

**SOUTHWEST TRANSMISSION
COOPERATIVE, INC.**

2009 SYSTEM OPERATING LIMITS REPORT

February 2, 2009

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1. INTRODUCTION

This report provides Southwest Transmission Cooperative, Inc. (SWTC) with contingencies in the Operating and Planning Horizon that affect its transmission system and/or surrounding entities. This analysis further identifies limiting factors that impede its systems performance and ability to serve load in the future. Note, SWTC methodology for defining System Operating Limits (SOL) is outlined in the ‘Establish and Communicate System Operating Limits’ document.

2. OPERATING HORIZON

2.1. Modeling Assumptions, Setup, and Initial Conditions

SWTC used PowerWorld Simulator 12.0 as its modeling tool. SWTC not only modeled its transmission system, but also adjacent transmission systems that influenced SWTC’s power flow. The adjacent transmission systems modeled in part include Tucson Electric Power (TEP), Arizona Public Service (APS), and Western Area Power Administration – Parker Davis system. SWTC also modeled Member and adjacent distribution loads. These loads include Duncan Valley Electric Cooperative (DVEC), Sulphur Springs Valley Electric Cooperative (SSVEC), Anza Electric Cooperative (Anza), Mohave Electric Cooperative (MEC), Graham County Electric Cooperative (GCEC), Trico Electric Cooperative (TRICO), and UniSource Energy Services (UES). SWTC also modeled the 69 kV system that impacts system performance in the Operating Horizon.

Based on the 2008 actual Member load total (Figure 1), SWTC’s system only has one heavy summer loading period. Hence, only two conditions need to be modeled to approximate SWTC’s system performance at its extremities –Heavy Summer (HS) and Light Winter (LW). Each extreme case has been analyzed for Category’s A and B, where A is defined as N-0 and B is defined as an N-1 contingency.

The 2009 peak load forecast of the six Class A Members was used in the PowerWorld Heavy Summer simulation. These loads were used to determine SOLs in the Operating Horizon. The 2009 Member load projections are attached in Appendix A. The projected 2009 Light Winter load was scaled apportionally from the 2008 actual load data. The scaling consisted of the ratio of the maximum and minimum loads in 2008, multiplied by the projected 2009 heavy summer peak outlined in Appendix A. The scaling factor is $166.1/606 = .274$

