

February 2017 ERCOT Monthly Operations Report

Reliability and Operations Subcommittee Meeting

April 6th, 2017

Table of Contents

[1. Report Highlights 2](#_Toc477772776)

[2. Frequency Control 3](#_Toc477772777)

[2.1. Frequency Events 3](#_Toc477772778)

[2.2. Responsive Reserve Events 4](#_Toc477772779)

[2.3. Load Resource Events 4](#_Toc477772780)

[3. Reliability Unit Commitment 4](#_Toc477772781)

[4. Wind Generation as a Percent of Load 5](#_Toc477772782)

[5. Congestion Analysis 5](#_Toc477772783)

[5.1. Notable Constraints for February 5](#_Toc477772784)

[5.2. Generic Transmission Constraint Congestion 7](#_Toc477772785)

[5.3. Manual Overrides for February 7](#_Toc477772786)

[5.4. Congestion Costs for Calendar Year 2017 7](#_Toc477772787)

[6. System Events 8](#_Toc477772788)

[6.1. ERCOT Peak Load 8](#_Toc477772789)

[6.2. Load Shed Events 9](#_Toc477772790)

[6.3. Stability Events 9](#_Toc477772791)

[6.4. Notable PMU Events 9](#_Toc477772792)

[6.5. TRE/DOE Reportable Events 9](#_Toc477772793)

[6.6. New/Updated Constraint Management Plans 9](#_Toc477772794)

[6.7. New/Modified/Removed SPS 9](#_Toc477772795)

[6.8. New Procedures/Forms/Operating Bulletins 9](#_Toc477772796)

[7. Emergency Conditions 9](#_Toc477772797)

[7.1. OCNs 9](#_Toc477772798)

[7.2. Advisories 9](#_Toc477772799)

[7.3. Watches 9](#_Toc477772800)

[7.4. Emergency Notices 10](#_Toc477772801)

[8. Application Performance 10](#_Toc477772802)

[8.1. TSAT/VSAT Performance Issues 10](#_Toc477772803)

[8.2. Communication Issues 10](#_Toc477772804)

[8.3. Market System Issues 10](#_Toc477772805)

[Appendix A: Real-Time Constraints 11](#_Toc477772806)

# Report Highlights

* The unofficial ERCOT peak for February was 42,729 MW.
* There were two frequency events in February. PMU data indicates the ERCOT system transitioned well in each case.
* There was one instance where Responsive Reserves was deployed, which was the result of a frequency event.
* There were two RUC commitments in February.
* The level of reportable SCED congestion increased in February. This congestion was mostly due to planned outages as well as high wind output. There were fifty-one instances over 28 days on the Generic Transmission Constraints (GTCs) in February. There were twenty-one days on the Panhandle GTC, one day on the Valley Import GTC, nine days on the Zorillo to Ajo GTC, seven days on the Bakersfield GTC, and thirteen days on the Liston GTC in February. There was no activity on the remaining GTCs during the Month.
* There were no application issues to report for February.

# Frequency Control

## Frequency Events

The ERCOT Interconnection experienced two frequency events in February, all of which resulted from Resource trips. The average event duration was approximately 0:02:40.

