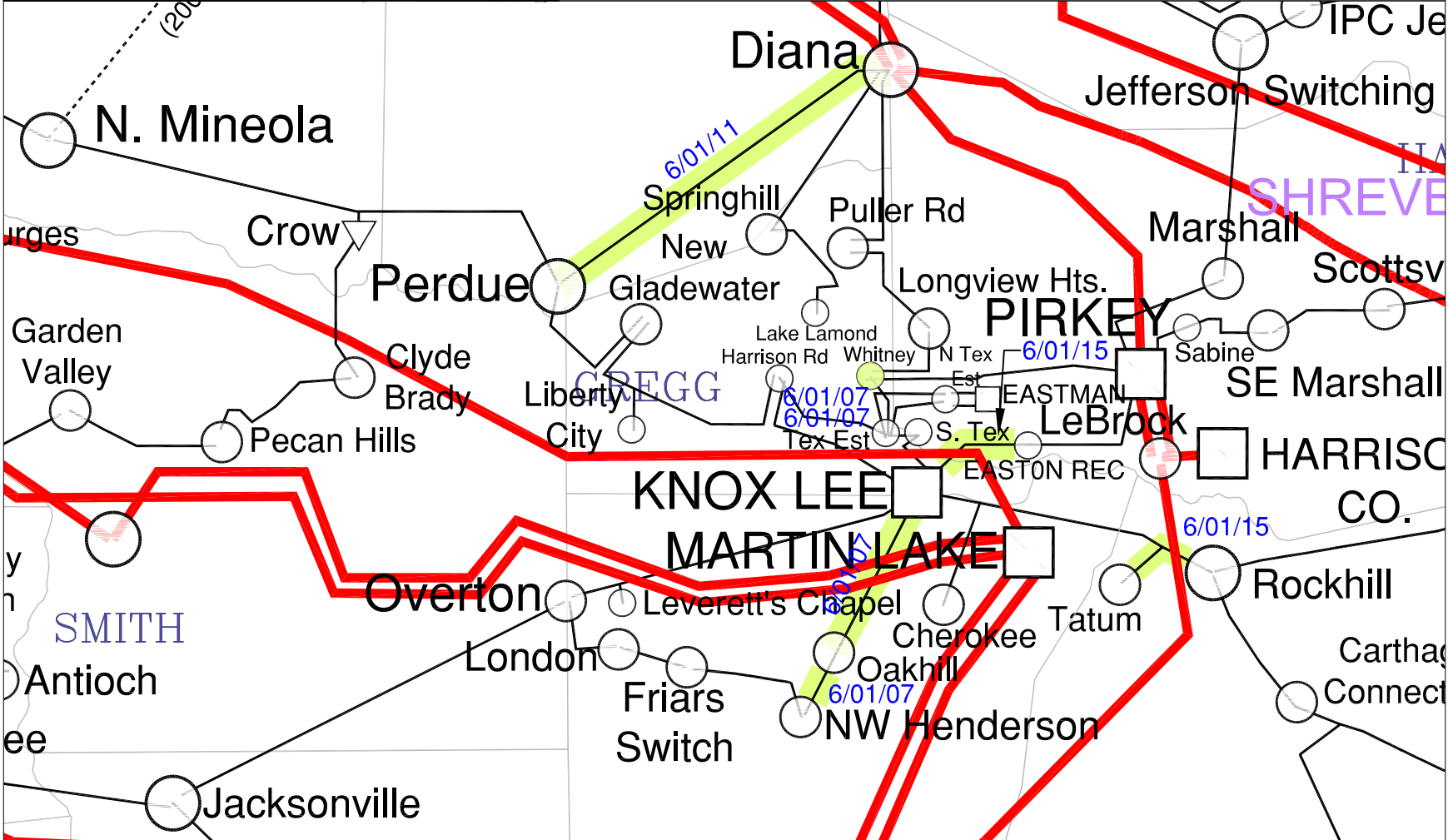






Legend

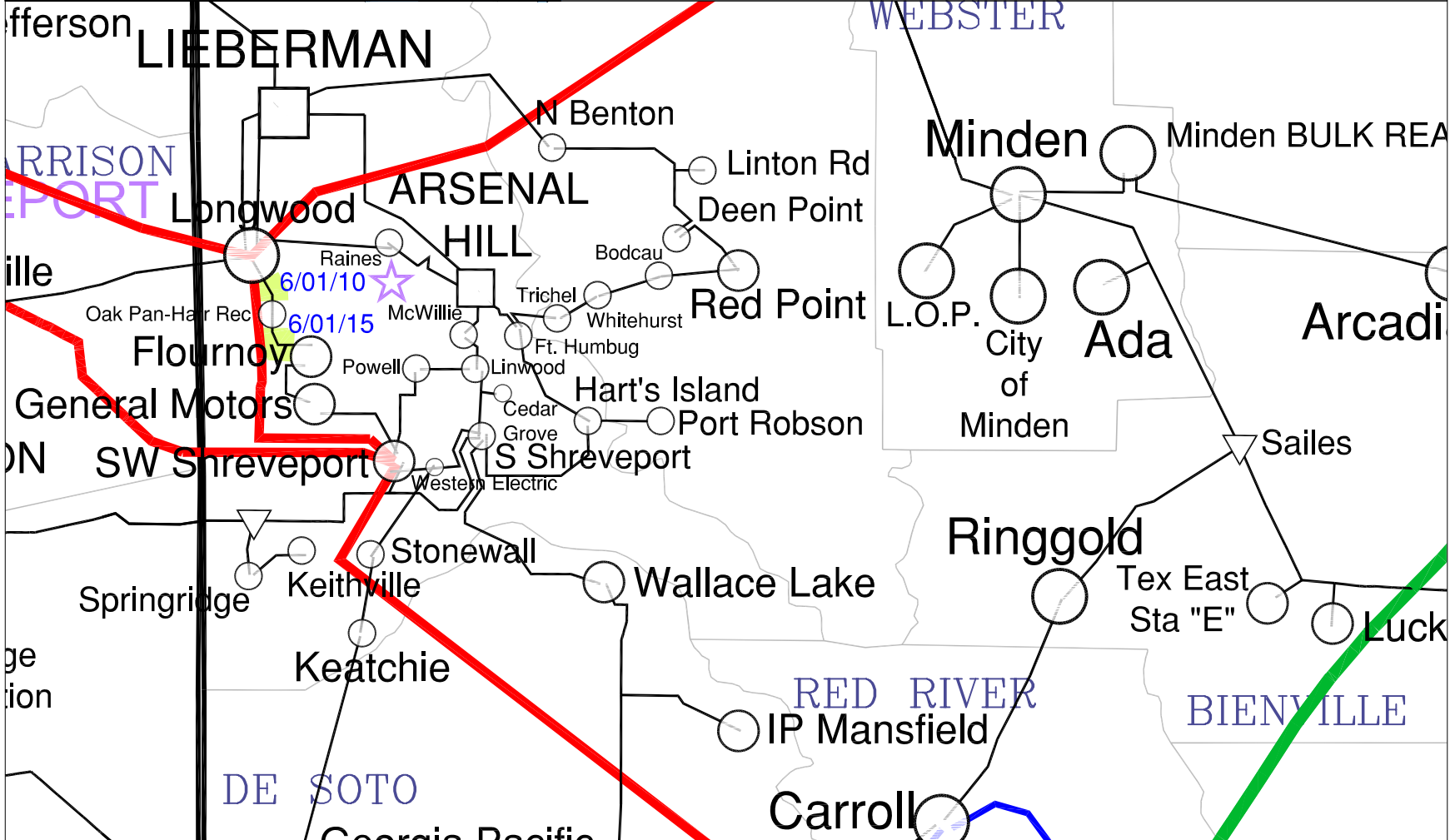
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES - - - TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION UPGRADE
--	---