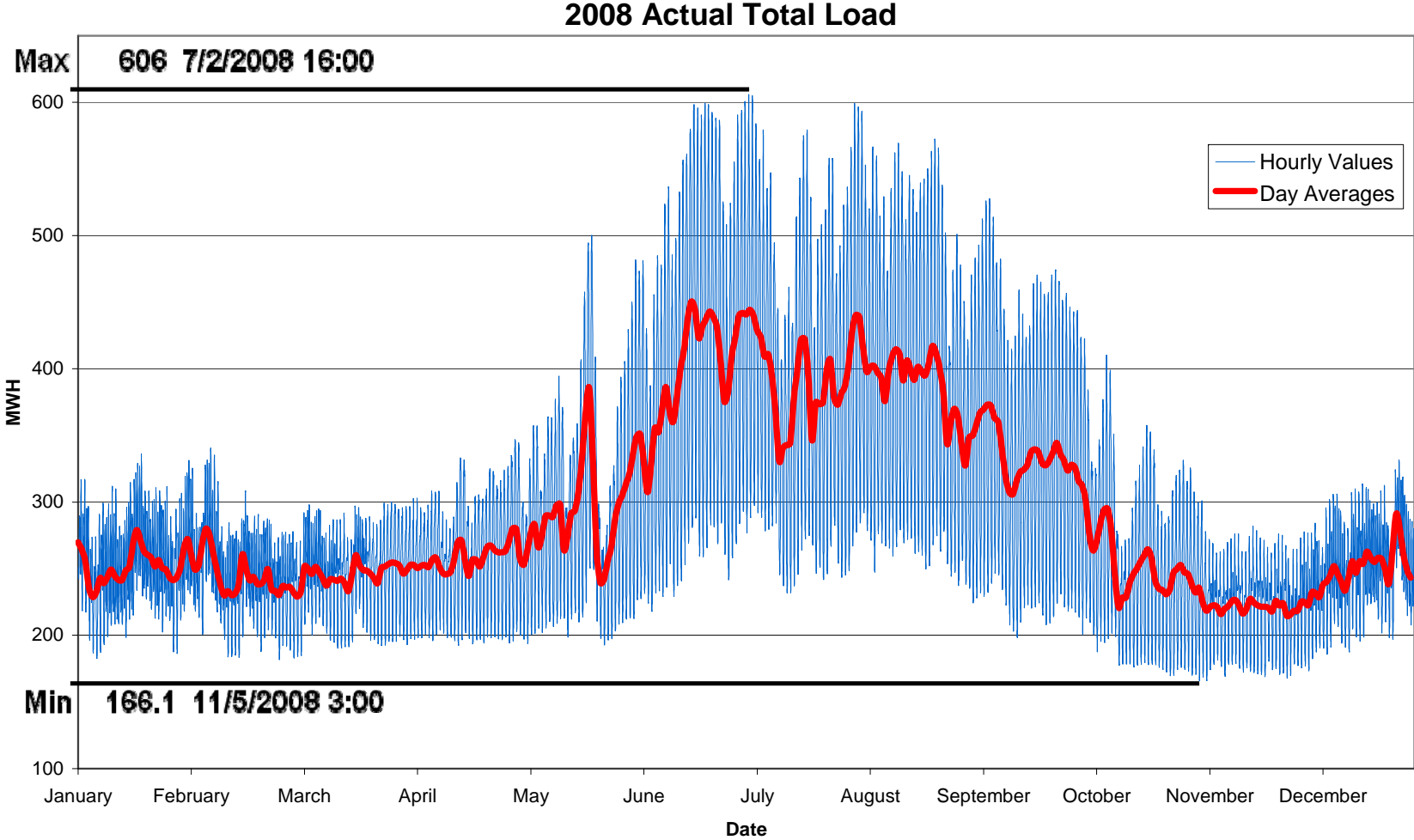


Figure 1: 2008 Actual Total Load

2.2. Forecasted Contingencies

2.2.1. 2009 Heavy Summer

There were no Category A violations of thermal loading or voltage limit issues seen on the SWTC system. However, SWTC's 115kV line segments from Marana to Avra Valley are approaching the thermal limits (89%, and 96% respectively). Additionally, the two paralleled Dos Condados 230/69kV transformers are being loaded 83% of their maximum MVA rating.

Category B violations are:

SWTC:

- The Marana Tap to Sandario 115kV line segments overload from 101% to 122% of its emergency rating under an outage of the Apache to Butterfield line. Under the same outage, the Bicknell 345/230kV transformer will overload to 109% of its emergency rating. There are also low bus voltage conditions in the SSVEC area (See Mitigation Plan below).
- SSVEC will experience low bus voltages in its area due to an outage of the Butterfield to San Rafael 230kV line, Apache to Redtail 230kV line, or Pantano to Kartchner 115kV line (See Mitigation Plan below).
- Greenlee 345/230 kV transformer overloads to 134% of its emergency rating under an outage of the Greenlee to Copper Verde 230 kV line. (See Mitigation Plan below.)

Mitigation Plan

The low bus voltage conditions in the SSVEC area can be alleviated by closing in one of capacitor banks at the Kartchner substation.

To alleviate the Greenlee transformer overloads, SWTC, MW&E, and FMI has developed a manual load tripping scheme. This scheme gives the mine 120 seconds to drop load. If the 120 second timeline is not met, SWTC will open 230kV line to the mine and load will be dropped to relieve transformer overload.

2.2.2. 2009 Light Winter

There were no Category A violations of thermal loading or voltage limit issues seen on the SWTC system.

Category B violations are:

SWTC:

- SSVEC high bus voltages on the loss of Butterfield to San Rafael, Butterfield to Pantano, or Pantano to Kartchner (See Mitigation Plan below.)

Mitigation Plan

The high bus voltage condition can be resolved in full or to some extent by removing the two capacitor banks (if in service) at the Kartchner substation from the system.