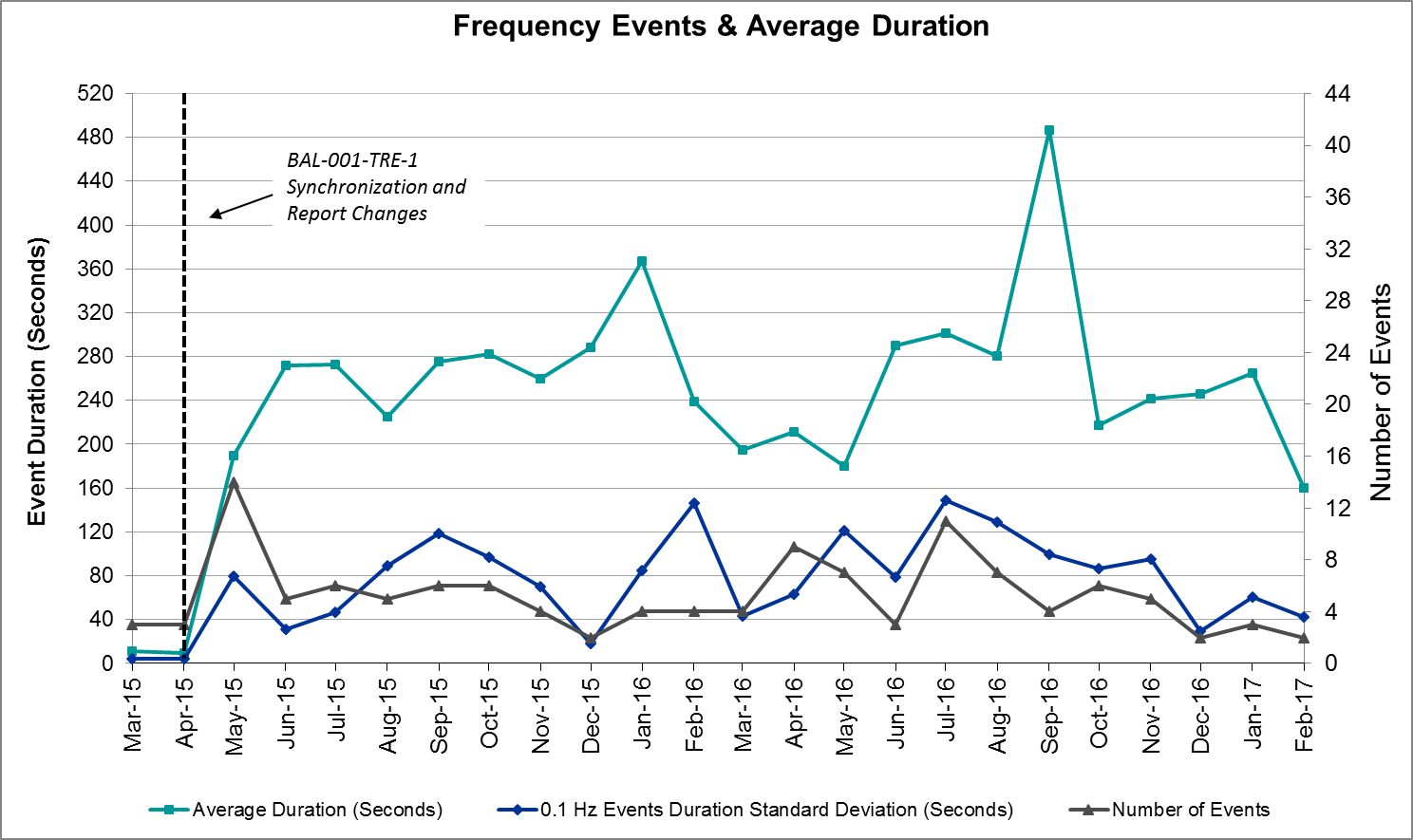
When analyzing frequency events, ERCOT evaluates PMU data according to industry standards. Events with an oscillating frequency of less than 1 Hz are considered to be inter-area, while higher frequencies indicate local events. Industry standards specify that damping ratio for inter-area oscillations should be 3.0% or greater. All events listed below indicate the ERCOT system met these standards and transitioned well after each disturbance.

Reported frequency events will include both frequency events where frequency was outside the range of 60±0.1 Hz as well as those determined to be Frequency Measurable Events (FME) as defined by BAL-001-TRE-1. Delta Frequency is defined as the difference between the pre-perturbation and post-perturbation frequency. The Duration of Event is defined as the time it takes for the frequency to recover to lesser/greater of the frequency at the time of the frequency event (t(0) or “A-point”) for low/high-frequency events, respectively. Further details on FMEs can be found in the MIS posted BAL-001-TRE-1 PDCWG Unit Performance reports. A summary of the frequency events is provided below:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date and Time** | **Delta Frequency** | | **Max/Min Frequency** | | **Duration of Event** | **PMU Data** | | | **Load** | **Wind** | **Inertia1** |
| **(Hz)** | | **(Hz)** | | **Oscillation Mode (Hz)** | **Damping Ratio** | | **(MW)** | **%** | **(MW-s)** |
| 2/13/2017 23:52 | | 0.086 | | 59.91 | 0:03:10 | 0.65 | 7% | 30,776 | | 23% | 173,740 |
| 2/19/2017 22:49 | | 0.055 | | 59.84 | 0:02:10 | 0.80 | 12% | 32,690 | | 20% | 182,283 |

(Note: frequency events highlighted in blue have been identified as FMEs per BAL-001-TRE-1 and the Performance Disturbance Compliance Working group.)