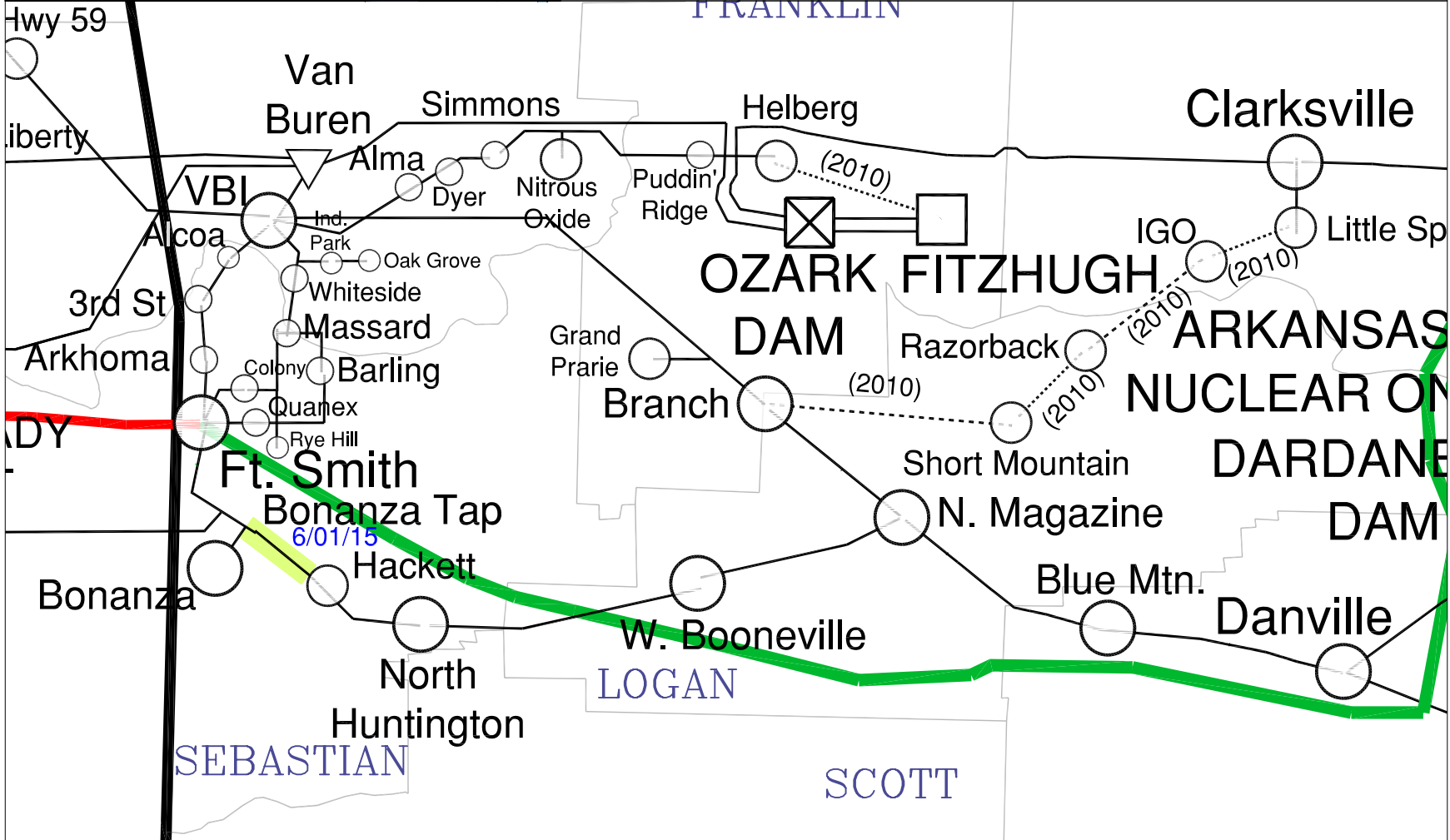
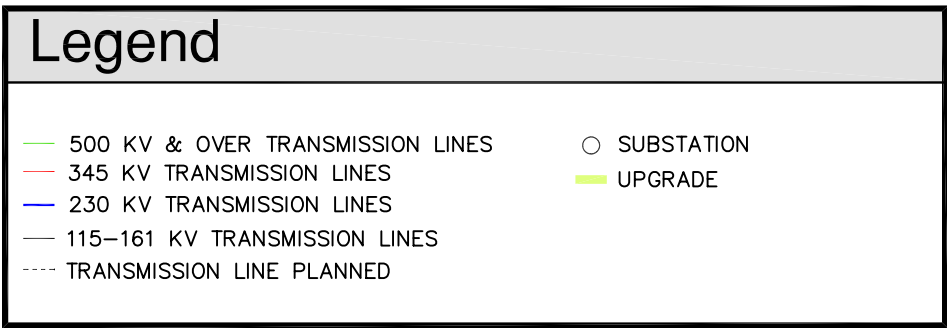




Legend

— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	 UPGRADE
— 230 KV TRANSMISSION LINES	
— 115–161 KV TRANSMISSION LINES	
- - - TRANSMISSION LINE PLANNED	