PLANNING HORIZON

2.3. Modeling Assumptions, Setup, and Initial Conditions

The Southwest Transmission Cooperative (SWTC) System Operating Limits (SOL) for the Planning Horizon were determined from the January 2009 transmission planning study¹ (Planning Study) that assessed its interconnected transmission system such that the SWTC can be operated to supply its member demands and Firm Transmission Services throughout the ten year planning period. The Planning Study looked at thermal and voltage limits and determined if any issues associated with transient and voltage instability existed in the cases studied.

In the recent Planning Study assessment, the SWTC SOLs for the Planning Horizon were defined by thermal and voltage limits in the area studied for the SWTC system. Selected Category² summaries from this recent assessment are presented here for each of the load flow cases studied. Additional details about all the cases studied and information concerning Category results not presented in this document can be found in the Planning Study.

2009 Heavy Summer (HS) – Category A, B, C & D

2009 Light Winter (LW) – Category A, B, C & D

2013 Heavy Summer (HS) – Category A & B

2013 Light Winter (LW) – Category A & B

2018 Heavy Summer (HS) – Category A & B

In all the cases studied, assumptions were made about the transmission system, today's system with new facilities added in the future, and loads and resources. Any changes to any one of these parameters will likely result in some kind of adjustment to what is presented here.

Given the incongruent nature of the SWTC system, determining problems by location in the SWTC system proved more valuable than finding the worst problem for the entire SWTC system for a given time period. The SOLs presented here are defined by conditions in the analyses that produced violations of SWTC's planning criteria³ for that area of the SWTC system. The results include a description of what facilities reached their limits of operation and what was needed to alleviate the problem. This is presented in the remainder of this report.

¹ Transmission Planning Process and Guidelines, TPL Standards 001—004, SWTC Transmission Planning, January 29, 2009, Southwest Transmission Cooperative, Inc.

² Table I. Transmission System Standards – Normal and Emergency Conditions, NERC Transmission Planning Standards

³ In the SWTC facility rating methodology document

The various planning models were simulated using the General Electric – Positive Sequence Load Flow (GE-PSLF). GE’s simulator Steady State Tools were utilized to perform the numerous outages required for the analyses.

2.4. Forecasted Contingencies

2.4.1. 2009 Heavy Summer

There were no Category A violations of thermal loading or voltage limit issues seen on the SWTC system. There were a number of thermal loading issues and voltage deviations seen on the SWTC and adjacent system for the other categories.

Category B violations are:

SWTC:

- Greenlee 345/230 kV transformer overloads to 134% of its emergency rating under an outage of the Greenlee to Copper Verde 230 kV line. (See Mitigation Plan below.)
- Marana Tap to Marana 115 kV line overloads to 104% of its emergency rating under an outage of the Marana Tap to Rattlesnake 115 kV line. (See Mitigation Plan below.)

Mitigation Plan

SWTC has identified both the near term and long term solutions to mitigate the problems noted above. For example, in the event of a thermal overload of the Greenlee transformer, in the 2011-2013 CWP, SWTC plans to install a second transformer at Greenlee in 2013. In the event of a thermal overload of the Marana Tap to Marana 115 kV line, SWTC will open the breaker at Avra Valley Substation opening the loop feed while maintaining member loads. In its 2011-2013 CWP, SWTC plans to upgrade the conductor to a higher rating in 2012.

Category C violations are:

Western⁴:

- Marana Tap to Rattlesnake 115 kV line loads to 107% of its emergency rating under a double outage of the Apache to Butterfield 230 kV and the Marana Tap to Marana 115 kV line. (See Mitigation Plan Below)

⁴ Western Area Power Administration

- Voltage deviations between 5-6% are seen on many of the Central Arizona Project (CAP) buses. (See Mitigation Plan Below)

SWTC:

- Bicknell 345/230 kV transformer loads to 158% of its emergency rating, Apache to Butterfield loads to 124% of its emergency rating and Butterfield to Pantano loads to 105% of its thermal rating under a double outage of TEP⁵'s 345 kV lines from Winchester to Vail and Springerville to Vail. (See Mitigation Plan Below)
- Bicknell 345/230 kV transformer loads to 120% of its emergency rating under a double outage of TEP's 345 kV lines from Winchester to Vail and Pinal West to South. (See Mitigation Plan Below)
- Voltage deviations are seen on the SWTC 230 kV buses between Apache to Bicknell as well as voltage deviations on several buses within the SWTC system under a double outage of TEP's 345 kV lines from Winchester to Vail and Springerville to Vail. (See Mitigation Plan Below)
- Additional Voltage deviations are seen on many of the SWTC buses between 5-8% for outages. (See Mitigation Plan Below)

There were no non-solved cases found on the system under the category C criteria.