Currently, the Critical Inertia Level for ERCOT is approximately 100,000 MW-s (Source: [link](http://www.ercot.com/content/wcm/key_documents_lists/77622/06.__Inertia_Background_for_ROS.pptx))



## Responsive Reserve Events

There was one event where Responsive Reserve MWs were released to SCED in February. The events highlighted in blue were related to frequency events reported in Section 2.1 above.

|  |  |  |  |
| --- | --- | --- | --- |
| **Date and Time Released to SCED** | **Date and Time Recalled** | **Duration of Event** | **Maximum MWs Released** |
| 2/19/2017 22:49:08 | 2/19/2017 22:55:08 | 0:06:00 | 607.25 |

## Load Resource Events

None.

# Reliability Unit Commitment

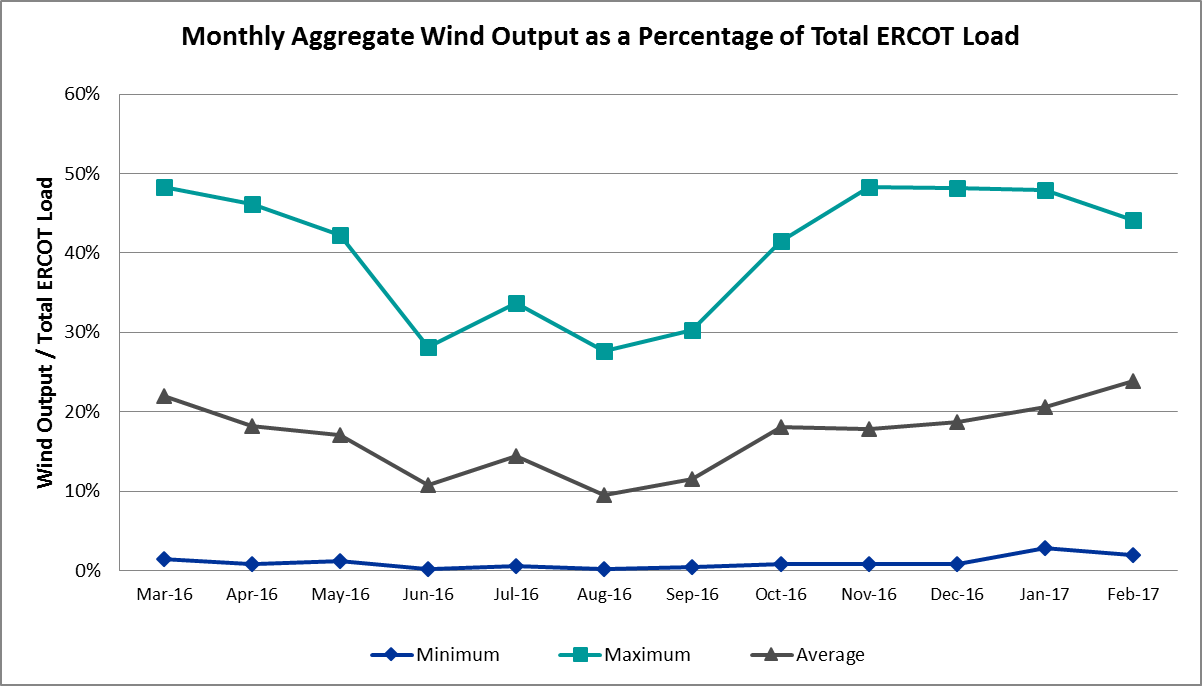
ERCOT reports on Reliability Unit Commitments (RUC) on a monthly basis. Commitments are reported grouped by operating day and weather zone. The total number of hours committed is the sum of the hours for all the units in the specified region. Additional information on RUC commitments can be found on the MIS secure site at Grid 🡪 Generation 🡪 Reliability Unit Commitment.

There were no DRUC commitments in February.

There were two HRUC commitments in February.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Resource Location** | **# of Resources** | **Operating Day** | **Total # of Hours Committed** | **Total MWhs** | **Reason for Commitment** |
| Southern | 2 | 2/27/2017 | 6 | 2,082 | Local Congestion |
| Southern | 1 | 2/28/2017 | 14 | 3,243 | Local Congestion |

# Wind Generation as a Percent of Load



# Congestion Analysis

The number of congestion events experienced by the ERCOT system decreased in February. There were fifty-one instances over 28 days on the Generic Transmission Constraints (GTCs) in February.