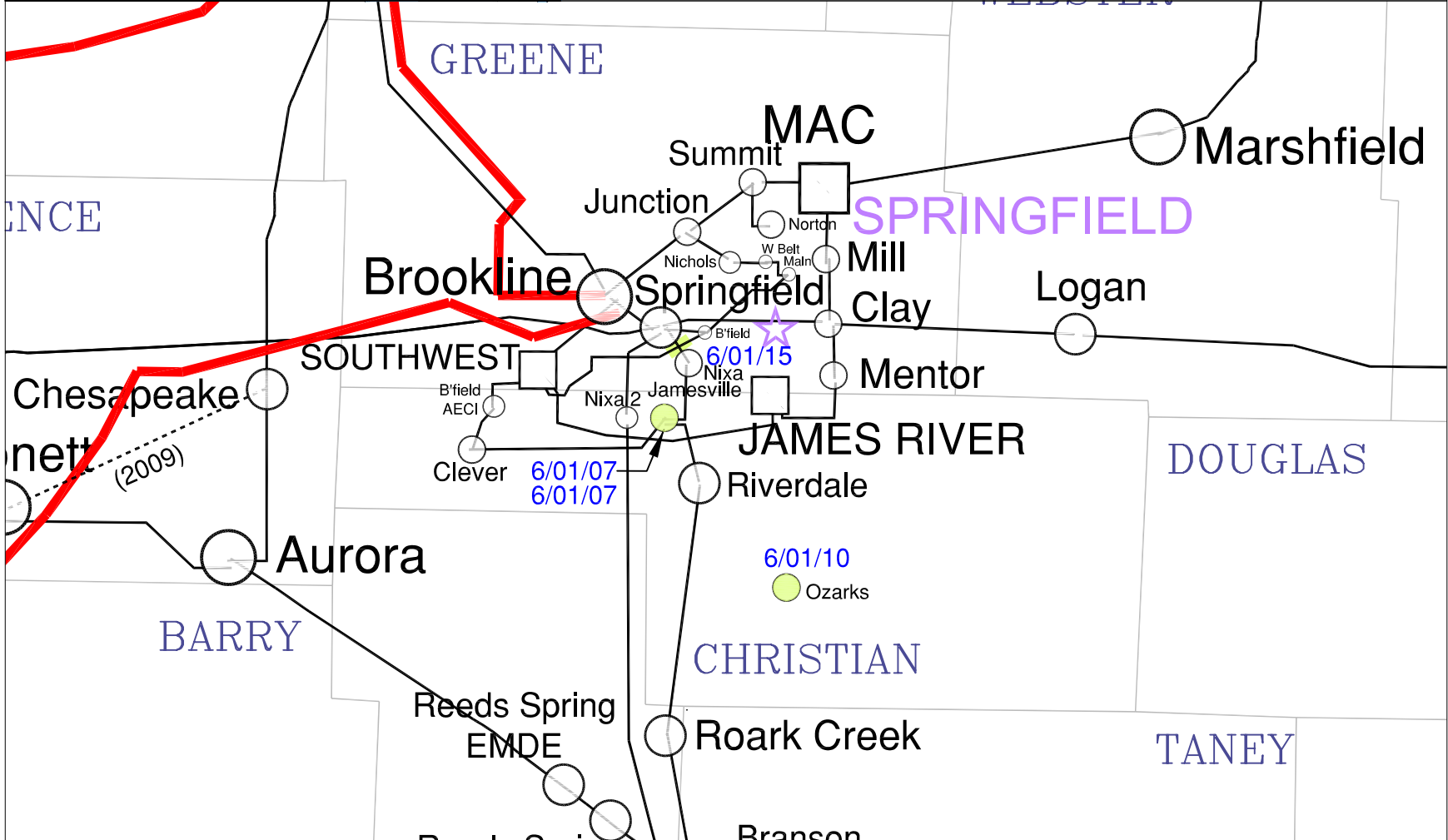













Legend

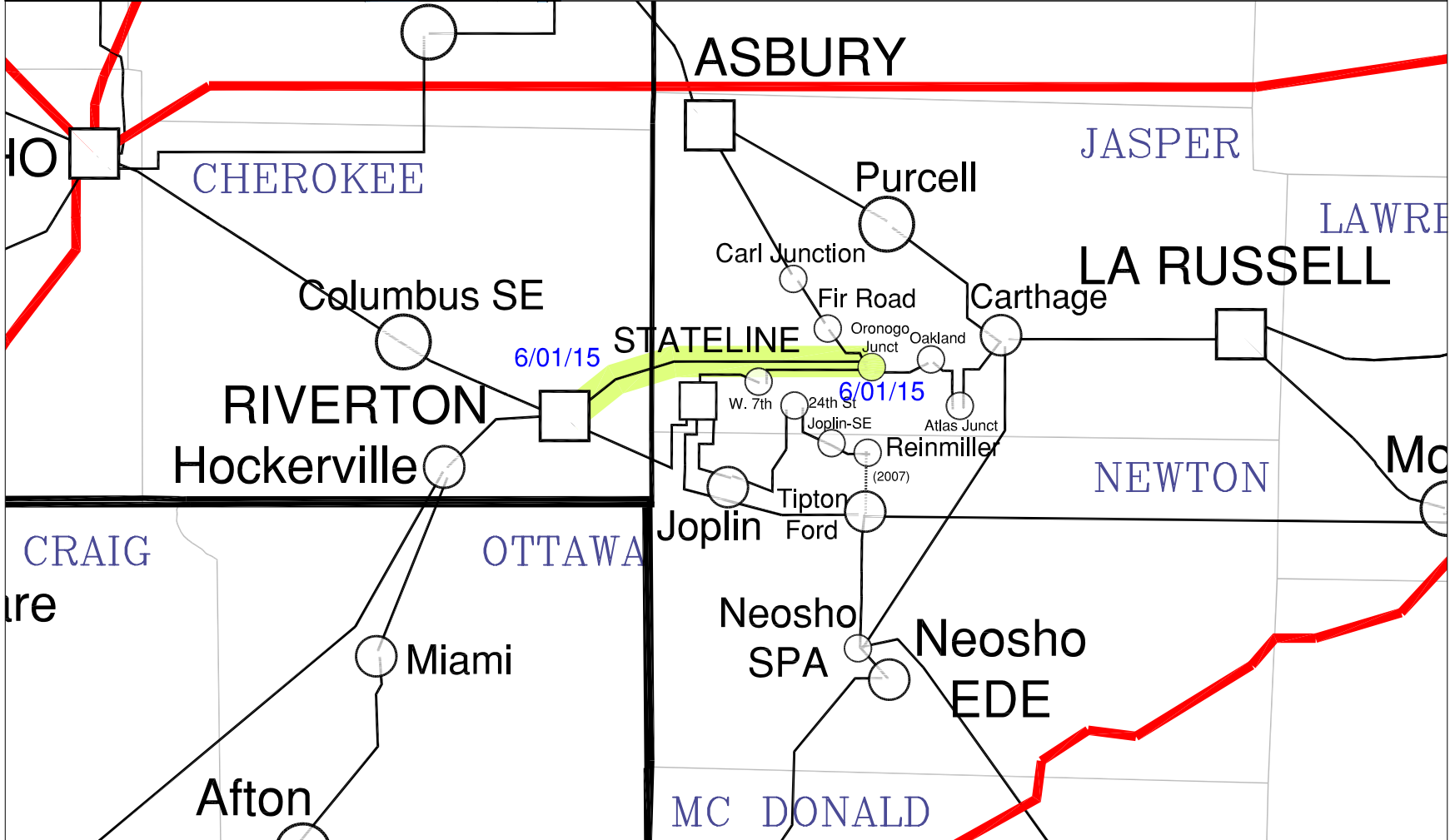
— 500 KV & OVER TRANSMISSION LINES	 SUBSTATION
— 345 KV TRANSMISSION LINES	 UPGRADE
— 230 KV TRANSMISSION LINES	
— 115–161 KV TRANSMISSION LINES	
- - - TRANSMISSION LINE PLANNED	