Mitigation Plan

SWTC has identified both the near term and long term solutions to mitigate the problems noted above. SWTC plans on mitigating the issues seen on the system, which result from outages on neighboring systems, by working with the neighboring utilities, such as Western and TEP to alleviate any thermal overloads or voltage violations. Many of these have been studied in SATS⁶ and SWTC is assessing the mitigation plans that have been proposed in SATS, for solutions to these violations, which will be included in future SWTC construction work plans, once a resolution with the neighboring utilities has been reached.

Included in future SWTC construction work plans will be a larger transformer at Bicknell and upgrades to the Apache to Butterfield 230 kV line. This will resolve the voltage deviations seen within the SWTC System.

Category D load flow was examined considering several extreme transmission contingency events. The scenarios that were considered can be found in Appendix D N-n Scenarios, in the February 2009 transmission planning study¹. Issues found under these extreme outages included several non-solved scenarios documented in the tables in Appendix E of the February 2009 transmission planning study.

⁵ Tucson Electric Power Company

⁶ Southeast Arizona Transmission Study

2.4.2. 2009 Light Winter

There were no Category A violations of thermal loading or voltage limit issues seen on the SWTC system. There were a number of thermal loading and voltage deviations violations seen on the SWTC and adjacent system for the other categories.

Category B violations are:

Thermal Loading:

- Greenlee 345/230 kV transformer overloads to 101% of its emergency rating under an outage of the Greenlee to Copper Verde 230 kV line. (See Mitigation Plan below.)
- Saguaro East to Marana Tap 115 kV line overloads to 118% of its emergency rating under an outage of the Twin Peaks to Sandario 115 kV line. (See Mitigation Plan below.)

Voltage Deviations:

- Under an outage of Twin Peaks to Sandario, SWTC shows a number of buses with deviations between 5-9%. (See Mitigation Plan below.)

Mitigation Plan

For the issues seen under an N-1 contingency, SWTC has identified solutions to mitigate the problems in the near term but has allowed time to plan for these issues in the next CWP. For example, in the event of a thermal overload of the Greenlee transformers, SWTC plans to install a second Greenlee transformer in 2012. In the event of a thermal overload of the Saguaro East to Marana Tap 115 kV line, SWTC will open the line from Marana to Avra 115 kV line to reduce the loading. It should be noted that SWTC has recently become aware of limiting elements on the Western system that has lead to the de-rating of many of their 115 kV lines. SWTC will work with Western to fix the limiting factor in order to mitigate these overloads. In the event of the Twin Peaks to Sandario 115 kV outage, SWTC will mitigate the issue by placing the Sandario 19.2 MVAR capacitor in service.

Category C violations are:

SWTC:

- Voltage deviation of 5% was seen on the Marana 115 kV bus under a double outage of the Marana Tap to Marana and the Marana Tap to Rattlesnake 115 kV lines. (See Mitigation Plan below.)

- There were no non-solved cases found on the system under the category C criterion.

Mitigation Plan

SWTC plans on mitigating the issues seen on the system by placing the Sandario 19.2 MVAR capacitor in service.