## Notable Constraints for February

Nodal protocol section 3.20 specifies that ERCOT shall identify transmission constraints that are active or binding three or more times within a calendar month. As part of this process, ERCOT reports congestion that meets this criterion to ROS. In addition ERCOT also highlights notable constraints that have an estimated congestion rent exceeding $1,000,000 for a calendar month. These constraints are detailed in the table below. Rows highlighted in blue indicate the congestion was affected by one or more outages. For a list of all constraints activated in SCED for the month of February, please see Appendix A at the end of this report.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Contingency Name** | **Overloaded Element** | **# of Days Constraint Active** | **Congestion Rent** | **Transmission Project** |
|
| Crlnw-Lwssw 345kv | Carrollton Northwest - Lakepointe Tnp 138kV | 22 | $9,118,012.88 | 5488 |
| Basecase | PNHNDL GTC | 21 | $3,915,396.49 | Panhandle Upgrade |
| Rns-Rtw & Sng-Tb 345kv | Singleton - Zenith 345kV | 11 | $3,676,812.62 | Houston Import Project |
| Bbses-Jewet 345kv | Trinidad Ses - Richland Chambers 345kV | 1 | $3,672,664.11 | 5480 |
| North Edinburg 345\_1382 345/ | Burns Sub - Rio Hondo 138kV | 2 | $3,031,472.66 |  |
| Rns-Rtw & Sng-Tb 345kv | Singleton - Zenith 345kV | 7 | $2,762,558.22 | Houston Import Project |
| Sng-Tb&Rns 345kv | Singleton - Zenith 345kV | 7 | $2,541,071.17 | Houston Import Project |
| Crlnw-Lwssw 345kv | Lewisville Switch - Jones Street Tnp 138kV | 6 | $1,550,362.24 |  |
| Basecase | BKRSFL GTC | 7 | $1,155,428.61 |  |
| Sndsw-Austro 345kv | Hutto Switch - Taylor West 138kV | 4 | $1,128,588.35 | 5800 |
| Barrilla to Solstice 138 KV | Barrilla - Fort Stockton Switch 69kV | 8 | $1,078,056.00 |  |
| Pleasant Valley Switch Axfmr | Lake Wichita Switch - Wichita Falls 69kV | 3 | $907,373.65 | 06TPIT0042 |
| Basecase | ZO\_AJO GTC | 9 | $394,367.58 |  |
| Jardin to Cotulla Sub (2)138 | Dilley Switch Aep - Cotulla Sub 69kV | 3 | $334,655.49 | 5222 |
| Basecase | LISTON GTC | 13 | $305,002.20 | 5171 |
| Re Roserock Solar Plant to F | Barrilla - Fort Stockton Switch 69kV | 3 | $250,893.54 |  |
| Loyola Sub to Kleberg Aep 13 | Loyola Sub 138/69kV | 7 | $233,474.99 |  |
| Lwssw-Krwsw&Rnksw 345kv | Corinth (Oncor) - Pockrus Substation 138kV | 3 | $228,840.56 |  |
| Mercers Gap Sw to Comanche S | Camp Bowie (Oncor) - Brownwood Switch 138kV | 16 | $175,925.95 | 5713 |
| Asphalt Mines to Blewett (3) | Hamilton Road - Maverick 138kV | 5 | $96,652.47 | 16TPIT0024 |
| Basecase | Randado Aep - Zapata 138kV | 8 | $40,865.69 |  |
| Fort Stockton Plant 138\_69t1 | Solstice - Pig Creek Tap 138kV | 14 | $35,425.79 | 3705 |
| Basecase | Wkn\_Bkr - Ena Snyder Wind 69kV | 7 | $21,064.80 |  |
| Sndsw-Austro 345kv | Taylor West - Taylor (Oncor) 138kV | 5 | $19,039.39 | 5800 |
| Sandow Switch Axfmr1h-H (3) | Sandow Switch 345/1kV | 6 | $6,131.96 | 5625 |
| Scurry Switch to Sun Switch | Wolfgang - Rotan 69kV | 3 | $1,586.86 |  |
| Laquinta to Lobo 138 KV | Bruni Sub 138/69kV | 3 | $1,010.38 | 5529 |

## Generic Transmission Constraint Congestion

There were twenty-one days on the Panhandle GTC, one day on the Valley Import GTC, nine days on the Zorillo to Ajo GTC, seven days on the Bakersfield GTC, and thirteen days on the Liston GTC in February. There was no activity on the remaining GTCs during the Month.