Legend

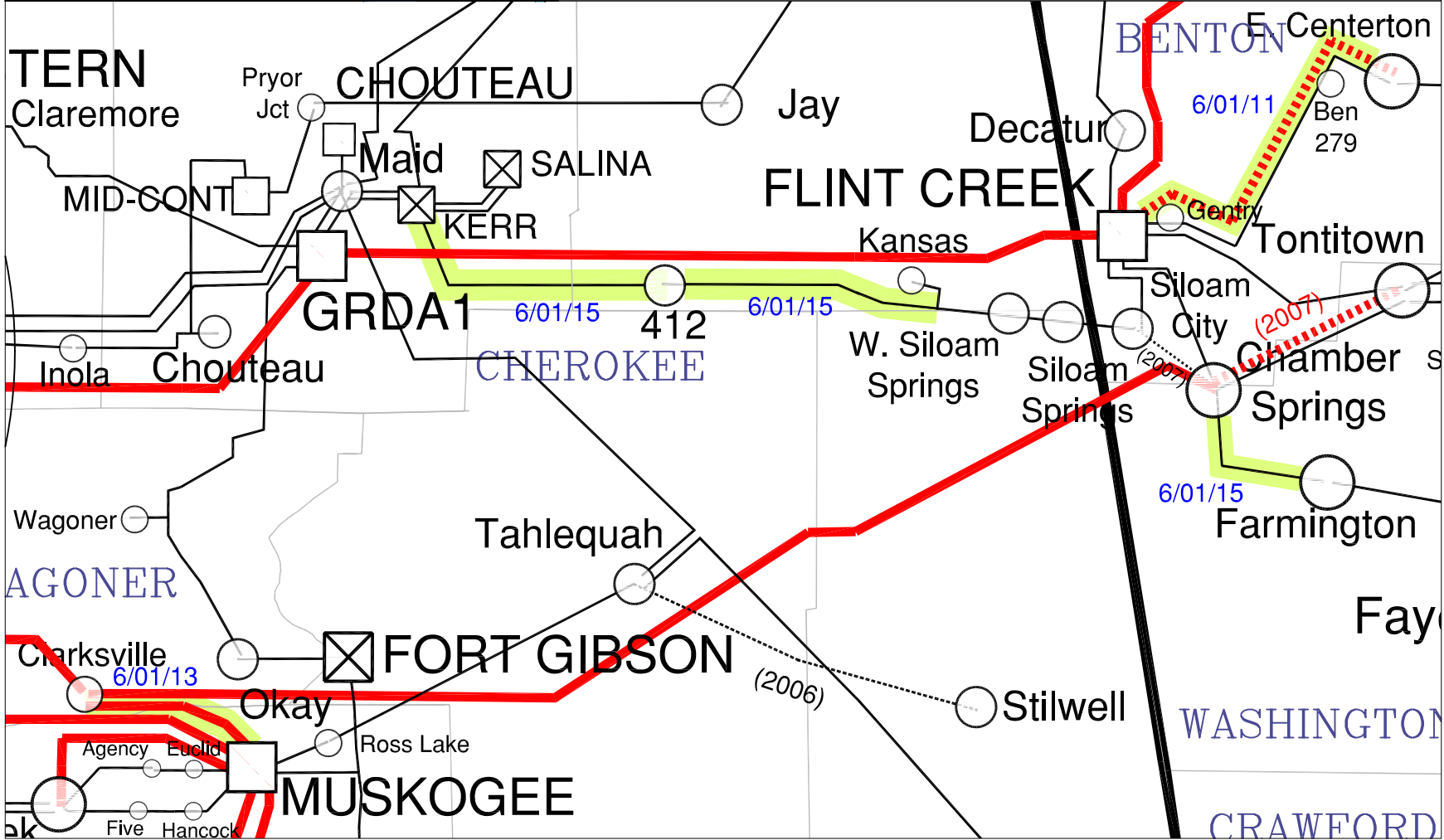
 500 KV & OVER TRANSMISSION LINES	 SUBSTATION
 345 KV TRANSMISSION LINES	 UPGRADE
 230 KV TRANSMISSION LINES	
 115-161 KV TRANSMISSION LINES	
 TRANSMISSION LINE PLANNED	





Legend

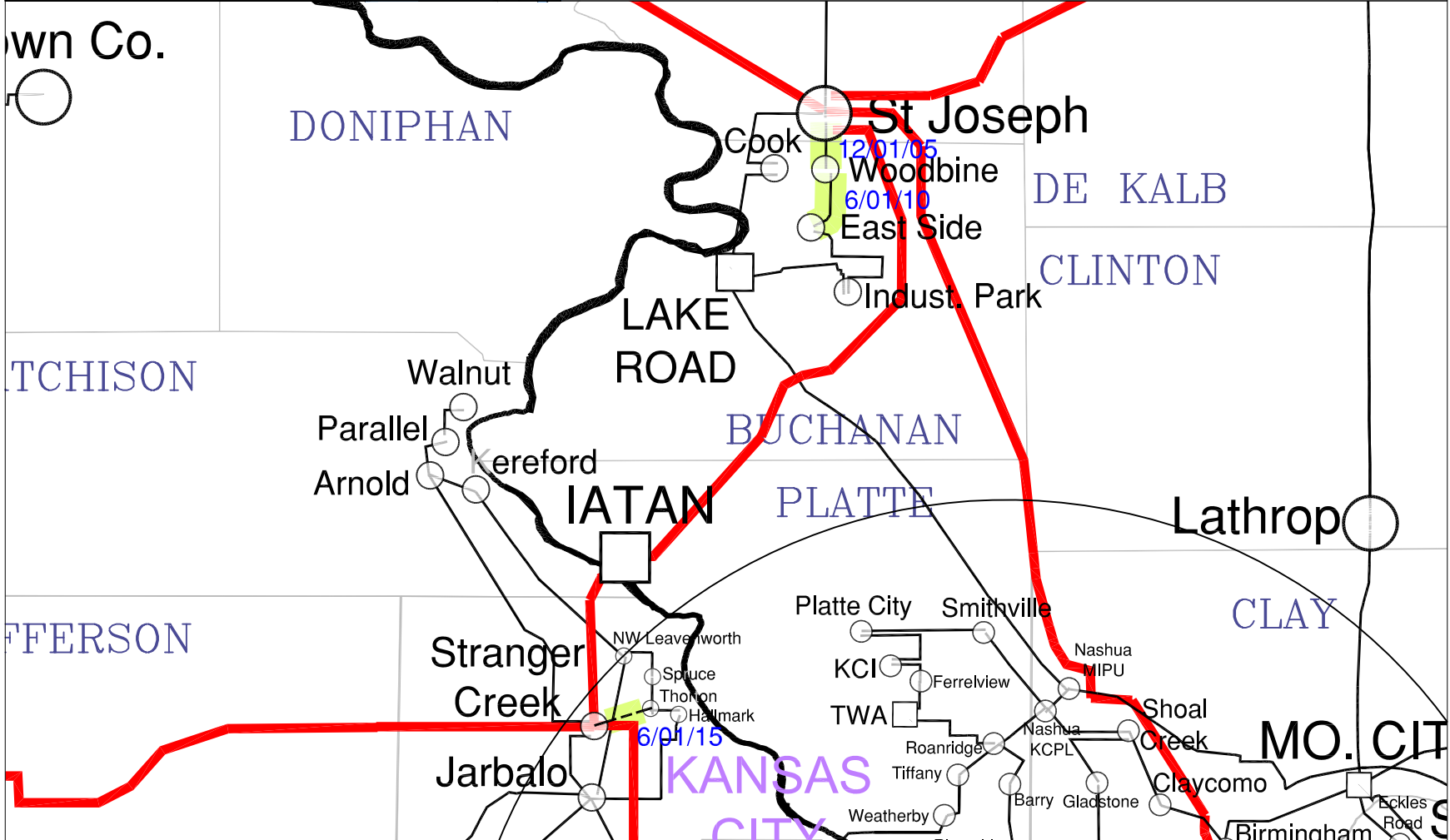
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES - - - TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION UPGRADE
--	--