Category D violations are:

Western:

- Adams Tap to Apache 115 kV line loads to 153% of its emergency rating for multiple lines out - Apache to Butterfield, Apache to Red Tail and Apache to Winchester 230 kV lines. (See Mitigation Plan below.)
- Saguaro East to Marana Tap loads to 114% of its emergency rating for multiple lines out - Apache to Butterfield, Apache to Red Tail 230 kV lines and Bicknell to Vail 345 kV lines. (See Mitigation Plan below.)
- Marana Tap to Rattlesnake loads to 107% and Saguaro East to Marana Tap loads to 116% of its emergency rating for multiple lines out - Apache to Butterfield 230 kV, Avra to Marana 115 kV and Bicknell to Vail 345 kV lines. (See Mitigation Plan below.)
- Voltage deviations between 7-11% are seen on Adams Tap, Nogales, Del Bac and Tucson for multiple lines out - Apache to Butterfield, Apache to Red Tail and Apache to Winchester 230 kV lines. (See Mitigation Plan below.)

SWTC:

- Both Apache 230/115 kV transformers load to 158% of their emergency rating for multiple lines out - Apache to Butterfield, Apache to Red Tail and Apache to Winchester 230 kV lines. (See Mitigation Plan below.)
- Voltage violations are seen below .85 p.u. on SWTC buses between Butterfield to Bicknell 230 kV and between Bicknell to Valencia 115 kV buses for multiple lines out - Apache to Butterfield 230 kV, Bicknell to Vail 345 kV and Avra to Marana 115 kV lines. Voltage deviations between 6-21% are also present on these buses. (See Mitigation Plan below.)

Mitigation Plan

In the event of these extreme contingencies, SWTC would drop load to its member cooperatives.

2.4.3. 2013 Heavy Summer

There were no Category A violations of thermal loading or voltage limit issues seen on the SWTC system. There were a number of thermal loading and voltage deviations violations seen on the SWTC and adjacent system for Category B.

Some elements on Western's and CAP⁷'s system reached emergency rating limits or voltage deviations above the criteria due to outages on SWTCs system. Those that require further review are discussed individually below.

Western Line Loading:

- Saguaro East to Marana 115 kV line overloads to 136% of its emergency rating under an outage of the Saguaro East to Adonis (SWTC) 115 kV line. (See Mitigation Plan below.)

SWTC Line Loading:

- Sandario (CAP) to Sandario (SWTC) 115 kV line overloads to 122% of its emergency rating under an outage of the Marana Tap to Marana (SWTC) 115 kV line. This outage occurs due to limiting factors on the line that reduce the emergency operating limit. SWTC is working with Western to reduce these limiting factors. (See Mitigation Plan below.)

Voltage Violations:

- San Rafael and Butterfield 230 kV buses have a voltage deviation of 6% under an outage of the Apache to Butterfield 230 kV line. (See Mitigation Plan below.)
- Kartchner 115 kV has a voltage deviation of 5% under an outage of the Apache to Butterfield 230 kV. (See Mitigation Plan below.)

Mitigation Plan

For the issues seen under an N-1 contingency, SWTC has identified solutions to mitigate the problems in the near term but has allowed time to plan for these issues in the next CWP. In the event of thermal loading of the Sandario (SWTC) to Sandario (CAP) 115 kV line, SWTC has found that a CT bushing is the limiting factor of this line and is scheduled to be upgraded with the project in-service date of 2010. In the event of the thermal overload of Western's 115 kV line from Saguaro to Marana, SWTC is working with Western in order to upgrade any limiting elements (i.e. CTs) that have reduced the line capacity, before the 2013 thermal loading occurs. (What about the voltage violations and non-solved cases listed above?)

⁷ Central Arizona Project

2.4.4. 2013 Light Winter

There were no Category A and B violations of thermal loading or voltage limit issues seen on the SWTC system.

2.4.5. 2018 Heavy Summer

There were no Category A violations of thermal loading or voltage limit issues seen on the SWTC system. There were a number of thermal loading and voltage deviations violations seen on the SWTC and adjacent system for Category B.

Some elements on Western's and CAP's system reached emergency rating limits or voltage deviations above the criteria due to outages on SWTCs system. Those that require further review are discussed individually below.

Western Line Loading

- Saguaro East to Marana 115 kV line overloads to 129% of its emergency rating under an outage of the Saguaro East to Naviska (SWTC) 115 kV line. (See Mitigation Plan below.)