Note: This is how many times a constraint has been activated to avoid exceeding a GTC limit, it does not imply an exceedance of the GTC occurred or that the GTC was binding.

## Manual Overrides for February

None.

## Congestion Costs for Calendar Year 2017

The following table represents the top twenty active constraints for the calendar year based on the estimated congestion rent attributed to the congestion. ERCOT updates this list on a monthly basis.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Contingency** | **Binding Element** | **# of 5-min SCED Intervals** | **Estimated Congestion Rent** | **Transmission Project** |
| Hcksw-Allnc&Rnksw 345kv | Wagley Robertson - Summerfield 138kV | 1,429 | $20,785,800.16 |  |
| Crlnw-Lwssw 345kv | Carrollton Northwest - Lakepointe Tnp 138kV | 2,787 | $11,982,271.80 | 5488 |
| Victoria-V\_Dupsw 138kv | Formosa - Lolita 138kV | 222 | $5,906,733.06 |  |
| Basecase | Panhandle GTC | 5,230 | $5,089,207.63 | Panhandle Upgrade |
| Roserock Solar to Fort Stockton 138 kV | Barrilla - Fort Stockton Switch 69kV | 719 | $4,768,320.64 |  |
| Rns-Rtw & Sng-Tb 345kv | Singleton - Zenith 345kV | 2,200 | $4,146,353.19 | Houston Import Project |
| Rns-Rtw & Sng-Tb 345kv | Singleton - Zenith 345kV | 1,806 | $3,977,069.64 | Houston Import Project |
| Bbses-Jewet 345kv | Trinidad Ses - Richland Chambers 345kV | 31 | $3,672,664.11 | 5480 |
| North Edinburg 345\_1382 345/138 KV | Burns Sub - Rio Hondo 138kV | 221 | $3,031,472.66 |  |
| Sng-Tb&Rns 345kv | Singleton - Zenith 345kV | 744 | $2,541,071.17 | Houston Import Project |
| Twin Buttes AT2H 345/138 kV | San Angelo Red Creek T1H 345/13.2/138kV | 46 | $2,061,790.34 | 3664 |
| Crlnw-Lwssw 345kv | Lewisville Switch - Jones Street Tnp 138kV | 413 | $1,892,190.87 |  |
| Basecase | Bakersfield GTC | 753 | $1,155,428.61 |  |
| Sndsw-Austro 345kv | Hutto Switch - Taylor West 138kV | 808 | $1,128,588.35 | 5800 |
| Barilla to Solstice 138 kV | Barrilla - Fort Stockton Switch 69kV | 437 | $1,124,411.33 |  |
| Jewet-Sng 345kv | Gibbons Creek - Singleton 345kV | 315 | $1,102,507.70 | Houston Import Project |
| Pleasant Valley Switch Axfmr1-H 138/69 KV | Lake Wichita Switch - Wichita Falls 69kV | 351 | $907,373.65 | 06TPIT0042 |
| Sandow Switch to Austrop 345 KV | Sandow Switch - Austrop 345kV | 484 | $663,530.94 | 5625, 4477 |
| Leg-Navarro 345kv | Trinidad Ses - Richland Chambers 345kV | 42 | $660,556.45 | 5480 |
| Loyola Sub to Kleberg Aep 138 KV | Loyola Sub 69\_1 138/69kV | 1,481 | $613,649.92 |  |

# System Events

## ERCOT Peak Load

The unofficial ERCOT peak load for the month was 42,729 MW and occurred on February 16th during hour ending 08:00.

## Load Shed Events

None.

## Stability Events

None.

## Notable PMU Events

ERCOT analyzes PMU data for any significant system disturbances that do not fall into the Frequency Events category reported in section 2.1. The results are summarized in this section once the analysis has been completed.

There were no reportable events in February.

## TRE/DOE Reportable Events

None.

## New/Updated Constraint Management Plans

None.

## New/Modified/Removed SPS

* Mitchell Bend SPS was activated on February 28, 2017.

## New Procedures/Forms/Operating Bulletins

None.

# Emergency Conditions

## OCNs

None.