Legend

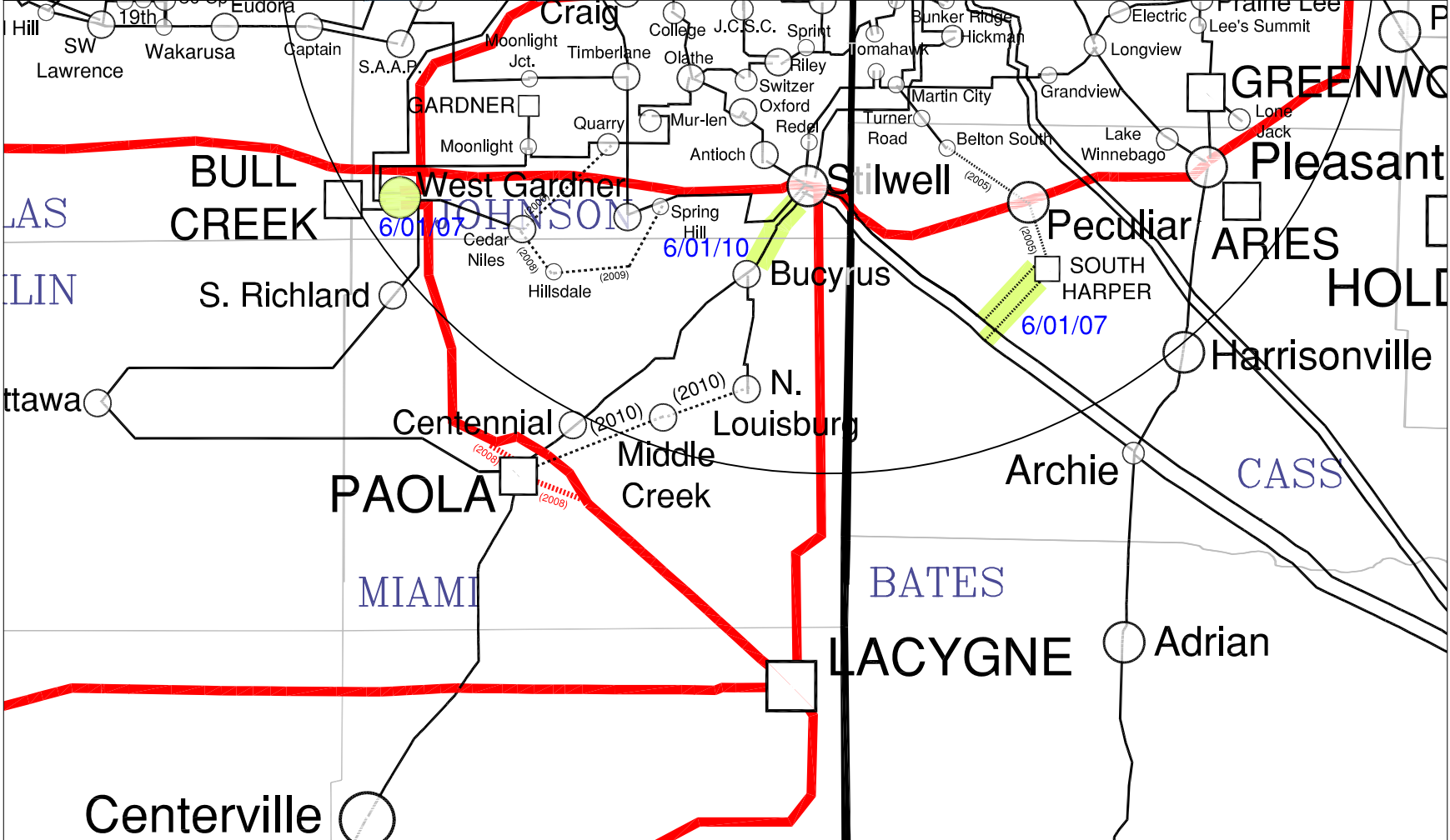
<ul style="list-style-type: none"> — 500 KV & OVER TRANSMISSION LINES — 345 KV TRANSMISSION LINES — 230 KV TRANSMISSION LINES — 115–161 KV TRANSMISSION LINES - - - TRANSMISSION LINE PLANNED 	<ul style="list-style-type: none"> SUBSTATION UPGRADE
--	---





Legend

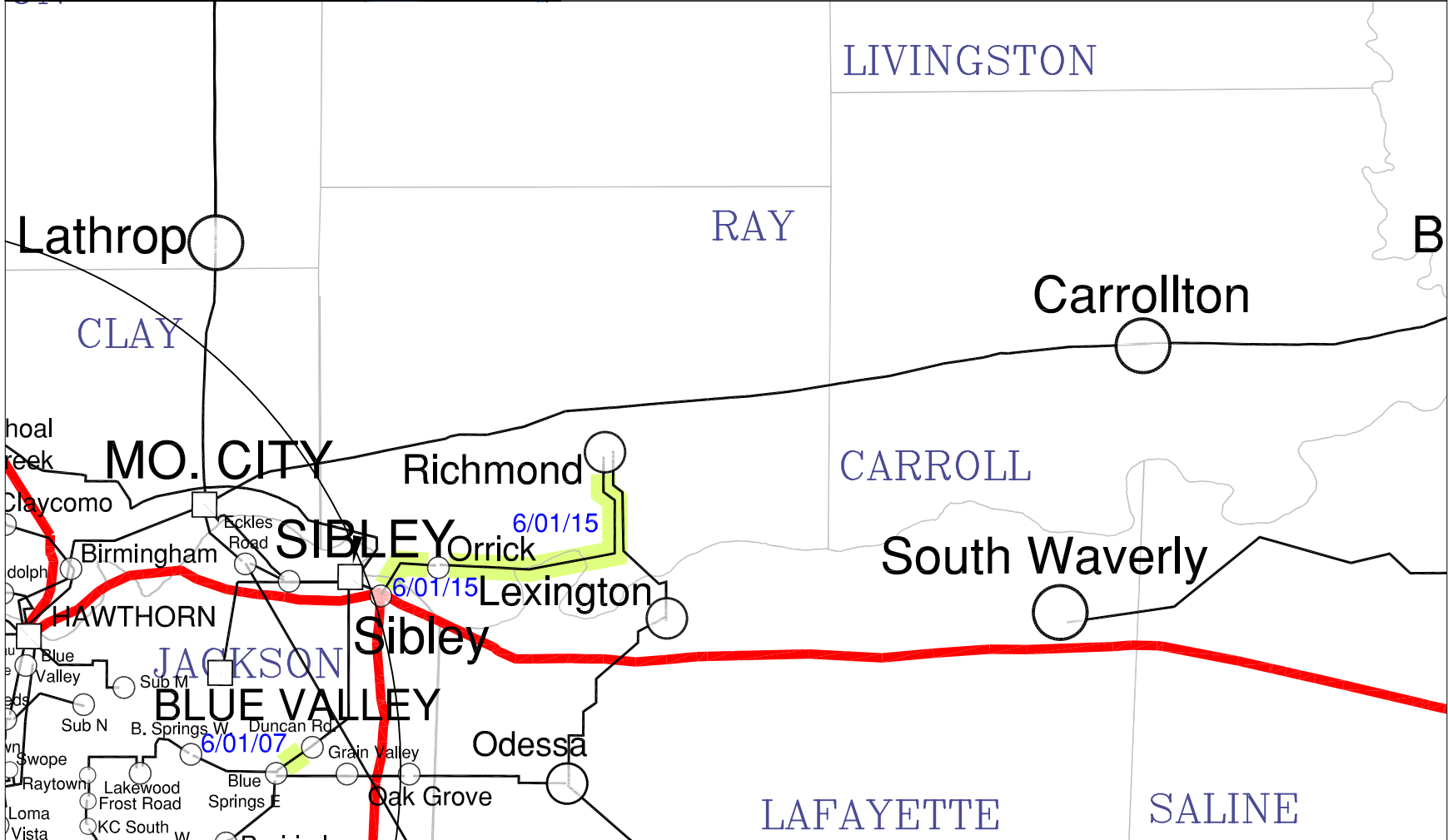
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	▬▬▬ UPGRADE
— 230 KV TRANSMISSION LINES	
— 115–161 KV TRANSMISSION LINES	
- - - TRANSMISSION LINE PLANNED	