Voltage Violations

- San Rafael, Butterfield, Sloan and Pantano 230 kV buses have a voltage deviation between 10-14% under an outage of the Apache to Butterfield 230 kV line. (See Mitigation Plan below.)
- Kartchner and Pantano 115 kV has a voltage deviation between 11-13% under an outage of the Apache to Butterfield 230 kV line. (See Mitigation Plan below.)
- New Tucson and Sahuarita have voltage deviations between 7-9% under an outage of the Apache to Butterfield 230 kV line. (See Mitigation Plan below.)

Mitigation Plan

For the issues seen under an N-1 contingency, SWTC has identified solutions to mitigate the problems in the near term but has allowed time to plan for these issues in the next CWP. In the event of a thermal overload of Western's 115 kV line from Saguaro to Marana, SWTC is working with Western in order to upgrade any limiting elements (i.e. CT bushings) that have reduced the line capacity, before the 2013 thermal loading occurs. SWTC is also working with their member cooperative to resolve any loads served off any radials that may be lost in the event of an outage.

3. CONCLUSION

This report provides Southwest Transmission Cooperative, Inc. (SWTC) with contingencies in the Operating and Planning Horizon that affect its transmission system and/or surrounding entities. This study further identifies limiting factors that affect SWTC transmission system performance and ability to serve load in the future. The methodology for this report is based on SWTC's System Operating Limits.

Overall, SWTC may experience some limitations in the near future. These limitations include high and low bus voltage at the SSVEC 69 kV substations and thermal limitations on SWTC's 115 kV transmission system. The Greenlee 345/230 kV transformer may also overload depending on the outage. Transmission projects that were described in mitigation plans for the Planning Horizon will solve system performance reliability and load serving issues that caused SOLs on the SWTC transmission system.

4. REVISION HISTORY

Version	Date	Action	Change Tracking
0	2/2/09	Effective Date	New

5. APPENDIX A –Operating Case Loads

Heavy Summer Loads

Number	Name	ID	Status	MW	Mvar	MVA
14223	ROUND VALLEY	SW	Closed	10.07	3.31	10.6
16904	FRISCOT5	PD	Closed	57.5	19.23	60.63
16905	PDM-T1	PD	Closed	57.5	19.23	60.63
16906	PDM-T2	PD	Closed	57.5	19.23	60.63
16907	PDM-T3	PD	Closed	57.5	19.23	60.63
17009	GREENLEE-SWTC	SW	Closed	2.59	0.85	2.73
17045	HACKBERRY	PD	Closed	50	16.45	52.64
17150	HEMET	SW	Closed	1.44	0.3	1.47
17151	TONY LAPPOS	SW	Closed	8.48	1.72	8.65
17153	LAKE RIVERSIDE	SW	Closed	3.39	0.69	3.46
17200	ROMNEY	SW	Closed	4.85	1.59	5.11
17301	CACTUS	SW	Closed	8.47	2.78	8.92
17302	CORK	SW	Closed	6.81	2.24	7.17
17304	FREEMAN	SW	Closed	5.57	1.83	5.86
17306	HOOKER	SW	Closed	1.58	0.52	1.67
17309	NEW THATCHER	SW	Closed	6.15	2.02	6.47
17312	SAN JOSE	SW	Closed	7.86	2.58	8.27
17314	THATCHER	SW	Closed	9.79	3.22	10.31
17315	SWIFT TRAIL	1	Closed	6.05	1.98	6.37
17400	AIRPORT	SW	Closed	14.16	4.65	14.91
17401	BILL WILLIAMS	SW	Closed	1.05	0.35	1.11
17403	BIG BEND	SW	Closed	33.61	11.05	35.37
17404	BULLHEAD	SW	Closed	6.78	2.23	7.14
17405	CAMP MOHAVE	SW	Closed	33.41	10.98	35.16
17406	HUALAPAI	SW	Closed	9.07	2.98	9.55
17407	MEDLIN	SW	Closed	38.99	12.82	41.04
17410	SILVER CREEK	SW	Closed	29.92	9.83	31.49
17412	SWAN	SW	Closed	23.23	7.64	24.46
17413	WELLFIELD	SW	Closed	5.78	1.9	6.09
17414	WILLOW VALLEY	SW	Closed	10.47	3.44	11.02
17501	BELLA VISTA	SW	Closed	15.74	5.17	16.56
17502	BENSON	SW	Closed	6.89	2.26	7.25
17503	BOWIE	SW	Closed	4.98	1.64	5.24
17507	COCHISE	SW	Closed	7.21	2.37	7.59
17510	HUACHUCA WEST	SW	Closed	6.95	2.28	7.31
17511	HAWES	SW	Closed	21.8	7.16	22.95
17514	HUACHUCA EAST	SW	Closed	6.6	2.17	6.95
17516	JOHNSON MINE	SW	Closed	1.48	0.48	1.56
17517	KANSAS SETTLEMENT	SW	Closed	9.83	3.23	10.34