## Advisories

|  |  |
| --- | --- |
| **Date and Time** | **Description** |
| 2/11/17 12:50 | Advisory issued due to delay in DAM solution. |
| 2/18/17 14:45 | Advisory issued due to Physical Responsive Capability being below 3000 MW. |

## Watches

|  |  |
| --- | --- |
| **Date and Time** | **Description** |
| 2/11/17 18:05 | Watch issued due to RUC not completing on schedule. |

## Emergency Notices

None.

# Application Performance

## TSAT/VSAT Performance Issues

None.

## Communication Issues

None.

## Market System Issues

None.

# Appendix A: Real-Time Constraints

The following is a complete list of constraints activated in SCED for the month of February. Full contingency descriptions can be found in the Standard Contingencies List located on the MIS secure site at Grid 🡪 Generation 🡪 Reliability Unit Commitment.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Contingency** | **Constrained Element** | **From Station** | **To Station** | **# of Days Constraint Active** |
| DCRLLSW5 | 591\_\_A | LKPNT | CRLNW | 22 |
| BASE CASE | PNHNDL | n/a | n/a | 21 |
| SZEPCMN8 | 670\_\_B | BRNSW | CMPBW | 16 |
| SZEPCMN8 | 670\_\_B | CMPBW | BRNSW | 16 |
| XFTS89 | PIGTAP\_SOLSTI1\_1 | SOLSTICE | PIGTAP | 14 |
| XFTS89 | PIGTAP\_SOLSTI1\_1 | PIGTAP | SOLSTICE | 14 |
| BASE CASE | LISTON | n/a | n/a | 13 |
| DRNS\_TB5 | SNGZEN98\_A | SNG | ZEN | 11 |
| BASE CASE | ZO\_AJO | n/a | n/a | 9 |
| SBARSOL8 | BARL\_FTSW1\_1 | FTSW | BARL | 8 |
| BASE CASE | RANDAD\_ZAPATA1\_1 | RANDADO | ZAPATA | 8 |
| DRNS\_TB5 | SNGZEN99\_A | SNG | ZEN | 7 |
| SKLELOY8 | LOYOLA\_69\_1 | LOYOLA | LOYOLA | 7 |
| BASE CASE | BKRSFL | n/a | n/a | 7 |
| BASE CASE | SNYDER\_WKN\_BK1\_1 | ENAS | WKN\_BKR | 7 |
| DSNG\_TB5 | SNGZEN99\_A | SNG | ZEN | 7 |
| DCRLLSW5 | 590\_\_A | LWSSW | LWVJS | 6 |
| XSND58 | SNDSW\_MR2H | SNDSW | SNDSW | 6 |
| SBRAUVA8 | HAMILT\_MAVERI1\_1 | HAMILTON | MAVERICK | 5 |
| DAUSSND5 | 1665\_\_B | TAYLR | TLRWT | 5 |
| DAUSSND5 | 1665\_\_A | TLRWT | HUTTO | 4 |
| DAUSSND5 | 1665\_\_A | HUTTO | TLRWT | 4 |
| BASE CASE | LGD\_SANTIA1\_1 | LGD | SANTIAGO | 4 |
| DLWSRNK5 | 570\_B\_1 | POCKRUSC | CRNTH | 3 |
| XPLV89 | 6945\_\_A | LKWSW | WFALS | 3 |
| SSCUSU28 | ROTN\_WOLFGA1\_1 | WOLFGANG | ROTN | 3 |
| DAUSSND5 | HWRDLN\_1 | HWRDTP | HWRDLN | 3 |
| SWCSBOO8 | BARL\_FTSW1\_1 | FTSW | BARL | 3 |
| SJARDIL8 | DIL\_COTU\_1 | DILLEYSW | COTULAS | 3 |
| SLAQLOB8 | BRUNI\_69\_1 | BRUNI | BRUNI | 3 |