Legend

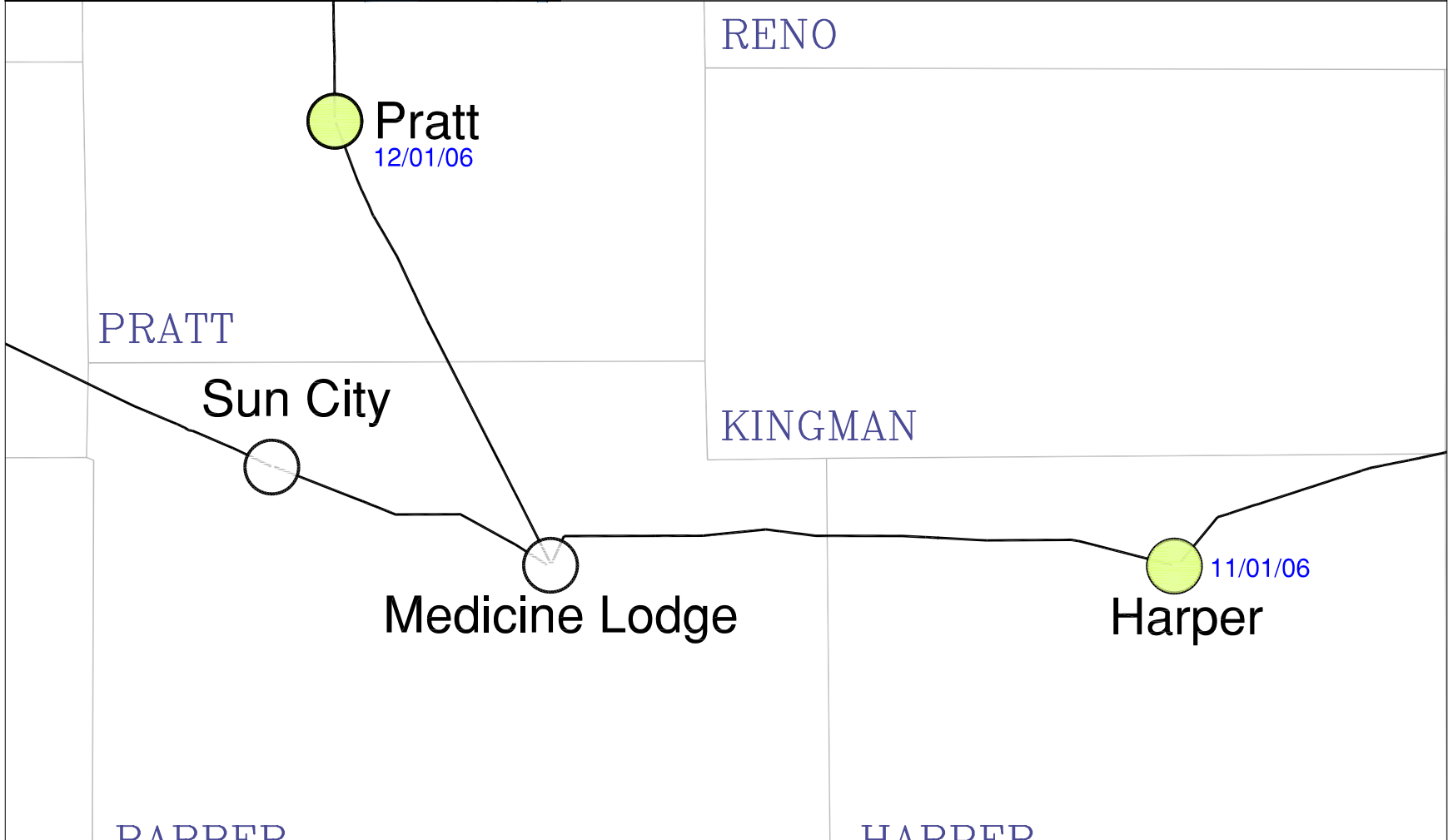
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	— UPGRADE
— 230 KV TRANSMISSION LINES	
— 115–161 KV TRANSMISSION LINES	
- - - TRANSMISSION LINE PLANNED	





Legend

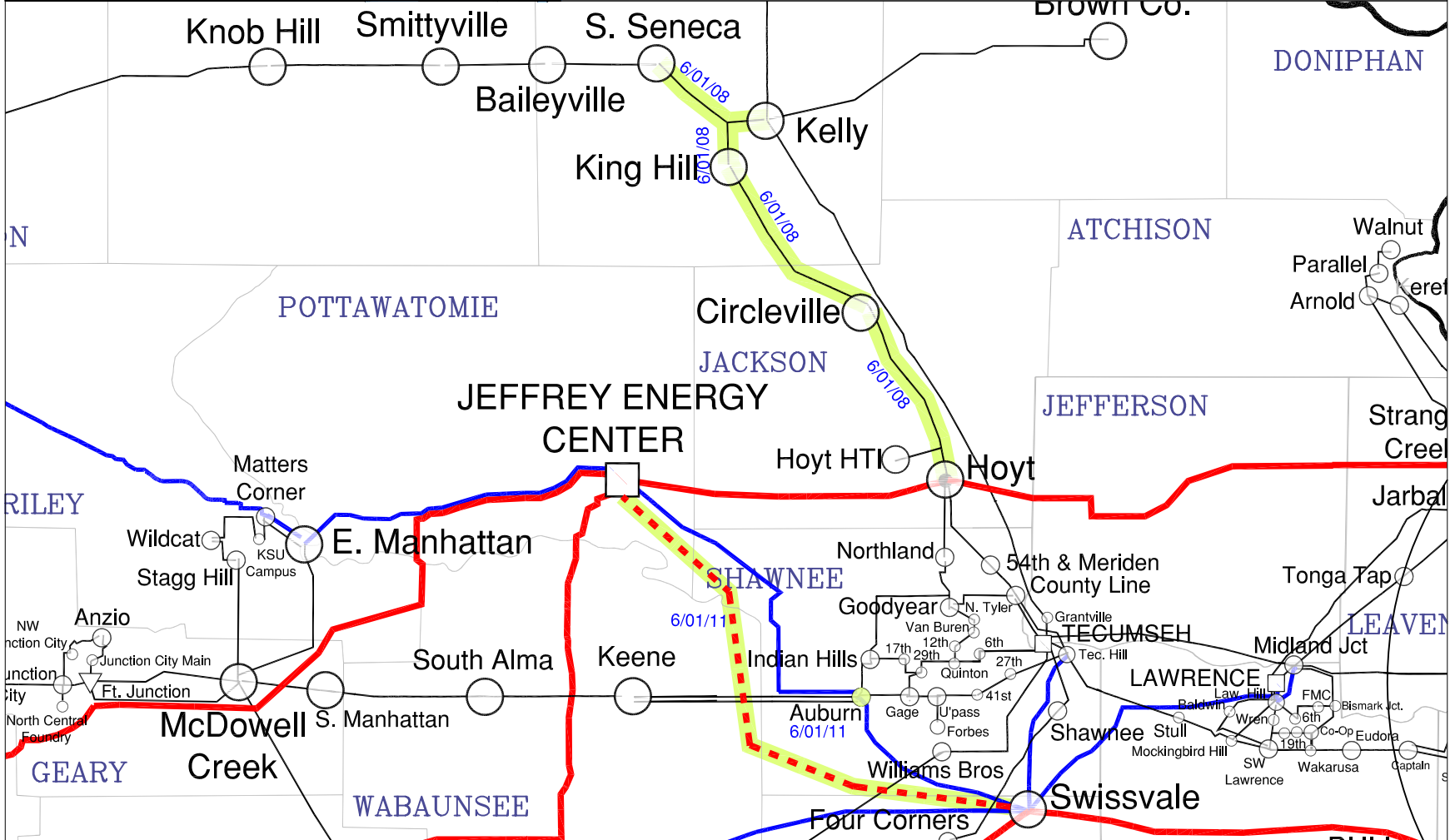
— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	■ UPGRADE
— 230 KV TRANSMISSION LINES	
— 115–161 KV TRANSMISSION LINES	
- - - TRANSMISSION LINE PLANNED	