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17519	KEATING	SW	Closed	11.84	3.89	12.46
17520	MCNEAL	SW	Closed	2.15	0.71	2.26
17521	MESCAL	SW	Closed	15.01	4.93	15.79
17523	MORTENSON	SW	Closed	8.73	2.87	9.19
17524	PUEBLO	SW	Closed	15.78	5.19	16.62
17525	RAMSEY	SW	Closed	14.27	4.69	15.02
17528	SIERRA VISTA	SW	Closed	11.21	3.69	11.8
17529	SAN SIMON	SW	Closed	5.93	1.95	6.24
17530	ST.DAVID	SW	Closed	4.67	1.54	4.91
17531	STEWART	SW	Closed	4.96	1.63	5.22
17533	TOMBSTONE	SW	Closed	0.99	0.33	1.04
17534	WEBB	SW	Closed	9.35	3.08	9.85
17536	WILLCOX	SW	Closed	9.31	3.06	9.8
17539	CHIRICAHUA	SW	Closed	5.19	1.71	5.46
17550	BONITA	SW	Closed	8.93	2.94	9.4
17551	COTTONWOOD	SW	Open	0	0	0
17600	AVRA VALLEY	SW	Closed	15.94	5.2	16.76
17601	GREEN VALLEY	SW	Closed	15.62	5.13	16.44
17602	MARANA	SW	Closed	20.57	6.79	21.66
17603	SADDLEBROOKE	SW	Closed	16.01	5.25	16.85
17604	THREE POINTS	SW	Closed	11.64	3.78	12.24
17605	VALENCIA	SW	Closed	26.69	8.8	28.11
17606	THORNYDALE	SW	Closed	20.01	6.6	21.07
17607	SAHUARITA	SW	Closed	20.01	6.58	21.06
17610	S.BRKRCH	SW	Closed	9.62	3.16	10.12
17611	BICKNELL	SW	Closed	8.1	2.7	8.54
17612	SANDARIO	SW	Closed	9.4	3.12	9.91
17724	OXIDE PLANT	1	Closed	1.35	0.44	1.42
17736	SAFFORD1	SW	Closed	11.84	3.89	12.46
17737	SAFFORD2	SW	Closed	8.9	2.92	9.37
TOTAL				975.1	320.2	1026