| SWOORI38 | TNAF\_FTS\_1 | FTST | TNAF | 2 |
| SWOORI38 | TNAF\_FTS\_1 | TNAF | FTST | 2 |
| SCRDLOF9 | BOW\_FMR1 | BOW | BOW | 2 |
| SCABWES8 | HOLLY4\_RODD\_F1\_1 | RODD\_FLD | HOLLY4 | 2 |
| DAUSSND5 | 216T421\_1 | ELGSW | GILLCR | 2 |
| SNEDLON5 | MV\_YUT\_RAYMND1\_1 | RAYMND2 | MV\_YUTT | 2 |
| DNAVLEG5 | 31\_\_A | RCHBR | TRSES | 2 |
| DHILMAR5 | 581T581\_1 | ECMORN | PARKWA | 2 |
| SCOLBAL8 | BALG\_HUMBLT1\_1 | BALG | HUMBLTAP | 2 |
| XNED258 | BURNS\_RIOHONDO\_1 | RIOHONDO | MV\_BURNS | 2 |
| SBIGOR45 | FRIR\_ROCKSP1\_1 | FRIR | ROCKSPRS | 2 |
| SN\_SLON5 | KINGSV\_KLEBER1\_1 | KLEBERG | KINGSVIL | 2 |
| SNORODE5 | PIGTAP\_SOLSTI1\_1 | SOLSTICE | PIGTAP | 2 |
| SSPUASP8 | ROTN\_WOLFGA1\_1 | WOLFGANG | ROTN | 2 |
| DBBSJEW5 | 31\_\_A | RCHBR | TRSES | 1 |
| SHACPB38 | RIOPEC\_WOODW21\_1 | WOODWRD2 | RIOPECOS | 1 |
| SSWDMGS8 | 6585\_\_A | ESKSW | TRNT | 1 |
| SGEOGEO8 | MAT\_MAT\_1 | MATHIS | MATHI\_ST | 1 |
| SMCEABS8 | ROBY\_RONDTP1\_1 | ROBY | RONDTPT | 1 |
| BASE CASE | VALIMP | n/a | n/a | 1 |
| SSCLWF18 | 6840\_\_B | NVKSW | ANARN | 1 |
| DLONOR58 | ARMSTR\_LOYOLA1\_1 | ARMSTRON | LOYOLA | 1 |
| DLWSRNK5 | 587\_\_A | ARGYL | LWSVH | 1 |
| SZEPCMN8 | 670\_\_C | CMPBW | BRNSO | 1 |
| DNEDPAL8 | AZTECA\_SE\_EDI1\_1 | AZTECA | SE\_EDINB | 1 |
| SBIGTWI5 | BONDRO\_SONR1\_1 | SONR | BONDROAD | 1 |
| SDUKNED8 | DUKE\_NEDIN2\_1 | DUKE | NEDIN | 1 |
| DHARSKY8 | F4\_Y3\_1\_1 | F4 | Y3 | 1 |
| SHLC6S8 | LY\_PSA03\_A | PSA | LY | 1 |
| SLOBSA25 | NLARSW\_PILONC1\_1 | NLARSW | PILONCIL | 1 |
| SSPUMW18 | ROTN\_WOLFGA1\_1 | WOLFGANG | ROTN | 1 |
| DELMSAN5 | SANMIGL\_ATAH | SANMIGL | SANMIGL | 1 |
| DELMSAN5 | SANMIGL\_ATAL | SANMIGL | SANMIGL | 1 |
| DAUSSND5 | SNDSW\_MR1H | SNDSW | SNDSW | 1 |
| SN\_SLON5 | CELANE\_N\_SHAR1\_1 | N\_SHARPE | CELANEBI | 1 |
| SMCEABS8 | 6585\_\_A | ESKSW | TRNT | 1 |
| DWAPHLJ5 | DOWSTP27\_A | STP | DOW | 1 |
| DB\_DPHA8 | HOLLY4\_RODD\_F1\_1 | RODD\_FLD | HOLLY4 | 1 |
| SLOBSA25 | BRUNI\_69\_1 | BRUNI | BRUNI | 1 |
| BASE CASE | POTOMES\_1 | LNCRK2 | LNCRK2 | 1 |
| BASE CASE | SMS\_SPUR\_1 | SPUR | SMS\_SW\_9 | 1 |
| DAUSSND5 | 1261\_\_C | MNRVA | MILANO | 1 |
| DB\_DAIR8 | AIRLIN\_CABANI1\_1 | AIRLINE | CABANISS | 1 |
| DELMSTP5 | CKT\_3124\_1 | STP | HLJ | 1 |
| XLOB58 | FREER\_SAN\_DI1\_1 | SAN\_DIEG | FREER | 1 |
| DJEWSNG5 | JK\_TOKSW\_1 | TOKSW | JK\_CK | 1 |
| SSCLWF18 | NVKSW\_FMR1 | NVKSW | NVKSW | 1 |
| SRCHTRS5 | 31\_\_A | RCHBR | TRSES | 1 |