Legend

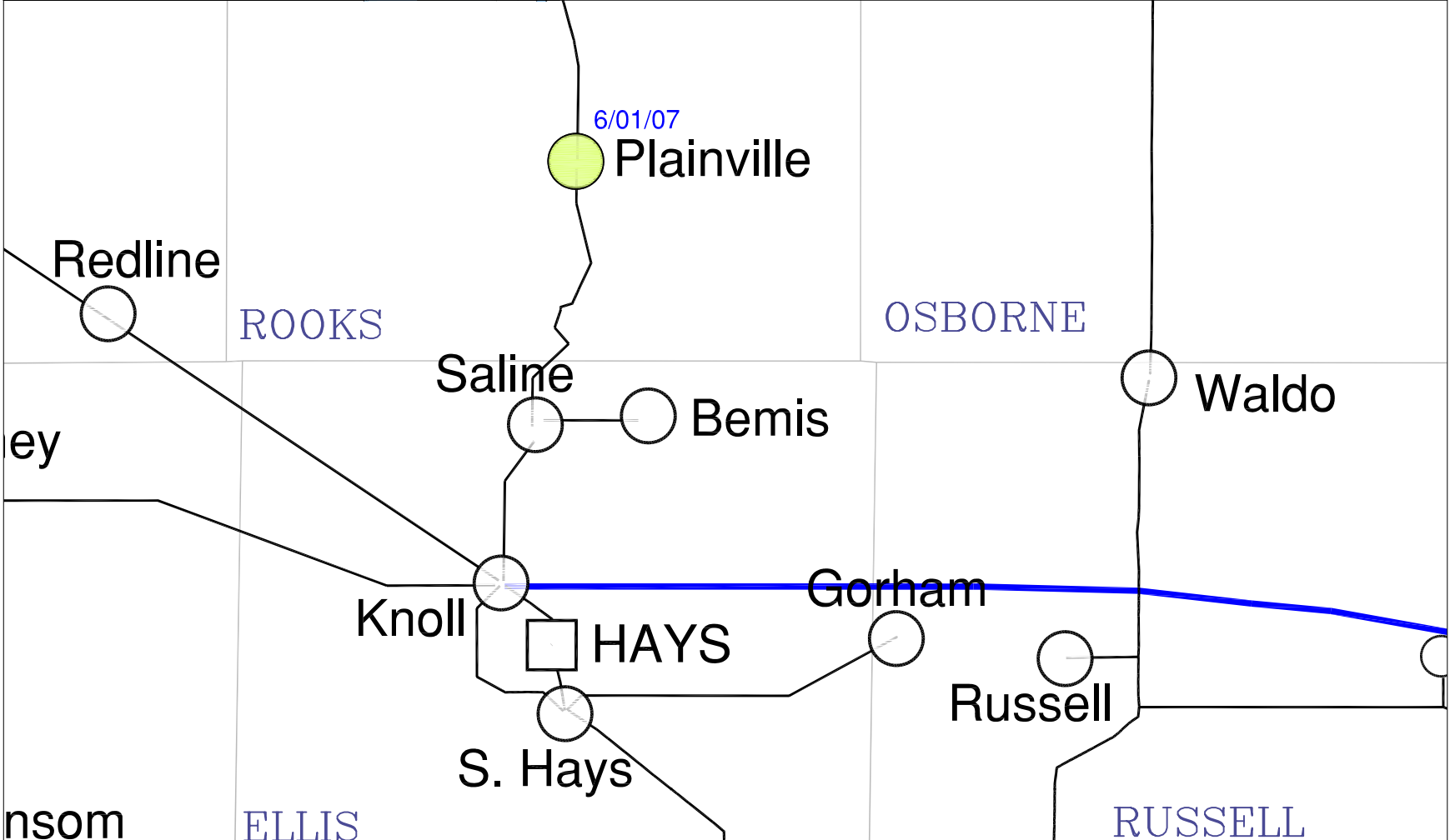
- 500 KV & OVER TRANSMISSION LINES
- 345 KV TRANSMISSION LINES
- 230 KV TRANSMISSION LINES
- 115–161 KV TRANSMISSION LINES
- - - TRANSMISSION LINE PLANNED
- SUBSTATION
- UPGRADE