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Light Winter Loads

Number	Name	ID	Status	MW	Mvar	MVA
14223	ROUND VALLEY	SW	Closed	10.07	3.31	10.6
16904	FRISCOT5	PD	Closed	15.52	5.19	16.37
16905	PDM-T1	PD	Closed	15.52	5.19	16.37
16906	PDM-T2	PD	Closed	15.52	5.19	16.37
16907	PDM-T3	PD	Closed	15.52	5.19	16.37
17009	GREENLEE-SWTC	SW	Closed	0.7	0.23	0.74
17045	HACKBERRY	PD	Closed	13.5	4.44	14.21
17150	HEMET	SW	Closed	0.39	0.08	0.4
17151	TONY LAPPOS	SW	Closed	2.29	0.46	2.34
17153	LAKE RIVERSIDE	SW	Closed	0.92	0.19	0.93
17200	ROMNEY	SW	Closed	1.31	0.43	1.38
17301	CACTUS	SW	Closed	2.29	0.75	2.41
17302	CORK	SW	Closed	1.84	0.6	1.94
17304	FREEMAN	SW	Closed	1.5	0.49	1.58
17306	HOOKER	SW	Closed	0.43	0.14	0.45
17309	NEW THATCHER	SW	Closed	1.66	0.55	1.75
17312	SAN JOSE	SW	Closed	2.12	0.7	2.23
17314	THATCHER	SW	Closed	2.64	0.87	2.78
17315	SWIFT TRAIL	1	Closed	1.63	0.54	1.72
17400	AIRPORT	SW	Closed	3.82	1.26	4.02
17401	BILL WILLIAMS	SW	Closed	0.28	0.09	0.3
17403	BIG BEND	SW	Closed	9.07	2.98	9.55
17404	BULLHEAD	SW	Closed	1.83	0.6	1.93
17405	CAMP MOHAVE	SW	Closed	9.02	2.96	9.49
17406	HUALAPAI	SW	Closed	2.45	0.81	2.58
17407	MEDLIN	SW	Closed	10.53	3.46	11.08
17410	SILVER CREEK	SW	Closed	8.08	2.65	8.5
17412	SWAN	SW	Closed	6.27	2.06	6.6
17413	WELLFIELD	SW	Closed	1.56	0.51	1.64
17414	WILLOW VALLEY	SW	Closed	2.83	0.93	2.98
17501	BELLA VISTA	SW	Closed	4.25	1.4	4.47
17502	BENSON	SW	Closed	1.86	0.61	1.96
17503	BOWIE	SW	Closed	1.35	0.44	1.42
17507	COCHISE	SW	Closed	1.95	0.64	2.05
17510	HUACHUCA WEST	SW	Closed	1.88	0.62	1.97
17511	HAWES	SW	Closed	5.89	1.93	6.2
17514	HUACHUCA EAST	SW	Closed	1.78	0.59	1.88
17516	JOHNSON MINE	SW	Closed	0.4	0.13	0.42
17517	KANSAS SETTLEMENT	SW	Closed	2.65	0.87	2.79
17519	KEATING	SW	Closed	3.2	1.05	3.36
17520	MCNEAL	SW	Closed	0.58	0.19	0.61

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17521	MESCAL	SW	Closed	4.05	1.33	4.26
17523	MORTENSON	SW	Closed	2.36	0.78	2.48
17524	PUEBLO	SW	Closed	4.26	1.4	4.49
17525	RAMSEY	SW	Closed	3.85	1.27	4.05
17528	SIERRA VISTA	SW	Closed	3.03	1	3.19
17529	SAN SIMON	SW	Closed	1.6	0.53	1.69
17530	ST.DAVID	SW	Closed	1.26	0.42	1.33
17531	STEWART	SW	Closed	1.34	0.44	1.41
17533	TOMBSTONE	SW	Closed	0.27	0.09	0.28
17534	WEBB	SW	Closed	2.53	0.83	2.66
17536	WILLCOX	SW	Closed	2.51	0.83	2.65
17539	CHIRICAHUA	SW	Closed	1.4	0.46	1.47
17550	BONITA	SW	Closed	2.41	0.79	2.54
17551	COTTONWOOD	SW	Open	0	0	0
17600	AVRA VALLEY	SW	Closed	4.3	1.4	4.53
17601	GREEN VALLEY	SW	Closed	4.22	1.39	4.44
17602	MARANA	SW	Closed	5.55	1.83	5.85
17603	SADDLEBROOKE	SW	Closed	4.32	1.42	4.55
17604	THREE POINTS	SW	Closed	3.14	1.02	3.3
17605	VALENCIA	SW	Closed	7.21	2.37	7.59
17606	THORNYDALE	SW	Closed	5.4	1.78	5.69
17607	SAHUARITA	SW	Closed	5.4	1.78	5.69
17610	S.BRKRCH	SW	Closed	2.6	0.85	2.73
17611	BICKNELL	SW	Closed	2.19	0.73	2.31
17612	SANDARIO	SW	Closed	2.54	0.84	2.68
17724	OXIDE PLANT	1	Closed	0.36	0.12	0.38
17736	SAFFORD1	SW	Closed	3.2	1.05	3.37
17737	SAFFORD2	SW	Closed	2.4	0.79	2.53
TOTAL				270.6	88.86	284.88