Legend

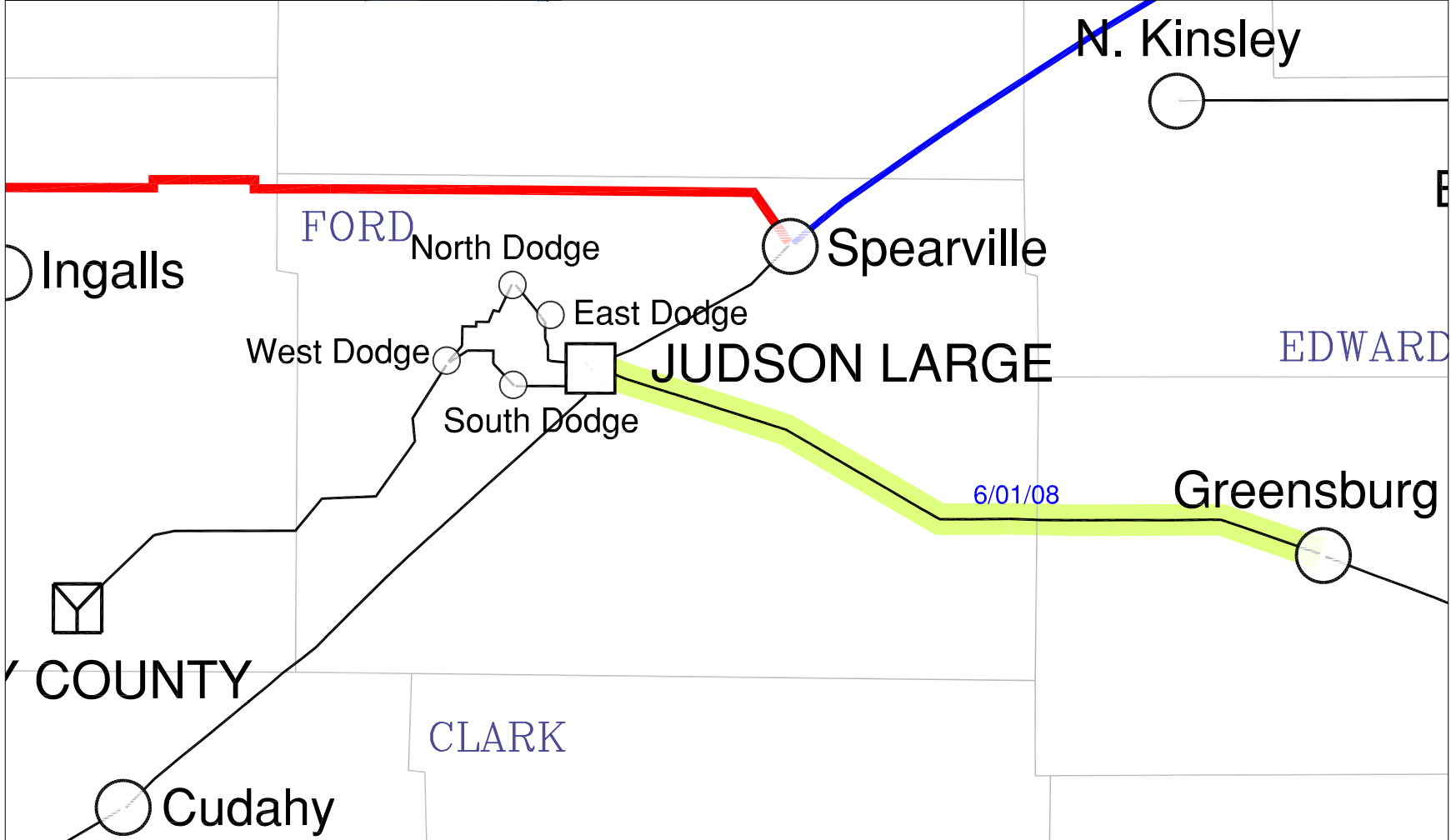
- 500 KV & OVER TRANSMISSION LINES
- 345 KV TRANSMISSION LINES
- 230 KV TRANSMISSION LINES
- 115–161 KV TRANSMISSION LINES
- - - TRANSMISSION LINE PLANNED
- SUBSTATION
- UPGRADE





Legend

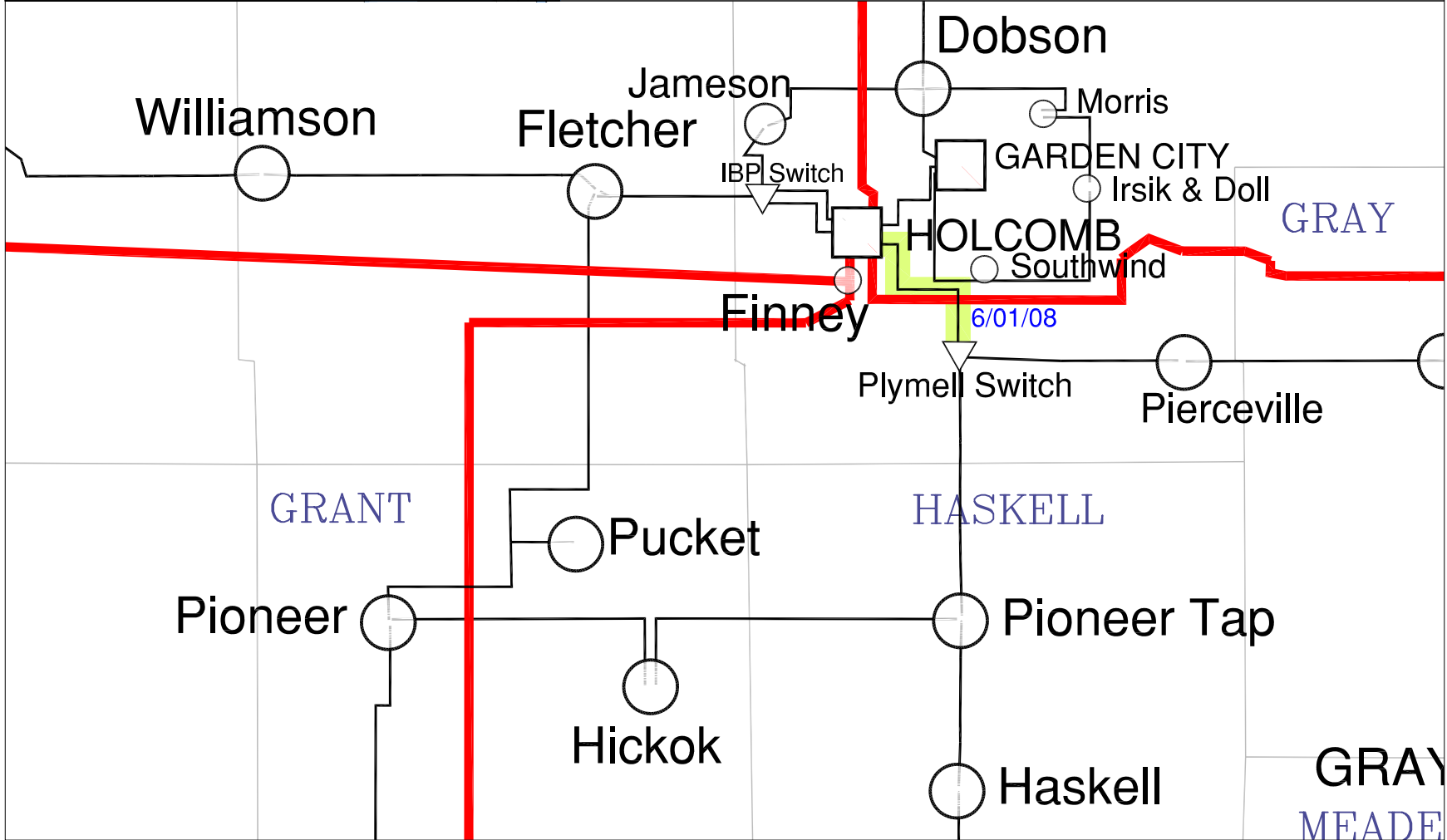
- 500 KV & OVER TRANSMISSION LINES
- 345 KV TRANSMISSION LINES
- 230 KV TRANSMISSION LINES
- 115–161 KV TRANSMISSION LINES
- - - TRANSMISSION LINE PLANNED
- SUBSTATION
- UPGRADE





Legend

— 500 KV & OVER TRANSMISSION LINES	○ SUBSTATION
— 345 KV TRANSMISSION LINES	▬ UPGRADE
— 230 KV TRANSMISSION LINES	
— 115–161 KV TRANSMISSION LINES	
- - - TRANSMISSION LINE PLANNED	





Legend

- 500 KV & OVER TRANSMISSION LINES
- 345 KV TRANSMISSION LINES
- 230 KV TRANSMISSION LINES
- 115–161 KV TRANSMISSION LINES
- - - TRANSMISSION LINE PLANNED
- SUBSTATION
- UPGRADE

